TeachME PROFESSIONAL DEVELOPMENT
CEU's for Teachers and Educators

Helping Learners Prepare for the GED

The Adult Learner

The GED® Student

As an adult educator, it is important that you have a basic understanding of the adult learner. If you understand the adult learner, you will be able to develop a learning environment that is supportive and yields the greatest measure of success for your students.

Set the right tone in your GED® classroom. You want to create an environment that welcomes and encourages your students. Remember, many adult students experience anxiety and even fear when beginning a GED® program. It is important that you understand that many adult students do not associate education with positive, inspiring experiences, but rather with negative experiences that often resulted in frustration and failure. The first class meeting is the single most critical time for you, as the instructor, to engage the learner and assist him/her in successfully completing the GED® process.

Characteristics of the GED® Student

It is important to be aware of what historic and social background learners bring with them to the classroom, how each student learns best, and what each student desires from the program. GED® students arrive in your classroom with many different skills and experiences. The following information identifies some of the basic characteristics of adult education students.

Adult students bring their varied pasts with them, including:

- History of successes and failures from early in life, school, the military, employment, family, marriage, and interpersonal relationships
- Different qualities of experiences with education, educational institutions, and learning with both positive and negative thoughts and feelings about school
- Different cultural, ethnic, gender, and religious values and norms
- Differing intellectual abilities
- Ingrained "school habits" and ideas about what school is or should be like

Adult students bring differing situations to the classroom, including:

- Differences in their careers
- Different stages in their personal life, e.g. family, job, and other responsibilities may take precedence over school
- Harmonious home environments or those of conflict and extreme stress
- Differing communication skills (verbal, written, and psychomotor skills)

Students have different reasons for attending school, such as:

- Securing a high school diploma
- Transitioning to postsecondary education and training
- Obtaining employment
- Improving skills to upgrade employment or status in life
- Acquiring desired knowledge to improve their personal lives
- Meeting family's or friends' goals
- Building self-confidence and motivation

Adult students may also lack confidence in:

- Their own capabilities and life skills in general
- Their specific ability to learn because they may expect to fail
- Their ability to learn specific subject areas such as math, science, or writing skills
- Their ability to use computers and other technology
- Their skills in academics and the testing required by the GED® program
- The ability of the educational system to be a caring and helpful place

Working with the adult learner is an extremely rewarding and challenging experience. It is important that you recognize the wealth of life experiences that each student brings to your classroom.

The GED® Classroom

The master GED® instructor understands the challenges of teaching the adult learner. The learning environment must be flexible with a variety of instructional approaches geared to meet the characteristics and personal goals of each student.

Adult students generally prefer that educational environments:

- Provide an opportunity to relate new learning to their past and present experiences
- Focus on real-world problems and life situations with practical strategies to address these issues
- Assist them in obtaining the skills necessary to be successful in their chosen career pathway
- Emphasize how learning can be applied to today's workplace
- Provide learning experiences differently than the system they experienced as a child
- Be related to their own goals
- Provide appropriate support, direction, and structure
- Allow debate and the challenging of ideas
- Listen to and respect their opinions
- Encourage them to be resourceful and share experiences with others
- Provide for differences in learning style, cultural background, gender differences, social/economic concerns, and age factors
- Care about them as individuals and treat them as adults

Effective GED® Programs

The GED® instructor needs to understand the challenges of being an adult learner. Each adult learner has different characteristics and goals. However, each student has a reason for enrolling in a GED® class and wants to succeed. It is the goal of the instructor to find that which can help each student be successful in obtaining a GED® diploma.

Effective GED® or adult education programs share four key characteristics. The successful program provides a curriculum that uses:

- Learner experiences
- Learner involvement
- Learner choices
- Real-life experiences with an emphasis on application over theory

Adult learners do learn differently than children. Generally, adult students learn best when:

- Learning is voluntary
- They are actively involved in:
    - Decision-making processes regarding what they wish to learn
    - Interactive learning experiences
- They know what is expected of them and why

- They believe that the skills they are gaining will benefit them in all areas of their life
- Their questions are answered without embarrassment
- They receive sincere praise
- They can acquire a sense of accomplishment in their achievements
- The social and physical setting is adult oriented
- They are competent readers
- They know their instructor is there to help them achieve their goals and is individualizing instruction to meet their specific needs
- The instructor engages in multiple teaching techniques and is actively involved with the students
- The instructor understands adult learners, establishes a supportive learning climate, accepts others' ideas, and is an active listener
- The classroom uses technology to prepare students for the real world

A GED® classroom is different from the K-12 programs that students once attended. The successful GED® classroom:

- Places the student as the primary person in the classroom
- Provides an adequate needs assessment of the student's academic levels, learning style, career planning, and individual goals
- Designs a program to meet individual workplace and personal goals
- Integrates a contextualized approach to learning that fosters teamwork skills
- Changes to ensure that current trends, research-based practices, and state-of-the-art technology are continuously integrated into the learning process
- Develops collaborative workplace and community partnerships
- Provides positive marketing and public relations
- Uses research-based instructional strategies
- Provides a structure based on the learner's experiences, involvement, goals, and needs for being successful in a global economy

Helping Students Become Better Learners

The primary goal of the GED® instructor is to help students become better learners. To do this most effectively, the instructor must incorporate strategies and activities that emphasize active rather than passive learning. A key to getting and keeping students actively involved in learning is an understanding of each individual's learning style preference. Learning style is the manner in which a person thinks or learns.

Four primary perceptual learning styles or ways of receiving information are:

1. Visual
2. Aural
3. Read/write
4. Kinesthetic

The **visual learner** learns through seeing. This learner prefers to learn through written materials or visual materials. Pictorial descriptions, videos, charts, graphs, and illustrations are important to use with the visual learner.

The **aural learner** learns through listening. This learner prefers to learn by discussions, tutorials, making presentations, or through hearing information. Often tape recorders are a helpful tool for the auditory learner.

The **read/write learner** has a strong preference for learning by reading and writing. This learner prefers to learn by reading materials, such as textbooks, handouts, PowerPoint slides, manuals, and then writing the information through lists or notes (often verbatim). Read/write learners prefer instructors who use words well and have lots of information in sentences and notes. Many instructors are read/write learners and teach to this strength.

The **kinesthetic learner** learns by doing and through his/her senses. This learner prefers to learn with a hands-on approach. Movement, music in the background, labs, field trips, trial and error methods, and use of real-world examples and exhibits are good teaching techniques for this type of learner.

Being aware of the diverse learning styles of adult students is one of the most important things an instructor can know. If an instructor uses only one teaching style, that instructor has excluded many students from learning in the classroom. It is important that every instructor recognize the importance of identifying the learning style of each student and make necessary adjustments in teaching strategies, resources, and materials to address those learning styles.

Resources

Learning Style Inventories

Although there are many different resources on learning styles, the following are a few to get you started, including the VARK.

- VARK: a guide to learning styles
  http://vark-learn.com/

- Barsch Learning Style Inventory
  https://valenciacollege.edu/east/academicsuccess/spa/BarschLearningStyles.cfm

  http://windward.hawaii.edu/trio/forms/participant_inventories.pdf

- Dr. Richard Felder (NC State University). Learning Styles Survey
  http://www.engr.ncsu.edu/learningstyles/ilsweb.html

- Kiersey Temperament Sorter II (no charge for summary; small fee for full report) http://www.keirsey.com/

- Learning Styles Inventory http://www.ldpride.net/learning-style-test.html

- Learning-Styles-Online.Com http://www.learning-styles-online.com/overview/

Teaching Styles – What's My Style?

The GED® instructor fills many roles in the classroom. Typically students expect instructors to assume several different roles, such as:

- Diagnostician and Process Planner (determines the areas of student strengths and weaknesses and then creates or assigns exercises that serve as the focus for a learning activity)
- Facilitator (creates a setting in which students will be comfortable sharing their ideas)
- Consultant (provides or points the way to relevant information)
- Quality Controller (redirects students who may be stuck, need help evaluating their strategies and solutions, or pursuing unproductive or unrealistic approaches to their problems)

How each instructor fills these varied roles is based on their teaching style. Each of us develops a teaching style based on our beliefs about what constitutes good teaching, personal preferences, our abilities, and the norms of our particular discipline. Some instructors believe classes should be instructor-centered, where the instructor is an expert and authority in presenting information. Others take a learner-centered approach, viewing their role as more of a facilitator of student learning. Although most of us have a dominant, preferred teaching style, an effective GED® instructor combines elements of different teaching styles. If you wish to take a more open approach to your teaching, a blended approach is the most effective.

Personal Teaching Style Inventory

Numerous teaching style inventories exist. The questions they ask and the criteria they use reflect the author's particular philosophy. Rather than limiting your perspectives, a variety of these inventories are available for you to explore either by participating in an online response form or downloading a print-based survey.

- **Develop a draft of your philosophy of teaching:** Create a statement that synthesizes what you think is effective teaching.
- **Take a survey:** Select a survey from the following list and complete it.
- **Share and compare:** Once you've finished and analyzed your results, share and compare them with a member of your cohort, your mentor, or a colleague.

- **Examine and integrate:** The final step is to revisit your Philosophy of Teaching statement and check for discrepancies between what you've stated as your belief and what you've found in the inventory results. If necessary, rethink your teaching statement and rewrite it to integrate the elements you have determined to be critical to an effective teaching-learning environment.

Resources

The following are samples of different teaching style inventories for you to explore:

- CORD Teaching Styles Inventory
  http://www.texascollaborative.org/tools/TSI.pdf

- Grasha-Reichmann
  http://www.longleaf.net/teachingstyle.html

- Multiple Intelligences Teacher Inventory
  http://jeffcoweb.jeffco.k12.co.us/high/wotc/confli3.htm

- Teaching Perspectives Inventory
  http://www.teachingperspectives.com/tpi/

Why Do I Need to Know About the Adult Learner?

Most adult learners in your classroom have a practical reason for their return to the educational system. Often, this goal is to obtain a high school diploma as quickly as possible. To be most effective, the GED® instructor must be knowledgeable about the five major academic areas of the GED® tests and about the adult learner. Having a solid understanding of how the adult learns and what styles of learning an individual uses will assist the GED® instructor in providing the best educational setting possible.

The Multi-Generational Classroom

Who Are Our Students?

When most of us think of an adult education classroom, the "traditional" student comes to mind. However, what is a "traditional" student? In today's educational environment, there really is no such thing as a "typical" adult education student.

In today's classroom, you will encounter students from many different generations. According to Strauss and Howe (1997)—pioneers in the field of generational studies—a generation shares a time and space in history, leading to similar life experiences and a collective personality.

There are at least four generations in both the modern American workforce and our adult education classrooms:

- Traditionalists (1927-1944)
- Baby Boomers (1945–1964)
- Generation X (1965–1982)
- Millennials (1982-mid 2000)

Each generation has certain characteristics inherent in most members of the cohort. Although there are differences, the following table provides you with an at-a-glance view of each generation.

	Traditionalists (1927-1945)	Baby Boomers (1945–1964)	Generation X (1965–1982)	Millennials (1982-mid 2000)
Profile	• Hard work • Loyal employee • Sacrifices for the company • Thrifty • Conforms	• Workaholic • Optimistic • Crusades causes • Success = materialism • Works efficiently	• Work-life balance • Independent • Lives for today • Distrusts companies • Bends rules if needed	• What's next? • On my terms • Civic minded • Earns to spend • Questions the status quo
Defining Events	• 1937 Hindenburg tragedy • 1937 Disney's first animated feature (Snow White) • 1941 Hitler invades Russia • 1941 Pearl Harbor; U.S. enters World War II • 1945 World War II ends in Europe and Japan • 1947 Jackie Robinson joins major league baseball • 1950 Korean War begins	• 1954 First transistor radio • 1962 John Glenn circles the earth • 1963 Martin Luther King, Jr. leads march on Washington • 1963 President Kennedy assassinated • 1965 U.S. sends troops to Vietnam • 1966 Cultural Revolution in China begins • 1967 World's first heart transplant • 1969 U.S. moon landing • 1969 Woodstock • 1970 Women's liberation demonstrations	• 1973 Global energy crisis • 1976 Tandy and Apple market PCs • 1979 Margaret Thatcher becomes first female British Prime Minister • 1980 John Lennon killed • 1981 AIDS identified • 1986 Chernobyl disaster • 1986 Challenger disaster • 1987 Stock market plummets • 1989 Exxon Valdez oil spill • 1989 Berlin Wall falls • 1989 Tiananmen Square uprisings	• 1993 Apartheid ends • 1995 Bombing of Federal building in Oklahoma City • 1997 Princess Diana dies • 1998 Clinton impeachment • 1999 Columbine High School shootings • 2001 World Trade Center attacks • 2002 Enron, WorldCom and corporate scandal • 2003 War begins in Iraq • 2004 Tsunami in the Asian Ocean • 2005 Hurricane Katrina
Technology of the Era	Radio	Television	Personal computer	The Internet
Approach to Learning	Tell Me What to Do	Show Me What to Do	Why Do I Need to Learn This?	Connect Me to What I Need

Engaging with multigenerational students requires that you find ways to bridge "generational gaps" that may be present. While one cannot generalize, members of the Traditionalist and Baby Boomer generations may be skeptical of new information and technology, yet seek education that applies directly to their professional or vocational needs. While they may be proficient in technology, they may also require reassurance that they will succeed in new educational endeavors.

Generation Xers and the Millennials, on the other hand, are future-oriented and highly proficient in social networking and technology. They take education more for granted and are confident about professional success but may accept information uncritically as fact.

Because generational differences can impact learning, it is important that you determine "who" is in your classroom. One strategy to working with a multigenerational classroom is to use the **MEET** approach (VisionPoint, 2006):

- **M:** Make time to discuss
- **E:** Explore differences
- **E:** Encourage respect
- **T:** Take responsibility

When used in the classroom, **MEET** can assist you and your students in minimizing generational conflict and strengthening collaboration among all students – an important skill in postsecondary education and the workplace.

Remember, good teaching practices are good teaching practices regardless of the generation being taught. However, there are some strategies and techniques that work better for learners of certain ages based on generational differences.

The following chart provides some basic preferences/styles and the types of instructional activities that work best with the different generations in your classroom.

Classroom Implications for Different Generations

Generation	Preferences/Styles	Instructional Activities
Traditionalists	• Like the "traditional" classroom structure • Will not generally contradict or disagree with instructor in front of others • Does not enjoy being singled out in group discussions or for questions • Likes to practice alone, not in groups • Not likely to ask questions during discussions	• Organize materials in bullet/outline form • Don't provide too much information • Use at least 12 point type • Take your time through the important points • Don't assume that all are technophobic give computer/research assignments • Fastest growing segment of population learning to use the Internet • Encourage periodic movement during class time
Boomers	• Enjoy working in creative manner • Sensitive to criticism • Often possess significant professional experiences • Require significant interaction and "talk" time • Enjoy icebreaker and introduction activities • Prefer a spirit of collegiality in classroom • May have problems with authoritarian instructors	• Give plenty of time for Boomers to practice new skills alone • Use at least 12 point type for aging boomers • Have a tendency to "know" things but not be able to do them • Do not generally like role-play exercises • Enjoy most team projects • Can serve as group leaders, appealing to their "me" focus • Organize materials with headings/put details on a separate sheet
Gen Xer	• Self-reliant • Require regular, if not constant, feedback • May lack interpersonal skills • Can be cynical • Require relevance in assignments and courses • Often impatient • Consider themselves technologically capable • Are adaptable and informal	• School/life balance is important • Will resist group work outside of class • Use pop-culture examples if possible • Give lots of individual attention • Use most exciting material in short lecture (15-20 min) • Use small groups to cover other material • Use bullet points when giving information • Use plenty of graphics and white space/visual appeal is key • Explain why assignments, courses, skills are important on a regular basis

Millennials	• Accustomed to group work • Comfortable with active learning • Multi-task with ease • Technological experts • Goal and achievement oriented • Require more structure and mentoring • Learn from failure • Motivated by money and earning potential	• Give lots of activities with several steps • Use the most up-to-date technology and references available • Get creative or allow them to be creative with presentations, etc. • Give reading materials for lectures or supplemental information

Who Are the Millennials?

Because they are the newest generation to enter our adult education programs, it is important to better understand who the Millennials are. The millennial generation is the generation of children born between 1982 and 2002. A generation larger than those of us who are Baby Boomers, the Millennials have different characteristics than any generation before them.

Millennials are the most racially and ethnically diverse generation in U. S. history. One in four grew up in a single-parent household. They saw new examples of family and the workplace.

Students in your program who are Gen Xers grew up in the era of Sesame Street, whereas Millennials were raised with interactive education television. They have the expectation that education will also be entertaining.

Millennials have been highly protected and sheltered. They are also extremely team-oriented while also being pressured to succeed. Millennials have grown up in the world of high-stakes testing. Confident, they expect to advance rapidly in the workplace and to be successful in everything they do. A Millennial will support his/her case with you of why a grade or assignment is not appropriate. Due to their diversity, Millennials are accepting of lifestyle, racial, and ethnic differences.

In the classroom, Millennials expect technological processes that provide convenient, any-time, anyplace, replies to their questions. They grew up “googling.” To learn more, review the following chart on the core traits of Millennials and how the way in which they were raised impacts your adult education classroom.

Overview of the Millennials

	Core Traits	Educational Implications	Teaching Strategies
Special and Sheltered	• Political and social focus on children • Children are seen and heard • Columbine, campus shootings, abductions	• Helicopter parents • No Child Left Behind = progress carefully and regularly monitored, problems dealt with promptly or preemptively • Entitlement, comfortable asking for special treatment	• Develop relationships with students using internet communication such as Blackboard and email • Develop social interactions and interpersonal skills • Provide immediate feedback and reinforcement • Clarify expectations up front, provide structure, set ground rules • Use smaller projects and assignments rather than one-time sink-or-swim exams
Confident	• Self-esteem movement • Grown up feeling loved • Possibilities of fame and success enhanced with reality shows, My Space, YouTube, but higher rates of depression and anxiety	• Difficulty accepting criticism • Unrealistic expectations about college and professional work • Personal individuality, lack of need for the approval of others	• Communicate that they are better achievers • Recognize that they are multi-taskers • Provide specific feedback • Develop mentoring activities • Develop clear expectations, clear grading policies, stick to them • "Dignify errors," give positive feedback with criticism
Pressured	• High expectations • Increased competition for grades, schools, jobs • Highly scheduled, structured childhoods • Increased demands for time • More depression and anxiety	• Bottom-line learners • "More knowledgeable but less creative" • External reward focus can lead to cheating/plagiarism	• Understand that they are stressed and avoid overloading with a number of projects • Avoid long lectures • Use breaks and experiential learning • Realize that they have short attention spans • Define and support academic integrity

	• "Adulthood shock"		• Show meaning of content and learning • Provide smaller and more frequent vs. high-stakes assignments • Keep in touch with students about grades/assignments
Achieving	• Believe that it's cool to be smart • Internships rather than summer jobs • Double majors, concurrent degrees • Appealing an "A-" • Planning for the future	• Anxious about grades • External validation • Demand for high academic standards • Conformity results in "teaching to the test" • Increased competition means fewer rewards for creativity	• Use software and other digital devices • Use straight-forward objectives and grading system • Realize that they learn experientially and need feedback • Use latest trends and media information • Provide real-world application • Reward creativity
Techno-logically Savvy	• Immersed in technology • Informed about the world around them • Multi-taskers	• Students in 8 "places" at once • Shorter attention spans • Low tolerance for older technologies • Information gathering skills rather than analytical skills	• Use technology • Give students information with multi-tasking in mind • Control the use of technology, don't be afraid to say no • Teach students to use technology wisely
Team-Oriented	• Technological networking • Project-based nature of work & school • Groups with a mixture of genders/ethnicities /races is common	• Tolerance of differences • Lack of tolerance for disengaged teaching • Struggles with critical peer review	• Recognize that students are more diverse and that they seek interaction with different cultures • Provide opportunities for cooperative learning, group projects • Develop group projects in a way that ensures individual accountability • Integrate community-engaged teaching, real-life projects in the curriculum

			• Start with focused projects/assignments and gradually move towards more open-ended work
Anti-autocratic	• Informality of life/work • The Bill Gates success story (casual, young, no name, college dropout) • Community-generated knowledge (workplace projects, Wikipedia) • Lack of respect for central authority	• Less need for others' approval • Less respect for authority • Blurred lines about who owns knowledge	• Establish ground rules of discussion, role of instructor, behavior • Get students involved in class structure • Make students accountable to each other, peer grading • Treat students as "junior colleagues" • Give students ample opportunities to contribute • Treat them with respect

Implications for the Classroom

The era in which you grew up has helped to shape your expectations for the classroom. The key thing to remember is that learning preferences don't necessarily change with age. Millennials who are comfortable with multi-tasking and multi-media will always be comfortable with these things and are not likely to change. Traditionalist learners will always be more comfortable with lectures and with the instructor in a traditional teaching style, rather than a more participatory style that appeals to Millennials and Boomers. Generation X learners will always prefer individual work to group work and will generally complain the loudest when given a 20 chapter book to read. Conversely, members of the Millennial generation are readers, as evidenced by the increase in the publication of children's books (i.e., Harry Potter).

What Will Work For You?

There are some tips that will work for everyone. The following are strategies that will work for all students, regardless of the generation into which they were born.

- Ask for professional experiences from both Boomers and Xers
    - Boomers will often want to talk about their professional experience
    - You may need to encourage Xers to share, but the tendency of Xers to change jobs more frequently than past generations should give the older Xers a solid base from which to explain their experiences
- Change activities often
    - Research currently shows the attention span of a typical adult to be 15-20 minutes at best

    - Rotating group and individual activities works well
    - You can often take an individual activity (a question and answer sheet or reflection activity) into a small group or paired activity for more interaction among class members
- Tap into the technological strengths and interests of Xers and Millennials
    - Will often drag Boomers into the technology realm with them
    - Don't assume all Boomers or Traditionalists are technophobic
    - Don't assume all Xers and Millennials are technologically savvy
- Assign group roles for the first few team projects
    - Be sure to assign the Millennial student(s) a leadership role periodically to help develop their ability to make decisions for themselves
    - Be careful not to let the Gen X student check out of the group project by assigning that student an active role in the project
- Work to foster a team environment
    - Consider the use of formal groups with clearly defined roles that are rotated throughout the group
- Enforce individual accountability for group projects
    - Collaborative learning only works well when students feel both personally accountable as well as accountable within their group
- Require participation in some form each class period
    - This helps the less vocal generations (Traditionalists, Xers at times) understand that what they have to say is valued and important for others to hear
- Find the right mix of guidance, structure, and visibility for all groups
    - Some groups or individual students will find you hovering while others will appreciate the assistance
    - Try not to offer opinions unless asked by the group and ask the group to agree on when to bring in outside help
- Encourage discussion between the groups
    - Consider using an activity that will open up the discussion about differences between generations and in the classroom in general
- Recognize excellent performers individually
    - This is particularly important for each generation in their own way
    - Comments on papers and/or a note in front of the class can be very effective for boosting the self-esteem of all learners
- Give individual work in addition to group work
    - Appeals to the individual nature of Xers and the Traditionalists
    - Allows Boomers to be in charge of their own show

What Will Work Against You?

Teaching is hard work. It's important to also understand what does not work well. The following are a few hints on things that are less effective in the multigenerational classroom.

- Trying to appeal to all generations in the same assignment
    - Things you do will appeal to learners of different ages, with different learning styles at different times. Include a variety of activities so that all learners have the opportunity to participate in activities that appeal to them.
- Clashes will often come between Boomers & Xers and again between Xers & Millennials
    - Boomers tend to regard Millennials as children and will often give them more latitude
    - Don't let the potential for clashes prevent you from assigning students of different generations to work together in teams. Teamwork is a skill our students need to focus on continually
- Not allowing enough time for groups to become comfortable with one another before beginning a project
    - All groups require some kind of "norming" process before they can really be effective as a group, so allow the groups some time for introductions and small talk before beginning the activity
    - If you use longer-term groups, you will want to extend activities to include a formal icebreaker and/or biography exercise to ensure that students have enough time to develop relationships
- Not allowing students with experience to bring that into the classroom
    - Build enough discussion time into your classroom to allow for students to speak as this not only validates their generational need but also helps you set the andragogy context that tends to be effective in adult learning environments
- Ignoring generational differences completely
    - Pretending that there are no differences in students because of their age is like pretending that all students learn the same way.
    - Don't go overboard in trying to design your class to appeal to every generation. Good teaching is good teaching. However, make sure to design your GED® program with a variety of activities.
- Not asking students to stretch beyond their comfort zones
    - Learning is an uncomfortable process and when you ask students to do something they aren't familiar with, you are helping facilitate that process of growth
    - Growth requires assistance, so be careful about throwing students into situations for which they are completely unprepared[1]

[1] Beattie, Sheri. Teaching Across Generations. Baker College. Retrieved from the World Wide Web at: https://www.baker.edu/departments/etl/trainingresources.cf

Assessment

Assessment for the GED® program

What Is Assessment?

Assessment is the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of their educational experiences; the process culminates when assessment results are used to improve subsequent learning.

Some definitions divide assessment into the areas of measurement and evaluation. Collecting information about how much knowledge and skill students have learned is defined as the measurement component of assessment. Making judgments about the adequacy of a student's learning is defined as evaluation.

The Role of Assessment in Teaching

Assessing student learning is something that every instructor does. Written tests, research papers, homework exercises, presentations, question-and-answer sessions, and projects are just some of the ways in which we measure student learning. Why do we assess student learning?

The most common reasons for assessment are to:

- Provide summaries of learning (summative evaluation)
- Provide information on learning progress (formative evaluation)
- Diagnose specific strengths and weaknesses in an individual's learning (diagnosis)
- Motivate further learning (effects on learning)

Entrance Criteria for GED® preparation

The GED® program is open to any student age sixteen or over who does not have a State of Florida recognized high school diploma. A student of legal school age must have declared his/her intent to withdraw from the regular school program or provide proof of withdrawal. State Board of Education Rule 6A.6.014

Entrance into a GED® program is dependent on the individual site. Some programs provide an open-entry, open-exit enrollment system, whereas other programs provide a managed intake and/or managed enrollment course of study.

Placement into a GED® preparatory program is based on an individual needs assessment. State Board of Education Rule 6A-6.014, FAC, General Requirements for Adult General Education Programs requires an academic skills test for adult general education, which includes the GED® preparatory program.

Initial Assessment

The assessment phase of the intake process is designed to gather data about a student's academic skill level. The data provides you with a clear picture of a student's academic strengths and weaknesses.

State Board of Education Rule 6A-6.014 allows programs to use the following approved assessment instruments for placement into an adult education program:

- Test of Adult Basic Education (TABE), Complete Battery or Survey Form, Forms 9 and 10
- Comprehensive Adult Student Assessment System (CASAS)
- General Assessment of Instructional Needs (GAIN) – test of English skills, Forms A and B
- General Assessment of Instructional Needs (GAIN) – test of Math skills, Forms A and B

Publishers for each of these assessment tools provide extensive materials for instructors and test administrators on the procedures required to produce valid results when assessing students. It's very important that all assessment materials be maintained in a secure area in order not to compromise the test.

As an instructor, you may be responsible for administering one of the state-approved assessments to your students. Whether you are using a computer-based assessment or

paper and pencil assessment, it is important that you are aware of the requirements of the test and the procedure to follow, including correctly timing the test.

Enrollment in the GED® Preparatory Program

Each assessment tool provides grade equivalent and scale scores. Scale scores link to basic skill competencies and provide more meaningful information than grade equivalents. When assessing students for entrance into a GED® preparatory program, a student should score a minimum of a 9.0 grade equivalent or a corresponding scale score.

The following table shows the test benchmarks in scale scores for each of the NRS levels for Adult Secondary Education students (adult high school and GED® preparatory programs).

NRS Educational Functioning Level (EFL)	TABE 9/10 Scale Scores	CASAS Scale Scores	GAIN Scale Scores
Low Adult Secondary Education (GE 9.0–10.9)	Reading: 567-595 Total Math: 566-594 Language: 560-585	Reading: 236-245 Math: 236-245 Writing: 261-270	English: 747-870 Math: 776-854
High Adult Secondary Education (GE 11.0–12.9)	Reading: 596 and above Total Math: 595 and above Language: 586 and above	Reading: 246 and above Math: 246 and above Writing: 271 and above	English: 871-1000 Math: 855-1000

The adult education administrator at your site will provide you with information regarding the procedures and forms you must use during the registration process. This includes the enrollment process and which course number(s) to use, as well as setting up and maintaining student files.

Resources

For additional information on assessment, access the:

- Adult Education Assessment Technical Assistance Paper prepared by the Division of Career and Adult Education
  http://www.fldoe.org/core/fileparse.php/5398/urlt/adultedassesslist.pdf

For additional information on course code numbers and curriculum frameworks, access the:

- Adult Education Curriculum Frameworks
  http://www.fldoe.org/academics/career-adult-edu/adult-edu/2016-2017-adult-edu-curriculum-framewo.stml

For additional information on the National Reporting System (NRS), access the:

- Florida NRS Reports
  http://fldoehub.org/cctcmis/pages/nrs.aspx

- National Reporting System website
  http://www.nrsweb.org/

GED Ready™

To assist students in being successful in passing the 2014 GED® test, the GED Testing Service® has developed the computer-based GED Ready™. GED Ready™ went through the same norming and standardization study that the official exam went through. That means the questions are designed to mimic the official exam and can be predictive of how a student will perform on the official test. Focused study plans contain feedback on over 50 different traits measured in the exam. Students are also provided with score level indicators on how likely they are to pass the official exam, indicated by a color – red, yellow, and green.

Not Likely to Pass	Too Close to Call	Likely to Pass
100 – 133	133 – 144	145 – 200

Assessment to Support Instruction and Student Outcomes

Assessment is a necessary tool for entrance into and exit from your GED® preparatory program and for the continuous tracking of a student's progress and instructional needs.

As you develop a comprehensive assessment plan, it is important that you:

1. Identify the purpose for each type of assessment required for student success, select appropriate assessment tools, and decide on the relative importance for each type of assessment tool used.
2. Develop both formative and summative assessment tools as part of your GED® preparatory program.
3. Implement the assessment plan, ensuring that all assessment tools are delivered according to the testing procedures established by the test publishers.
4. Evaluate the results of the assessment plan based on student outcomes and successful transition to postsecondary education and training programs.

The GED® Test

History of the GED® Test

In the United States, almost 1 in 5 adults, more than 39 million individuals, lacks a high school credential. The GED® test, established in 1942, has assisted over 18 million adults in earning their high school credential.

The GED® test was initially developed in 1942 by the United States Armed Forces Institute (USAFI) to provide military personnel and veterans an opportunity to demonstrate achievement comparable to that of high school graduates. In the 1950s, non-veterans were also allowed to take the test and the GED Testing Service® was established.

There have been five generations of the GED® test: 1942, 1978, 1988, 2002, and the new test in 2014. Each new generation of the GED® test has been the result of the identification of specific areas of need or changes in assessment that strengthens the test and ensures its validity and credibility in an ever changing world.

Reasons for Taking the GED® Test

The reason adults take the GED® test has changed since the test's inception. In the 1940s through the 1960s, most people took the test for employment reasons. Today, over two-thirds of all examinees indicate that they are taking the test to pursue postsecondary education and training. Approximately one in seven high school diplomas awarded annually is a GED® diploma.

Benefits of the GED® Test

Obtaining a GED® credential provides students with opportunities otherwise unavailable to them. Passing the GED® test opens the door for adults to continue their education and transition to postsecondary education and training programs. According to the College Board, 95 percent of U.S. colleges and universities accept GED®

graduates who meet their other qualifications for admission.

A GED® credential also documents that students have college- and career-ready skills. According to recent studies, approximately 96 percent of all U.S. employers accept the GED® credential as equal to a traditional high school diploma.

Overview of 2014 GED® Test

Changes in the landscape of education and the workforce required a new GED® test. The purposes of the 2014 GED® test are to provide:

- A high school equivalency credential that continues to remain meaningful for adult learners, employers, and institutions
- Evidence of readiness to enter workforce training programs or postsecondary education and the workplace
- Information about a candidate's strengths and areas of developmental need

The 2014 GED® test has four content-area assessments. The following are the different content area assessments and the time provided for taking each content area on the 2014 GED® test:

- Reasoning through Language Arts – 150 minutes, including a 10 minute break
- Mathematical Reasoning – 115 minutes
- Science – 90 minutes
- Social Studies – 70 minutes

Each of these content-area assessments measures a foundational core of knowledge and skills, as well as practices. The assessment targets for the 2014 GED® test are derived from the Common Core State Standards (CCSS) and similar career- and college-readiness standards in place in Texas and Virginia.

Common Core State Standards

The Common Core State Standards (CCSS) were developed through a state-led national initiative to establish consistent and clear education standards for English language arts and mathematics that would better prepare American students for success in college, career, and the competitive global economy. The initiative is sponsored by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO). Forty-five of the fifty states have adopted the standards. The state of Florida adopted the standards for the K-12 system in July 2010.

The Common Core State Standards form the basis of the skills necessary to successfully pass the GED® test. Additional information on the assessment targets for the GED® test is available in the next segment of the **Florida's Instructor Handbook for GED® Preparation.**

Resources

For additional information on Common Core State Standards, access the standards at:

- Common Core State Standards
  http://www.corestandards.org/

College and Career Readiness Standards for Adult Education

Standards-based education provides a structured approach for state adult education agencies and local programs to create a system that explicitly links standards, assessments, and instructional delivery. The Office of Vocational and Adult Education (OVAE) has identified a set of college and career-readiness (CCR) standards in English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects and in the area of Mathematics. The Common Core State Standards were reviewed with a focus on identifying a set of content standards reflecting what is essential for adult students to know to be prepared for the rigors of postsecondary education and the workplace. These standards are an integral part of the Florida Curriculum Frameworks for Adult Education.

More information on specific content areas of the standards will be covered in content-area chapters of the **Florida's Instructor Handbook for GED® Preparation.**

Computer-Based Testing

Computer-based testing is the standard for many different types of assessments in today's world. In fact, it is rapidly becoming the method of delivery for the K-12 system as well.

Computer-based testing is simple and easy to deliver. It allows for more consistent delivery, scoring, reporting, and security. Computer-based testing also improves access for students to the GED® testing program. Students have easy access to online registration and scheduling for the test, as well as instant score reports. Testing on a computer uses on-screen cues and directions to guide the test-taker through the process. Because The 2014 GED® test includes the latest standards in assessment development, a computer-based delivery platform was required to develop the various complex item types.

A tutorial for students is available on the GED Testing Service® website, as well as information on setting up a computer-based testing lab.

Resources

For additional information on computer-based testing, setting up a computer-based testing lab, and a tutorial for students, access the:

- 2014 GED® test on computer website
  http://www.gedtestingservice.com/educators/ged-test-on-computer

Eligibility Requirements for the GED® Test

To take the GED® test in Florida, an individual must:

1. Be 18 years of age or older
2. Be a resident in Florida at the time of application.
3. Possess a State of Florida Identification Card or Florida Driver License
4. Apply for an Age Waiver if under the age of 18. Individuals ages 16 and 17 may be granted an Age Waiver according to the policies and procedures of the school district or college.

Scores for the GED® Test

In 2016, the scores for passing the GED test were changed based on a recalibration of the test. Recalibrating the test ensures that the passing score is indicative of current high school graduates and current graduation standards. The following are the scores:

Below Passing	Passing/High School Equivalency	GED College Ready	GED College Ready + Credit
100 – 144	145 – 164	165 – 174	175 – 200

Resources

For additional information on the performance skills required for each area, access the:

- GED® Testing Website
  http://www.gedtestingservice.com/ged-testing-service

Question Types on the 2014 GED® Test

Because of the integration of computer-based testing, a variety of question types are used by the 2014 GED® test. The following is a chart that includes the different item types and the tests on which each is used.

Item Type	Overview	Content-Area Assessment
Multiple choice (MC)	This type of question has four answer options from which to select the correct answer.	All
Drag-and-Drop	These types of questions are interactive and require that test-takers move small images, words, or short phrases to designated drop targets on a computer screen.	All
Drop-down selection types	These item types are multiple response options that are embedded directly within a text. A test-taker selects an option, and the answer will display on the screen as part of the text.	All
Fill-in-the-blank	This item type requires that a test-taker fill in single or multiple blanks.	All
Hot spot	These test items consist of a graphic image with virtual sensors so that the test-taker can navigate the image. This question type is useful in selecting data points on a graph or chart or creating a geometric model or mapping activities	Mathematical Reasoning, Social Studies, Science
Extended response (ER)	A 45-minute task on Language Arts, the extended response item requires that test-takers analyze one or more source texts and produce a writing sample.	Reasoning through Language Arts
Short answer (SA)	This item type requires that test-takers demonstrate an understanding of cognitively complex skills by composing a brief response, approximately a 10-minute task. Two short answer questions are used on the GED® Science test.	Science

Resources

For additional information on the format of the test and item types, access the Assessment Guide for Educators:

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/the-new-assessment-downloads

Content Area Tests

Reasoning through Language Arts

Reasoning through Language Arts focuses on three essential components, a test-takers ability to:

- read closely
- write clearly
- edit and understand the use of standard written English in context

The Reasoning through Language Arts test integrates the reading and writing process. Seventy-five percent of the texts in the exam are informational (including literary nonfiction and texts from workplace contexts), whereas, the other 25% are passages from literature. Texts average between 400 to 900 words per passage.

The reading and writing standards that are used in the Reasoning through Language Arts test are also measured in both the Social Studies and Science Test. The Reasoning through Language Arts test features: multiple choice items, several different types of technology-enhanced items, cloze items embedded in passages, and a 45-minute extended response item.

Social Studies

The GED® Social Studies Test focuses on the fundamentals of social studies reasoning in four content domains:

- civics and government – approximately 50%
- United States history – approximately 20%
- economics – approximately 15%
- geography and the world – approximately 15%

Key concepts assessed in social studies focus on two major themes:

- Development of modern liberties and democracy
- Dynamic responses in societal systems

The Social Studies Test features: multiple choice items and a variety of technology-enhanced items.

Science

The GED® Science Test focuses on the fundamentals of science reasoning in three content domains:

- life science – approximately 40%
- physical science – approximately 40%
- Earth and space science – approximately 20%

Key concepts assessed in science focus on two major themes:

- Human health and living systems
- Energy and related systems

Each item on the Science Test is aligned to one science practice and one content topic. The Science test features: multiple choice items, brief short answer items, a variety of technology-enhanced item times, and drop-down items.

Mathematical Reasoning

The GED® Mathematical Reasoning Test focuses on two major content areas:

- quantitative problem solving – approximately 45%
- algebraic problem solving – approximately 55%

The area of descriptive statistics and basic inference are embedded primarily in the Science and Social Studies Tests.

The Common Core State Standards include Standards for Mathematical Practice, which describe the types of behaviors in mathematics that are essential to mastering mathematical content. Modeling is one of the most important behaviors, which emphasizes applying mathematics to real-life situations as well as to academic problems in other fields of study.

The Mathematical Reasoning Test features: multiple choice items, a variety of technology-enhanced item types, and drop-down items. A virtual scientific calculator is embedded in the computer-based delivery platform, along with a formulas page for use by the test-taker.

Knowledge and Skills Required for the 2014 GED® Test

While the 2014 GED® test is organized into four separate content-area assessments, many of the skills cross different content areas. It is important that students have effective reading comprehension and information processing skills so that they can read and understand the material provided. These skills serve as core knowledge that is essential in critical thinking and problem solving. Another very important skill for the 2014 GED® test is the ability to interpret graphic-based information, such as charts, maps, graphs, diagrams, political cartoons, and photographs.

In the next segment of the ***Florida's Instructor Handbook for GED® Preparation***, you will find information on assessment targets for the 2014 GED® test and Webb's Depth of Knowledge.

Resources

The following are resources for additional information on the GED Testing Service® and state contacts:

- GED Testing Service
  http://www.gedtestingservice.com

- Career and Adult Education
  Rod Duckworth, Chancellor
  http://www.fldoe.org/workforce/

- Florida Adult Education
  Zelda Rogers, Senior Educational Program Director
  http://www.fldoe.org/workforce/adulted/

- Official site of the Florida Department of Education for the GED® test
  Tara Goodman, Bureau Chief/GED Administrator™
  http://ged.fldoe.org/

- Florida Adult Education Curriculum Frameworks
  http://www.fldoe.org/workforce/dwdframe/ad_frame.asp

Webb's Depth of Knowledge & Assessment Targets for the 2014 GED® Test

Webb's Depth of Knowledge

In 1997, Norman Webb developed a process and criteria for systematically analyzing the alignment between instructional standards and standardized assessments. Webb's work grew out of research on studying different state assessments and their alignment with various state standards. Psychometricians and test developers use Webb's Depth of Knowledge (DOK) as a way to design and evaluate different assessment tasks. It is Webb's DOK that is used by the 2014 GED® test.

It is important to recognize that Webb's DOK:

- Is descriptive; it is not a taxonomy
- Focuses on how deeply a student has to know the content in order to respond

DOK provides instructors with a vocabulary and frame of reference when thinking about how students engage with course content.

Webb's Depth of Knowledge Levels

DOK Level	DOK Definition	DOK Examples
DOK-1 Recall and Reproduction	Recall of a fact, term, principle, concept, or perform a routine procedure.	Recall elements and details of story; structure, such as sequence of events, character, plot and setting; Conduct basic mathematical calculations; Label locations on a map; Represent in words or diagrams a scientific concept or relationship. Perform routine procedures like measuring length or using punctuation marks correctly; Describe the features of a place or people.
DOK-2 Basic Application of Skills/Concepts	Use of information, conceptual knowledge, select appropriate procedures for a task, two or more steps with decision points along the way, routine problems, organize/display data, interpret/use simple graphs.	Identify and summarize the major events in a narrative; Use context cues to identify the meaning of unfamiliar words; Solve routine multiple-step problems; Describe the cause/effect of a particular event; Identify patterns in events or behavior; Formulate a routine problem given data and conditions; Organize, represent, and interpret data.
DOK-3 Strategic Thinking	Requires reasoning, developing a plan or sequence of steps to approach problem; requires some decision making and justification; abstract, complex, or non-routine; often more than one possible answer.	Support ideas with details and examples; Use voice appropriate to the purpose and audience; Identify research questions and design investigations for a scientific problem; Develop a scientific model for a complex situation; Determine the author's purpose and describe how it affects the interpretation of a reading selection; Apply a concept in other contexts.
DOK-4 Extended Thinking	Requires investigation or application to real world; requires time to research, problem solve, and process multiple conditions of the problem or task; non-routine manipulations, across disciplines/content areas/multiple sources.	A product or a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/solutions; Apply mathematical model to illuminate a problem or situation; Analyze and synthesize information from multiple sources; Describe and illustrate how common themes are found across texts from different cultures; Design a mathematical model to inform and solve a practical or abstract situation.

Bloom vs. Webb

You may be more familiar with Bloom's Taxonomy. The following chart provides a comparison of the cognitive complexity of Bloom's Taxonomy and Webb's Depth of Knowledge.[2]

Bloom's Taxonomy	Webb's Depth of Knowledge
Knowledge The recall of specifics and universals, involving little more than bringing to mind the appropriate material.	**Recall** Recall of a fact, information, or procedure (e.g., What are 3 critical skill cues for the overhand throw?)
Comprehension The ability to process knowledge on a low level such that the knowledge can be reproduced or communicated without a verbatim repetition.	
Application The use of abstractions in concrete situations.	**Basic Application of Skill/Concept** Use of information, conceptual knowledge, procedures, two or more steps, etc. (e.g., Explain why each skill cue is important to the overhand throw. By stepping forward you are able to throw the ball further.)
Analysis The breakdown of a situation into its component parts.	***Strategic Thinking*** Requires reasoning, developing a plan or sequence of steps; has some complexity; more than one possible answer; generally takes less than 10 minutes to do (e.g., Design 2 different plays in basketball and explain what different skills are needed and when the plays should be carried out.)
Synthesis and Evaluation Putting together elements and parts to form a whole and then making value judgments about the method.	**Extended Thinking** Requires an investigation; time to think and process multiple conditions of the problem or task; and more than 10 minutes to do non-routine manipulations (e.g., Analyze 3 different tennis, racquetball, and badminton strokes for similarities, differences, and purposes. Then, discuss the relationship between the mechanics of the stroke and the strategy for using the stroke during game play.)

[2] Bloom's Taxonomy and Webb's Depth of Knowledge. Retrieved from the World Wide Web at: http://www.palmbeachschools.org/qa/documents/WebbsDepthofKnowledge.pdf

Resources

For additional information on the Webb's Depth of Knowledge and how it relates to each content area assessment, access the following:

- Assessment Guide for Educators, Introduction
  http://www.gedtestingservice.com/educators/the-new-assessment-downloads

Assessment Targets Aligned with Common Core State Standards

Setting clear and achievable targets is the starting point for creating an assessment tool. In developing the 2014 GED® test, the GED Testing Service® used the Common Core State Standards, along with the state standards of Virginia and Texas. The career- and college- ready content specifications of these standards provide clear and rigorous assessment targets that have been translated into different types of assessment tasks for the Next Generation GED® test.

Anchor standards are those core educational standards necessary to achieve a specific goal. The Common Core State Standards for high school completion provide anchor standards necessary for students to be college and career ready.

The philosophy that underlines the GED® test is that there is a foundational core of knowledge that must be obtained in order for an adult to enter postsecondary education and training and/or today's workplace.

The Common Core State Standards encompass the K-12 system. At the high school level, the following are the anchor standards for the areas of language, writing, reading, and mathematics.

Common Core State Standards: Anchor Standards for Language

Conventions of Standard English

1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Knowledge of Language

3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

Vocabulary Acquisition and Use

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
5. Demonstrate understanding of word relationships and nuances in word meanings.
6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Common Core State Standards: Anchor Standards for Reading

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

Common Core State Standards: Anchor Standards for Writing

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences

Mathematical Content Standards

At the high school level, the Common Core State Standards for Mathematics are divided by:

- Content Standards (6)
- Practice Standards (8)

Mathematical Content Standards

- Number and Quantity
- Modeling
- Algebra
- Functions
- Geometry
- Statistic and Probability

Mathematical Practice Standards

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively

- Construct viable arguments and critique the reasoning of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning

Resources

For additional information on the Common Core State Standards access the following resources:

- Common Core State Standards English Language Arts
  http://www.corestandards.org/ELA-Literacy

- Common Core State Standards Mathematics
  http://www.corestandards.org/Math

Assessment Targets for the 2014 GED® Test

The Florida Department of Education and the GED® Advisory Committee have aligned the assessment targets for all four content areas of the 2014 GED® test in the 2013-2014 GED® Curriculum Frameworks.

Resources

For additional information on the Webb's Depth of Knowledge and Assessment Targets for the 2014 GED® test, access the Assessment Guide for Educators:

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/assessment-guide-for-educators

For additional information on the Florida GED® Curriculum Frameworks access:

- Florida's GED® Curriculum Frameworks
  http://www.fldoe.org/academics/career-adult-edu/adult-edu/2016-2017-adult-edu-curriculum-framewo.stml

Writing Rubric

The 2014 GED® test uses different types of test items. Two of the item types are extended response and short answer items. Both of these types of assessment items require text-based

responses where students analyze source text(s) and use evidence to support an argument. This is a very different type of writing than that of an expository essay.

Three primary traits form the assessment rubric for extended response answers. These are:

- Creation of arguments and use of evidence
- Development of ideas and organizational structure
- Clarity and command of standard English conventions

Within each trait for the RLA extended response are three dimensions which are scored on a scale of 0 through 2 plus a non-scorable category. A non-scorable response would include such things as a response that:

- exclusively contains text copied from the source text(s)
- is off-topic
- is incomprehensible
- is left blank

Short-answer responses in the Science module are scored on a three-point scale. Scoring guides are developed for the different types of short-answer items.

The GED Testing Service® provides a comprehensive view of the short answer and the extended response scoring rubrics, as well as the reporting category descriptions for each of the content areas.

Introduction to Career Pathways and Contextualized Instruction

Career Pathways

A career pathway consists of a connected series of educational and training programs and services designed to prepare adults for employment and advancement in high-demand occupations. Each career pathway acts as a road map that provides individuals with career opportunities.

Career pathways integrate academic and career and technical skills in order for individuals to be successful in today's global economy.

How do career pathways connect with your GED® preparatory program?

No longer is a GED® diploma an ending point for students. Rather, this important credential opens the doors for our students to enter the career of their choice.

Some GED® programs act as "bridge" programs. A bridge program is an essential component in a career pathway. Research indicates that the most effective way to help adults improve academic skills is to teach these skills in the context of training for jobs, preparing for employment,

transitioning to postsecondary education, or some other activity that is related to skills necessary for today's world.

Bridge programs:

- Integrate academic competencies necessary to succeed in postsecondary education and training with real-world experiences that lead to career advancement
- Emphasize the basics of communication, problem-solving and critical-thinking skills, mathematical reasoning, technology applications, workplace competencies, and technical fundamentals taught in the context of problems and situations drawn from the workplace and postsecondary classrooms
- Emphasize learning by doing through projects, teamwork, simulations, and labs
- Expose students to opportunities and requirements of employment and education in fields of importance to local economies through career and college exploration and planning
- Integrate instructional methods and technologies appropriate for adult learners
- Offer support services

The major distinguishing factor between a bridge program and a traditional GED® preparatory program is the dual focus on preparation for postsecondary learning and career access and advancement.

Developing a GED® bridge program requires that you integrate the academic skills necessary for success with an identified career pathway. This process is being implemented throughout Florida. Remember, developing any new program is a process and requires a step-by-step plan with collaboration and support.

The important thing to remember is that most career pathways require a high school credential. As a GED® instructor, an important part of developing your program is ensuring that students relate to the concepts and skills being taught and are able to transfer these concepts and skills to different situations as they transition to postsecondary education and the workplace.

Resources

The following are resources on career pathways:

- Adult Education Career Pathways
  http://www.fldoe.org/workforce/AdultEd/pathways.asp

- Hull, D. and Hinckley, R. *Adult career pathways*. (2007). CORD Communications: Waco, TX

Contextualized Instruction

What is the best way to convey the many concepts that are taught in the GED® classroom so that all students can use and retain that information? How can you effectively communicate with students who wonder "Why do I need to know this?" How can you open the minds of a diverse student population so that every student can learn the concepts and techniques that will open doors of opportunity throughout their lives? These are the challenges that instructors in adult education encounter every day.

Many of our students are unable to make connections between what they are learning and how that knowledge will be used. This is often because the way that they process information and their motivation for learning are not connected to traditional methods of classroom teaching. Many have a difficult time understanding academic concepts (such as math concepts) as they are commonly taught (that is, using an abstract, lecture method). Our students must be able to understand these concepts as they relate to their lives and the workplace. Traditionally, students have been expected to make these connections on their own. However, contextual learning is a proven concept that helps students make these connections within the classroom.

What is contextual teaching and learning? It is simply a teaching and learning system that helps instructors relate subject matter content to real-world situations and motivates students to make connections between knowledge and its applications to their lives as family members, citizens, and workers, and to engage in the hard work that learning requires.

In a contextualized classroom, students discover meaningful relationships between abstract ideas and practical applications in the context of the real world; concepts are internalized through the process of discovering, reinforcing, and relating. For example, a science class might learn basic scientific concepts by studying the components of a nutritional diet or the spread of a disease in a community.

When developing a system of contextualized instruction, it is important to remember that effective contextualized instruction is based on:

- high expectations of student achievement;
- development and utilization of authentic methods of assessment;
- demanding courses of study;
- providing abundant and varied materials to read and discuss;
- promotion of new forms of student activity in and out of the classroom; and
- re-examination of the classroom environment to ensure that instruction is embedded in a genuine context rather than the decontextualized structure of traditional environments. [3]

[3] What is contextualized learning? Nebraska Institute for the Study of Adult Literacy. Retrieved from the World Wide Web at: http://literacy.kent.edu/~nebraska/curric/ttim1/art5.html

Research on Contextualized Learning

Although a major trend in the past twenty years, contextual learning is not new. Contextual approaches to teaching and learning, and efforts to attach meaningfulness to subject matter can be found in the education theories of John Dewey (1859-1952). Dewey stressed experiential modes of learning, theorizing that learning results as we strive to make sense of our experiences.

Effective instructors have always placed a heavy emphasis on the search for meaning and understanding. Educators have often motivated their students by relating what was being learned to the realities of daily life and have encouraged them to learn through hands-on and practical approaches. Although diverse ideological and pedagogical traditions exist, many believe that true learning exists only when contextual principles are being implemented.

Contextual learning had its true beginning in the work of William James. James believed that instructors should have their students put new knowledge to immediate use in order to build useful systems of association. James contended that the mind operates in a purposeful way to organized thoughts and to process experiences. In his work *Principles of Psychology* (1880), James reflected that without human experience and action, true learning cannot occur.

Within adult education, contextual education has been the focus of many researchers. Research has shown that "people learn best when they begin from what they already know and when the learning process allows them to accomplish something they want to accomplish."[4] Additionally, people retain more of what they study if they can simulate or actually perform the task. A contextual approach to teaching and learning seeks to connect subject matter to real world contexts in order to increase student motivation by increasing meaningfulness.

Thomas Sticht proposed a functional context theory in the 1990s based upon his research. When writing about the "turbulence" or student attrition so pervasive in adult literacy, Sticht (1998) proposed that persistence and attendance would be markedly improved if programs could provide education directly linked to job training objectives.[5] Sticht suggests that students who cannot link instruction to some direct outcome of significance to their lives are less likely to persist in the adult education program. For Sticht, functional context education is the most expedient way of providing adults with important knowledge in critical areas of their lives as they do not often have a long period of time to learn basic literacy skills in order to improve their work opportunities or role as a parent or community member. Sticht's approach focuses on the

mastery of tasks viewed as essential in various areas of life as evident in his emphasis on contextual learning through his research on military and workplace literacy.[6]

Contextualized Approach to Curriculum and Instruction

According to contextual learning theory, learning occurs only when students (learners) process new information or knowledge in such a way that it makes sense to them in their own frames of reference (their own inner worlds of memory, experience, and response). This approach to learning and teaching assumes that the mind naturally seeks meaning in context, that is, in relation to the person's current environment, and that it does so by searching for relationships that make sense and appear useful.

Teaching students in ways that they can understand is essential to ensuring that real learning takes place. When students see the connection between the concepts they are learning and the way in which these concepts are used in the real world, they are involved in contextual learning. Education becomes purposeful for students when it bases a solid content into a real-world context.

Dale Parnell in his book *Why Do I Have to Learn This?* (1995) identifies seven principles that form the framework for contextual education. "These principles of contextual education are:

1. Purpose Principle: Teachers help students understand . . . not only what they are to learn, but why!
2. Building Principle: New knowledge and new units of study are . . . connected with students' prior knowledge or past learning so that new learning builds on prior experience.
3. Application Principle: New knowledge is specifically related to its practical, real-life application – especially how it relates to students' future roles as citizens, consumers, workers, family members, lifelong learners, healthy individuals, and participants in cultural and leisure events.
4. Problem-Solving Principle: Students are encouraged to become active learners by using new knowledge and skills to solve problems.
5. Teamwork Principle: Students learn teamwork and cooperation by working together to solve problems.
6. Discovery Principle: The classroom slogan is "Try It!" Students are guided toward discovering new knowledge rather than having the answer (or multiple answers, as is often the case) handed to them. Teachers help students explore, test, and seek their own answers, often with the help of learning partners.
7. Connection Principle: Teachers help students see the connections between context and content, knowledge and application, one discipline and another. Divisions between traditional disciplines are minimized."[7]

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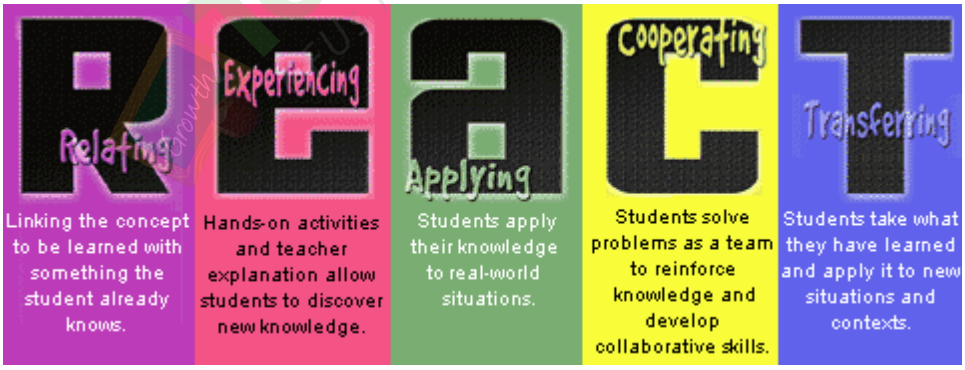
[6] Sticht, T. G. (1997). *Functional context education: Making knowledge relevant*. San Diego, CA: Consortium for Workforce Education and Lifelong Learning

[7] Parnell, Dale. (1995). *Why do I have to learn this?* Wacim, TX: CORD Communications, Inc., 8-9

The Center for Occupational Research and Development (CORD) provides a supporting framework for contextualized education through describing five essential forms of learning that are required to prepare students for greater success in careers and higher education. Often referred to by the acronym REACT, these skills are:

- **R**elating – placing learning in the context of life experiences to call attention to everyday sights, events, and conditions and then relating those everyday situations to new information.
- **E**xperiencing – providing hands-on learning opportunities for students so that they can learn in the context of exploration, discovery, and intervention by manipulating equipment and materials and actively researching problems.
- **A**pplying – taking concepts and information and placing students into an imagined future (a possible career) or into an unfamiliar location (a workplace) through text, video, labs, and activities, as well as firsthand experiences such as plant tours, mentoring arrangements and internships.
- **C**ooperating – learning in the context of sharing, responding, and communicating with other learners. Cooperating helps students learn the materials and is also consistent with the real-world focus of contextual learning through small-group and partnering activities.
- **T**ransferring – enabling students to gain confidence in their own ability to transfer skills that they know to new contexts. Building new experiences on what students already know assists them in developing confidence and retaining their sense of dignity when confronted with a new situation.[8]



In addition to the seven principles of contextual learning, Parnell describes the contextual learning process model through which a learner moves in order for learning to become meaningful. These elements are often referred to as the *Four As of Meaningful Learning*:

- Acquisition - learn and retain to apply to real life situation.

[8] The Center for Occupational Research and Development (CORD). Retrieved from the World Wide Web at: http://www.cord.org/the-react-learning-strategy/

- Application - actively engage in practicing and processing information in real life context, performing authentic tasks to gain an understanding of how information applies to real life.
- Assimilation - demonstrate sufficient understanding of context and content to apply knowledge and skills effectively to new situations (e.g., reading signs in a driver's manual, but also reading signs at work; reading signs in the community; and reading signs in the airport or at the bus terminal).
- Association - learning is organized around problems and themes, students learn to transfer, apply and assimilate knowledge to new problem solving situations (e.g., reading signs are necessary for my drivers' test, but do I need to know how to read signs when reading the directions with my new computer?).[9]

Why Should I Use a Contextualized Approach in My GED® Classroom?

The benefits of contextualized learning for the learner are that:

- The purpose of the learning is explicit. The learner knows why and how instruction will be provided and applied to real-world situations.
- Learners are actively learning and sharing previous knowledge with each other.
- What is being learned impacts their lives in their roles as parents, workers, and community members.
- Skills learned in the classroom can be used outside the lesson to solve real-world problems.
- Students are responsible for their own learning and can control their learning process by the rate of participation.
- Knowledge learned in the classroom is easily transferable to different situations as the skills learned are immediately recognizable in real-world settings.

There are also many benefits of a contextualized learning process for the education setting and the instructor. An effective contextualized learning system:

- Increases student knowledge retention;
- Increases student motivation;
- Views learning as a team effort between the teacher and the learner, encouraging student persistence; and
- Makes learning the learner's responsibility.[10]

Creating a Contextual Learning Environment in the Adult Education Classroom

Contextualized learning looks different depending on the content. An important part of all contextualized classrooms, however, is the use of authentic tasks or materials. Authentic tasks

[9] Ibid 14

[10] Center for Occupational Research and Development (CORD). Retrieved from the World Wide Web at: www.cord.org

replicate challenges faced in the real-world, as well as lead to tangible end products. They enable students to demonstrate their proficiency in applying the concepts and skills they have learned in real-world situations.

When planning contextual lessons for your GED® program, you may wish to use the following questions designed by Jonathan Mueller as a guideline.[11]

- What do you want students to know?
- Why do they need to know it?
- How will you know they know it?
- How will they learn it?

It's important to provide students with access to authentic materials in the GED® classroom. Research has indicated that the use of authentic materials increases the learner's motivation and retention level.

The following are a few ideas to get you started:

- Graphic-based materials – photographs, graphs, tables, charts, and maps
- Visual/auditory materials – news clips, comedy shows, stories on tape, documentaries
- Print materials – newspaper articles, book/movie reviews, letters to the editor and editorials, advice columns, informational brochures, print advertisements, leases, employment applications, employee manuals, memos, letters, food order slips, operational procedures, safety logs
- Tools – computers, calculators, spreadsheets, measuring tools[12]

Resources

The following is a great resource on contextualizing education:

- Center for Occupational Research and Development (CORD)
  www.cord.org

[11] Authentic Tasks. North Central Regional Education Laboratory. Retrieved from the World Wide Web at: http://www.ncrel.org

[12] Mueller, J. Authentic Task. Authentic Assessment Toolbox. Retrieved from the World Wide Web at: http://jonathan.mueller.faculty.noctrl.edu/toolbox/tasks.htm

Instructional Strategies for Success

Introduction to Instructional Strategies

As any experienced teacher knows, “one size fits all” does not apply to instruction, especially within the adult education classroom. Effective learning is more than the result of developing creative strategies and positive learning environments. Effective learning also includes active interactions among instructors, students, and students’ peers.

Course Design

Adult students tend to be problem-centered. When developing a GED® preparatory course of study, think about the following two questions often asked by students: “Why do I need to know this?” and “How will I use this information?” GED® curriculum must be relevant and inclusive of those ideas and concepts necessary for student success. As curriculum is designed for a GED® preparatory program, remember to:

- Select materials that have a variety of learning aids, such as study guides, online materials, and/or audio files, and encourage students to use them
- Craft a GED® syllabus that is standards-based, but that will also motivate students to learn
- Design a clear, meaningful assignments that enable students to accomplish course objectives and to reach individualized goals
- Expect students to attend each class and to be successful

- Space the workload, including homework, throughout the timeframe set for the course of study
- Provide constructive feedback on assignments and provide opportunities for "redoing" work as necessary for success

Some GED® preparatory programs are developed for a set timeframe, while others are open entry/open exit. Always ensure that the program is developed to best serve the student as well as obtaining a positive outcome. The knowledge to be learned requires multiple exposures with a variety of instructional strategies. Also, it is important that students understand that information, both academic and social, that is being learned in the classroom is applicable to both the workplace and postsecondary education.

Instructional Delivery Methods

A balanced mix of instructional methods is important in managing the adult education classroom. Each learner has preferences regarding how he or she learns best (working with a large group, small group, alone, with a tutor, etc.). Learning style inventories and questionnaires may help to determine these preferences that should be taken into consideration when organizing classroom activities.

The physical environment of the classroom may be better suited to some instructional methods than to others. For example, a small room with individual desks may lend itself better to large group or individualized instruction (although sometimes desks may be arranged to accommodate small group work). On the other hand, a large room with tables and chairs may offer the opportunity for large group, small group, or individual instruction all to happen at one time or another.

Regardless of which methods of delivery or classroom management are chosen, instruction should be standards-based. Integration of the Common Core State Standards is vital to success on the 2014 GED® test, as well as success in today's workplace and postsecondary education.

Some of the methods of instruction commonly used in adult education include the following:

- Large-group instruction
- Small-group instruction
- Cooperative learning
- Project-based instruction
- Computer-assisted instruction (technology based)
- One-on-one instruction
- Individualized instruction
- Field trips
- Guest speakers
- Exploratory/experiments

Large-Group Instruction

The instructor plans and directs activities to meet the needs of a large group or sometimes the whole class.

Appropriate when:	**Key steps:**
• They foster a sense of community in the classroom by starting everyone together. • They provide instruction or assistance in a particular subject area required by the majority of learners. • The physical environment is conducive to participation by the entire group. • Lesson content is at an appropriate level for all the learners included in the group. • The instructor varies the delivery of content and the assignments to include visual, auditory, tactile, and kinesthetic input and output alternatives. • Small group and personalized instruction are available alternatives for some learners.	• Establish group rapport. • Provide a multi-sensory presentation of information. • Provide guided practice. • Provide independent practice. • Offer a variety of multi-sensory assignments. • Set evaluation criteria. • Assess learner progress and demonstrate learner gains that are a result of large group activities. • Provide follow-up activities as needed.
Content areas that are addressed well:	**How technology is used:**
• Anything appropriate to all levels • Major concepts or processes in all academic areas • Job readiness • Health topics • Topics in affective and cognitive domains • Life skills	• Technology can be worked into any lesson or can be the basis for any lesson. • Video or audiotapes can be used to deliver information. • In a computer lab situation, all learners in the group may be using the same software program and the instructor may use an LCD panel to demonstrate how to use the program. • Educational software programs on computers may be used to drill and practice new skills in the large group setting.

Small Group Instruction

Material is presented to a small number of learners (probably no more than 10) that are either on a similar learning level or are participating with a specific purpose in mind.

Appropriate when:	**Key steps:**
• The instructor needs to teach specific skills to part of the larger group. • Several learners require instruction, but the other learners do not. • Certain learners need more opportunities to participate in a group but are intimidated by a large group setting. • Certain learners prefer to work in a group versus individually. • The instructor wants to build peer relationships among the learners. • Successful learners are given opportunities to model strong skills or good study habits to learners who have weaker skills/habits. • The classroom has a limited number of instructional materials on a particular subject.	• Set purposes and expectations in establishing the group. • Limit the amount of time the group will work together (4, 6, 8 weeks). • Provide a multi-sensory presentation of information. • Provide guided practice. • Provide independent practice. • Offer a variety of multi-sensory assignments. • Set evaluation criteria. • Assess learner progress and demonstrate learner gains that are a result of small group learning activities.
Content areas that are addressed:	**How technology is used:**
• All academic areas • Reasoning skills • Team building • Study- and test-taking skills • Chart, graph, and map-reading skills • Writing • Problem-solving/reasoning activities	• The Internet can be used as a resource • Technology can be worked into any lesson or can be the basis for any lesson. • Video or audiotapes can be used to deliver information. • Educational software programs on computers may be used to drill and practice new skills in the small group setting.

Cooperative Learning

Learners of all abilities and backgrounds work together towards a common goal. Each group or team member is responsible for a part of the learning process and offers feedback, support, and reinforcement to others. Often group members are assigned specific roles (i.e. worrier, encourager, time keeper, recorder, reporter, facilitator, etc.). A variety of grouping strategies and techniques are employed (i.e. round table, corners, color-coded co-op cards, simulation, jigsaw, co-op/co-op, pairs check, cubing, numbered heads together, etc.). This method is important as students gain reasoning and problem-solving skills.

Appropriate when:	**Key steps:**
• Group work/teamwork skills are perceived as important job skills for the work place. • Cooperative behavior is promoted in the classroom. • Classroom activities and lesson content are structured so learners see each other as resources; students are willing to learn from peers as well as from the instructor. • Group members are active in sharing ideas and practicing skills. • Learners feel comfortable with one another. • Independent learners are allowed to work alone at times. • Learners are functioning at different academic levels/	• Teach skills for group/team learning. • Describe a clear and specific learning task. • Choose a grouping strategy and group size. • Select group members so that learner abilities are mixed, which will allow them to help each other. • Discuss and practice roles. • Engineer groups; assign team roles. • Set time limits and goals. • Facilitate the teams by providing materials and assistance as needed. • Monitor the teams. • Have teams report back and analyze their process. • Transfer these cooperative skills into life-skills/problem solving. • Establish evaluation criteria. • Assess learner progress and demonstrate learner gains that are a result of cooperative learning activities.

Content areas:

- Current events
- Writing
- Science experiments
- Mathematical problem solving
- Research skills
- Workplace/life skills

Project-based Instruction

Learners explore a chosen theme. Researching the theme and preparing to present the information involves a range of skills across the curriculum.

Appropriate when:	Key steps:
• The entire group focuses on a theme that is later developed at various levels with varying tasks depending on the learners' abilities. • Everyone is included in the completion of a finished product but each learner is allowed to select a task based on his or her ability and interest. • Learners are allowed to contribute to projects using their strengths and improving on their weaker areas. • Learners actively initiate, facilitate, evaluate, and produce a project that has meaning to them. • A context for new learning and cross-curricular integration is provided. • The instructor facilitates and coaches rather than creating and directing the activities. • The classroom environment is comfortable, risk-free, and promotes learner discussion without fear of criticism.	• Select a theme as a group. • Narrow the theme to a manageable length. • Design a project as a group. • Clarify objectives and desired outcomes of the project. • Research the theme as a group. • Decide within the group who will do what to gather information and present the results. • Create a product or program to share • Reflect on the process and evaluate the project. • Set evaluation criteria. • Assess learner progress and demonstrate learner gains that are a result of project-based instruction.
Content areas:	**How technology is used:**
• All academic areas • Science projects • Cross-curricular projects • Research projects • Workplace problems/career planning	• Educational videos, computerized encyclopedia, and Internet are constant resources. • Technology can offer a method of collecting information (video or audiotape live interviews and speakers or broadcast radio or television programs. • Technology can offer a method of presentation (PowerPoint, video production, etc.). • Technology can assist in creation of a final product (word processing).

Computer-assisted Instruction (Use of Technology)

The learner receives instruction and practice by means of technology that is used as a tool in teaching basic skills or knowledge. Education in today's classroom is about more than just computer literacy, it can also integrate other types of technology, such as smart phones, pads, video, audio, the Internet, white boards, lcds.

Appropriate when:	**Key steps:**
• The learner sees the use of technology as necessary to function in today's world. • The learner likes privacy and prefers to control the content and pace of learning. • The learner needs more drill and practice and feedback that demonstrates success and boosts self-esteem. • Flexibility in the length and scheduling of study time is necessary • The learner requires multi-media input and practice in order to learn. • Technology is not utilized as the sole means of instruction. • An instructor is readily available.	• Introduce basics about the computer (turning on/off, going to programs, putting in/taking out disks and CDs, etc.). • Introduce the specific software program(s) a learner will use (getting in/exiting the program, saving material/place, moving around within the program, etc.). • Introduce basic computer keyboarding. • Present new skills in a non-threatening manner: explain, show, have the learner do it, have the instructor keep hands off. • Establish the objectives of educational activities using the computer. • Assess learner progress and demonstrate learner gains that are a result of computer-assisted Instruction.
Content areas:	**How technology is used:**
• All academic areas – if you have the appropriate software, you can do anything. • The Internet as an information source, research tool, and teaching tool (many sites allow interactive learning). • Writing Skills – process writing. • Research.	• Educational videos and software programs can introduce basics of computers/Internet. • Computer/Internet basics or a software program can be demonstrated using an lcd panel to project onto a large screen. • Multi-media presentations can be created by learners to demonstrate their knowledge • Headphones should be utilized for software programs with sound (to avoid distractions). • Integration of other types of technology (smart phones, pads, readers, videos, etc.). • Spell checker, grammar checker, and encyclopedia as resource tools for other programs.

Individualized Instruction

The instructor or a tutor works with one learner at a time, usually in a subject area in which a particular learner needs intensive individual instruction or is learning information not being accessed by the rest of class.

Appropriate when:	**Key steps:**
• Individual's skill levels require individualized instruction (either a skill mastered by the group or a skill that the student is specifically interested in attaining). • Individual's strong personal preference for this type of instruction is shown in the learning style inventory. • Only one individual needs to study a particular subject and requires substantial assistance. • It does not impede the progress of the rest of the class. • There is a least one instructor available to the rest of the group (a volunteer or speaker may work with the rest of the group or a tutor may do the one-on-one instruction). • An individual learner is not singled out in a negative way.	• Evaluate the learner's skill level and learning style. • Schedule appropriate times. • Limit the amount of one-on-one time so that it does not dominate total time available for instruction. • Plan for instruction. • Identify the specific subject matter/ objectives to be covered in that session. • Set evaluation criteria. • Assess learner progress and demonstrate learner gains that are a result of learning activities.
Content area:	**How technology is used:**
• All academic and workplace areas.	• Reinforce concepts when more drill and practice is necessary for mastery. • Provide opportunity for research into new skills.

Instructional Strategies

An instructional strategy is a method used in teaching (in the classroom, online, or in some other medium) to help activate students' curiosity about a topic, to engage the students in learning, to probe critical thinking skills, to keep them on task, to create sustained and useful classroom interaction, and to enable learning. There is no one best strategy. In fact, there are a multitude of instructional strategies that can be successfully implemented in the GED® classroom. It's important to remember that the learning process is not easily separated into a definite number of steps. Sometimes, learning occurs almost instantaneously, and other times it is acquired through diligent studying and lots of practice. Because students learn differently, it is important to have a toolkit of different strategies to use.

Let's look at some sample strategies in each of six different categories:

- Direct instruction
- Indirect instruction
- Experiential learning
- Independent study
- Interactive instruction
- Instructional skills

Direct instruction is an effective method for providing information, developing step-by-step skills, introducing other strategies, or actively involving students in knowledge construction. Strategies that are part of direct instruction are generally teacher centered. Some examples of direct instruction teaching strategies are: lecturing, explicit teaching or modeling, demonstrations, drill and practice, and structured overviews.

Indirect instruction strategies are primarily student centered and require a high level of student involvement. In indirect instruction, the role of the teacher shifts from lecturer/director to that of facilitator and resource. The teacher arranges the learning environment, provides students with what is needed, and then acts as a resource. Some examples of indirect teaching strategies are: case studies, discussions, problem solving, writing to inform, and reading for comprehension.

Like indirect instruction, **experiential learning** is learner centered and activity oriented. Experiential learning strategies provide students with the opportunity to:

- Experience an activity
- Share or publish their reactions or observations
- Analyze or process information to determine what has occurred
- Infer or generalize principles or concepts
- Apply what has been learned to new situations

A few strategies for experiential learning include: field trips, conducting experiments, role playing, model building, games, and surveys.

Independent study refers to the various strategies that help develop student initiative and self-reliance. Independent study strategies can be implemented with one student or within a team or small group. Independent study strategies include: crafting reports or research studies, completing homework, working in learning centers or computer-assisted instruction.

Interactive instruction relies on discussion and sharing among students. Interactive strategies assist students in developing skills and abilities, organizing thoughts, developing rational arguments, and learning from both their peers and their teachers. The success of interaction instruction strategies is highly dependent on success in structuring and developing group dynamics. A few interactive instructional strategies are: debates, brainstorming, think-pair-share, cooperative learning, and jigsaws.

Strategies for developing **instructional skills** have as their focus the teaching of behaviors necessary for procedural purposes and for structuring learning experiences for students. The instructional skills of explaining, demonstrating, questioning, and even the use of wait time are all teaching strategies that are used by the effective adult education instructor.

Remember, no one instructional strategy will work for all students, for all instructors, or in all subject areas. Think of strategies as places to start in determining what works best for the class.

Resources

The following are resources on instructional strategies and effective teaching.

- Glossary of Instructional Strategies
  http://www.beesburg.com/edtools/glossary.html

- Teaching Strategies KET Resources for Adult Education
- http://www.pbslearningmedia.org/collection/ketae/

- Leblanc, Richard. Good Teaching: The Top Ten Requirements (1998)
  http://www.appleseeds.org/good-teach.htm

- Fulk, Barbara. 20 Ways to Make Instruction More Memorable
  http://educationquality.blogspot.com/2006/05/20-ways-to-make-instruction-more.html

Strategies for Reasoning through Language Arts

Integrating Reading and Writing

The ability to read and comprehend a variety of texts and to write clearly using standard written English are strong predictors of both career and college readiness. These important skills of reading and writing are universally required in all professions. Reading opens the door to learning about math, history, science, literature, geography, technology, the workplace, and much, much more. Writing in the workplace is often viewed as a "threshold skill" for hiring and promotion.

The relationship among reading, writing, and understanding is clear. Students who are engaged in reading-to-learn will also be prepared to write well. In turn, students who are engaged in writing-to-learn will become more effective readers. Through both approaches, students will gain a better understanding of material and a greater ability to demonstrate that understanding.

Overview of Reasoning through Language Arts Test

The 2014 GED® Reasoning through Language Arts test assessment targets focuses on three essential skill areas:

- The ability to read closely
- The ability to write clearly
- The ability to edit and understand the use of standard written English in context

Reasoning through Language Arts integrates the reading and writing process through technology-enhanced items that assess the ability to read closely and to edit materials in context, as well as an extended response which assesses the test-taker's ability to write clearly.

The reading comprehension component measures two overarching reading standards, Common Core State Standards 1 and 10:

- Determine the details of what is explicitly stated and make logical inferences or valid claims that square with textual evidence
- Read and respond to questions from a range of texts that are from upper levels of complexity, including texts that are from the career- and college-ready level of text complexity

The writing component measures two high-level standards, Common Core Anchor Standards 9 and 6, provide an overview of the writing tasks:

- Draw relevant and sufficient evidence from a literary or informational texts to support analysis and reflection
- Use technology to produce writing, demonstrating sufficient command of keyboarding skills

The language component measures the test-takers ability to demonstrate command of standard English through editing items in various authentic contexts.

Performance Level Descriptors for Reasoning through Language Arts Test

Performance Level Descriptors (PLDs) explain the skills a test-taker generally demonstrates in order to score into one of the four performance levels on the GED® test and the skills they need to develop to advance their scores. PLDs provide us with the "stuff to teach" in our classrooms. The four performance levels for the GED® RLA test are:

- Performance Level 1 – Below Passing
- Performance Level 2 – Pass/High School Equivalency
- Performance Level 3 – GED College Ready
- Performance Level 4 – GED College Ready + Credit

The primary focus of a GED® Preparatory classroom includes those skills or descriptors found in Performance Level 2 – Pass/High School Equivalency. It is important to remember that some students will need to be taught skills at Performance Level 1, while other students may have higher level skills, such as those found at Performance Levels 3 and 4.

Resources

For additional information on the Reasoning through Language Arts Performance Level Descriptors, access the Assessment Guide for Educators:

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/the-new-assessment-downloads

2014 Extended Response Scoring Rubric

Extended response (ER) items on the RLA test are 45-minutes tasks that require test-takers to analyze two source texts in order to produce a writing sample. Candidate responses are scored based on three traits:

- Trait 1: Creation of arguments and use of evidence
- Trait 2: Development of ideas and structure
- Trait 3: Clarity and command of standard English conventions

These three traits in the rubric explicitly identify the qualities of test-takers' writing that are to be evaluated. Each of the three dimensions is scored on a 0-1-2 scale. A non-scorable response is possible if the test-taker's response:

- exclusively contains text copied from source text(s) or prompt
- shows no evidence that test-taker has read the prompt or is off-topic
- is incomprehensible
- is not in English
- has not been attempted (blank)

In Trait 1, three main qualities in test-takers' writing samples are being assessed:

- how well the test-taker establishes an argument and uses information from given source texts to support that stance,
- how well the test-taker analyzes the issue and/or validity of the argument presented in the source texts, and
- how well the test-taker integrates evidence from the source text with his or her own ideas about the topic.

Trait 2 also has multiple dimensions that readers must weigh in order to determine a score. No one dimension is weighted more than any other. Rather, these dimensions are considered together to determine the score of an individual response.

Effective writing is based on:

- Ideas and the development or elaboration of these ideas
- Logical progression or flow of ideas
- Organization so that the reader can easily follow the message conveyed
- Word choice that is appropriate to high school writing
- Awareness of the audience and purpose of the writing

For many students, standard English usage can be confusing. There are so many rules and so many exceptions to those rules. However, it's important that a test-taker exhibit clarity in writing, as well as a command of standard English conventions.

Trait 3 includes such things as:

- the application of standard English conventions (e.g., homonyms/ contractions, subject-verb agreement, pronoun usage, placement of modifiers, capitalization, punctuation);
- effective sentence structure (e.g., variety, clarity, and fluency - correct subordination, avoidance of wordiness, run-on sentences, awkwardness, usage of transition words, appropriate usage for formal structure); and
- ensuring few or no errors (mechanics/conventions and comprehension based on errors).

Resources

For additional information on the Reasoning through Language Arts Scoring Rubric, access the section on Reasoning through Language Arts in the Assessment Guide for Educators:

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/the-new-assessment-downloads

For additional information on how to score the extended response in Reasoning through Language Arts, access the following:

- Constructed Response Resource and Scoring Tools
  http://www.gedtestingservice.com/educators/constructedresponse

Standards-Driven Curriculum

Standards provide adult educators with a starting point – a method for increasing awareness and understanding of the skills and knowledge that adult learners must have to be successful as they pursue postsecondary education and training and employment. With the development of the

Common Core State Standards, a focus has been placed on what is most important to demonstrate college and career readiness.

The *College and Career Readiness (CCR) English Language Arts (ELA)/Literacy Standards* were designed to identify what content is most important and most relevant for adult learners as they continue to pursue their educational and career goals. Although standards do not tell individual schools or instructors in the classroom what they must teach, standards do provide "a consistent, clear understanding of what students are expected to learn, so teachers know what they need to do to help their students." Strong standards coupled with effective curriculum, strategies, and practices lead to increased student achievement.

The *College and Career Readiness (CCR) English Language Arts (ELA)/Literacy Standards* identify three key shifts: complexity, evidence, and knowledge.[13]

Shift 1 – Complexity: Regular practice with complex text and its academic language.

This shift focuses on the need for classrooms to:

- integrate the reading and comprehending of more complex text, including nonfiction
- insure that readability of text is at the appropriate level, such as high school level text for GED® preparatory programs
- focus on addressing academic vocabulary of students
- shift from how students read to the complexity of texts that are read

Shift 2 – Evidence: Reading, writing, and speaking grounded in evidence from text, both literary and informational

This shift focuses on the need for classrooms to:

- place a priority on textual evidence
- focus on a student's ability to cite evidence from text in order to present careful analyses, well-defended claims, and clear information

Shift 3 – Knowledge: Building knowledge through content-rich nonfiction

This shift focuses on the need for classrooms to:

- Integrate literacy across all disciplines – English language arts, science, social studies, and technical subjects
- Shift to nonfiction text that constitutes the majority of what people read in postsecondary education and the workplace

[13] *College and Career Readiness Standards for Adult Education. Chapter 4.* U.S. Department of Education, Office of Vocational and Adult Education, 2013

Strategies for the Classroom

Overview of Effective Reading Strategies

As students become proficient readers, they develop strategies for solving problems within the reading materials. The following are good practices to implement in the GED® classroom.

1. Deliver a balanced content reading program including oral, written, and reading materials from a variety of resources:

    - Teach students to read both orally and silently from a variety of fiction and non-fiction materials. Use diverse such as materials as technical manuals, literature, magazines, newspapers, textbooks, and business communications.
    - Have students use writing activities to increase their comprehension.
    - Use comprehension activities that include higher order skills of evaluation, synthesis, analyzing, inference and inquiry.
    - Teach students vocabulary building.
    - Use formal and informal assessments such as comprehension tests, portfolios, teacher observation of oral and silent reading, timed readings, and writing assignments.

2. Teach students, through demonstrations, how to use text organization to aid their comprehension.

    - Select an article and photocopy the selection for each student.
    - Read the selection through, paragraph by paragraph, and "think aloud" your own strategies for reading the selection. Have students write down your "think-alouds" in the margin.
    - After completing the reading demonstration, have students summarize the strategies that you used for reading the text.
    - Have students write their own summary of strategies.
    - Complete numerous demonstrations until students understand the strategies that you use.

3. Teach students how to use contextual clues, prefixes, suffixes, decoding skills, and high frequency words.

    - Have students identify main ideas, introductory, and conclusion sentences.
    - Have students review graphs, charts, lists, bold and italicized print, and symbolism in articles.

4. Integrate reading and writing instruction.

    - Have students read and write on a daily basis.
    - Use writing to critique a reading sample.

5. Use multiple resources to teach each individual student to better comprehend the written word, such as:
    - Libraries or media centers, internet, technology, real world situations

The following strategies are essential for students to gain greater proficiency in reading:

- Inference - reaching conclusions based on textual information
- Identifying Important Information - finding critical facts or details in the text regardless of the type of writing
- Monitoring - identifying difficulties and changing strategies to improve understanding
- Summarizing - pulling together important information from a lengthy article
- Question Generating - asking silent questions about the reading material in order to integrate information

It is important that teachers work with students to develop the skills they need to be proficient readers who have a better understanding of what they read and how to use the information they have read to answer questions developed on the various Depth of Knowledge levels.

Strategies for Timed Readings

The fluent reader is able to quickly review an article or excerpt with understanding. Many GED® students read in a slow and methodical fashion with decreased ability to comprehend. Use timed readings to increase a student's reading speed and comprehension. There are many commercial materials for timed reading; however, any type of fiction or non-fiction reading material can be used.

Initiate timed readings by providing a student with a single paragraph. Time the student for one minute. Divide the number of words the student has read by the number of minutes used in the timing. This is the student's rate of reading per minute. As the student becomes more fluent, increase the timed readings to five minutes. Add simple comprehension questions after the student is comfortable with the process.

Reading activities can also be located on the Internet. Use of a computer for timed readings provides a student with independence and a simple way to incorporate this strategy into the GED® classroom.

Students who are proficient readers have a heightened awareness and use of the organization and structure of texts. They know how to read in strategic ways to obtain important knowledge in diverse reading materials. The strategic reader knows how to preview an article in order to become familiar with the focus, scope,

Overview of Effective Writing Strategies

Just like in reading instruction, no single approach to writing instruction will meet the needs of every student. Instead, it's important that multiple strategies be used in the GED® classroom. Research-supported strategies include the following areas:

- **Writing strategies:** Explicitly teach students strategies for planning, revising, and editing their written products. This may involve teaching general processes (e.g., brainstorming or editing) or more specific elements, such as steps for writing a constructed response. When teaching a strategy, first model the strategy multiple times, provide assistance as students practice using the strategy on their own, and allow for independent practice with the strategy once they have learned it. Self-efficacy is important for students as they make strategies their own.
- **Summarizing text:** Explicitly teach students procedures for summarizing what they read. Summarization allows students to practice concise, clear writing to convey an accurate message of the main ideas in a text. Teaching summary writing can involve explicit strategies for producing effective summaries or gradual fading of models of a good summary as students become more proficient with the skill.
- **Collaborative writing:** Allow students to work together to plan, write, edit, and revise their writing. Provide a structure for cooperative writing and explicit expectations for individual performance within their cooperative groups or partnerships. For example, if the class is working on using descriptive adjectives in their compositions, one student could be assigned to review another's writing. He or she could provide positive feedback, noting several instances of using descriptive vocabulary, and provide constructive feedback, identifying several sentences that could be enhanced with additional adjectives. After this, the students could switch roles and repeat the process.
- **Goals:** Set specific goals for the writing assignments that students are to complete. The goals can be established by the teacher or created by the class themselves, with reviews from the teacher to ensure they are appropriate and attainable. Goals can include (but are not limited to) adding more ideas to a paper or including specific elements of a writing genre (e.g., in an opinion essay include at least three reasons supporting your belief). Setting specific product goals can foster motivation, and teachers can continue to motivate students by providing reinforcement when they reach their goals.
- **Word processing:** Using a computer for completing written tasks not only assists students in learning how to use technology, but improves the writing process. With a computer, text can be added, deleted, and moved easily. Furthermore, students can access tools, such as spell check, to enhance their written compositions. As with any technology, teachers should provide guidance on proper use of the computer and any relevant software before students use the computer to compose independently.
- **Sentence combining:** Explicitly teach students to write more complex and sophisticated sentences. Sentence combining involves teacher modeling of how to combine two or more related sentences to create a more complex one. Students should be encouraged to apply the sentence construction skills as they write or revise.
- **Process writing:** Implement flexible, but practical classroom routines that provide students with extended opportunities for practicing the cycle of planning, writing, and

reviewing their compositions. The process approach also involves: writing for authentic audiences, personal responsibility for written work, student-to-student interactions throughout the writing process, and self-evaluation of writing.

- **Inquiry:** Set writing assignments that require use of inquiry skills. Successful inquiry activities include establishing a clear goal for writing (e.g., write a story about conflict in the workplace), examination of concrete data using specific strategies (e.g., observation of an experiment and recording their reactions), and translation of what was learned into one or more compositions.
- **Prewriting:** Engage students in activities prior to writing that help them produce and organize their ideas. Prewriting can involve tasks that encourage students to access what they already know, do research about a topic they are not familiar with, or arrange their ideas visually (e.g., graphic organizer) before writing.
- **Models:** Provide students with good models of the type of writing they are expected to produce. Teachers should analyze the models with their class, encouraging students to imitate in their own writing the critical and effective elements shown in the models. [14]

[14] Gillespie, A. & Graham, S. Evidence-based practices for teaching writing. (2011). Retrieved from the World Wide Web at: http://education.jhu.edu/newhorizons/Better/articles/Winter2011.html

Graham, S., & Perin, D. (2007). *Writing next: Effective strategies to improve writing of adolescent in middle and high schools – A report to Carnegie Corporation of New York.* Washington, DC: Alliance for Excellent Education.

Pennington, M. Twelve Tips to Teach the Reading-Writing Connection. (2009). Retrieved from the World Wide Web at: http://penningtonpublishing.com/writing/teaching-essay-strategies.html

The Reading and Writing Project. Pathways to the Common Core: Videos from Inside Classrooms. Retrieved from the World Wide Web at: http://readingandwritingproject.com/resources/common-core-standards/ccs-videos.html

U.S. Department of Education, Office of Vocational and Adult Education. (2011). *Just Write! Guide*. Washington, DC: Author. Retrieved from the World Wide Web at: https://teal.ed.gov/tealGuide/toc

Developing Constructed Response

When integrating reading and writing to develop a constructed response, it is important to ensure that students have specific strategies to use, as well as a writing process to follow.

Students need:

- reading strategies for different types of text – including before, during, and after reading strategies, including strategies for identifying evidence and analyzing and evaluating text
- a process for unpacking the prompt where key words are identified
- skills and practice in developing thesis statements
- practice in identifying relevant details in the excerpt(s), using quotations, and paraphrasing
- methods for organizing their ideas and details logically
- strategies for drafting an effective answer
- skills in editing and revising

Steps for Drafting Constructed Responses

Although the steps for drafting a constructed response may look simple, the process requires numerous skills (and strategies) to produce effective writing. Often, instructors use a graphic organizer to assist students in drafting the information necessary to complete their answer.

1. **Unpack** the prompt (identify key words)
2. **Read** the passage and question, interacting with text and identifying the evidence
3. **Analyze and evaluate** the evidence and **write** a thesis statement/claim
4. **Collect** relevant details from passage
5. **Organize** details into a logical order
6. **Draft** an answer
7. **Re-read** and **edit/revise** the answer making sure all parts of the question are answered

Structure to Answering a Constructed Response Question

Beginning

- States the main idea or position
- Develops a thesis statement
- Sets the stage to answer the prompt

Middle

- Answers the question first
- Provides important information the author(s) stated and/or inferred
- Provides examples/evidence and important details to support the answer
- Includes background information as required through the prompt

Ending

- Summarizes the position taken
- Restates the thesis statement in a different way

Twelve Tips for Integrating Reading and Writing Skills – The Connection

Although there may be specific reading or writing instruction that is taught independently, the reading and writing processes are interrelated.

"**1. Teach the Author-Reader Relationship**

Both reading and writing involve interactive relationships between author and reader. Reading really is about communication between the reader and the author. Now, it's true that the author is not speaking directly to the reader; however, readers understand best when they pretend that this is so. Unlike reading, writing requires the thinker to generate both sides of the dialog. The writer must create the content and anticipate the reader response. Teaching students to carry on an internal dialog with their anticipated readers, *while they write,* is vitally important.

Strategy: Write Aloud

2. Teach Prior Knowledge

What people already know is an essential component of good reading and writing. Content knowledge is equally important as is skill acquisition to read and write well. Reading specialists estimate that reading comprehension is a 50-50 interaction. In other words, about half of one's understanding of the text is what the reader puts into the reading by way of experience and knowledge. However, some disclaimers are important to mention here. Although prior knowledge is important, it can also be irrelevant, inaccurate, or incomplete which may well confuse readers or misinform writers. Of course, the teacher has the responsibility to fill gaps with appropriate content.

Strategy: KWHL

3. Teach Sensory Descriptions

Both readers and writers make meaning through their sensory experiences. Recognizing sensory references in text improves understanding of detail, allusions, and word choice. Good readers apply all of their senses to the reading to better grasp *what* and *how* the author wishes to communicate. They listen to what the author is saying to *them*. For example, good readers try to feel what the characters feel, visualize the changing settings, and hear how the author uses dialog. Applying the five senses in writing produces memorable "show me," rather than "tell me" writing.

Strategy: Interactive Reading

4. Teach Genre Characteristics

All reading and writing genres serve their own purposes, follow their own rules, and have their own unique characteristics. Knowing the text structure of each genre helps readers predict and analyze what the author will say and has said. For example, because a reader understands the format and rules of a persuasive essay, the reader knows to look for the thesis in the introduction, knows to look for the evidence that backs up the topic sentence in each body paragraph, and knows to look for the specific strategies that are utilized in the conclusion paragraphs. Writing form is an important component of rhetorical stance. Knowing each genre (domain) also helps writers include the most appropriate support details and evidence. For example, persuasive essays often use a counterpoint argument as evidence.

Strategy: Rhetorical Stance

5. Teach Structural Organization

Readers recognize main idea, anticipate plot development or line of argumentation, make inferences, and draw conclusions based upon the structural characteristics of the reading genre. For example, readers expect the headline and introductory paragraph(s) of a newspaper article to follow the structural characteristics of that genre. For example, news articles include Who, What, Where, When, and How at the beginning, thus the informed reader knows to look for these components. Similarly, writers apply their knowledge of specific structural characteristics for each writing genre. For example, knowing the characteristics of these plot elements: problem, conflict; rising action, climax, falling action, and resolution will help the writer craft a complete narrative.

Strategy: Numerical Hierarchies

6. Teach Problem Solving Strategies

Good readers and writers act like detectives, looking for clues to understand and solve a case. In a persuasive essay, the reader should detect how a thesis is argued, how the variety of evidence is presented, and if the conclusions are justified in light of the evidence. In a narrative, the writer needs to clearly state the basic problem of the story and how that problem leads to a conflict. Through the elements of plot, the writer must deal with this conflict and resolve it to the reader's satisfaction.

Strategy: Evidence

7. Teach Coherency and Unity

For both reading and writing, the object is to make sense of the content. Recognizing the author's rhetorical organization, grammatical patterns, transition words, and use of writing techniques such as repetition, parallelism, and summary will facilitate comprehension. Knowing *how* the author communicates helps the reader understand *what* is being communicated. Applying an organizational pattern appropriate to the writing content and effective writing techniques will help the reader understand the content of the communication. Writing unity refers to how well sentences and paragraphs stay focused on the topic. For example, readers need to train themselves to look for irrelevant (off the point) details. Similarly, writers need to ensure that their writing stays on point and does not wander into tangential "birdwalking."

Strategies: Coherency and Unity

8. Teach Sentence Structure Variety

Good readers are adept at parsing both good and bad sentence structure. They consciously work at identifying sentence subjects and their actions. They apply their knowledge of grammar to build comprehension. For example, they recognize misplaced pronouns and dangling participles, such as in "The boy watched the dog beg at the table and his sister fed it" and are able to understand what the author means, in spite of the poor writing. Good writing maintains the reader's attention through interesting content, inviting writing style, effective word choice, and sentence variety. Knowing how to use different sentence structures allows the writer to say what the writer wants to say in the way the writer wants to say it. Most professional writers plan 50% of their sentences to follow the subject-verb-complement grammatical sentence structure and 50% to follow other varied sentence structures. No one is taught, convinced, or entertained when bored.

Strategy: Grammatical Sentence Openers

9. Teach Precise Word Choice

Understanding the nuances to word meanings lets the reader understand precisely what the author means. Knowing semantic variations helps the reader understand why authors use the words that they do and helps the reader "read between the lines," i.e., to infer what the author implies. When writers use words with precision, coherency is improved. There is no ambiguity and the reader can follow the author's intended train of thought.

Strategies: Vocabulary Ladders and Semantic Spectrums

10. Teach Style, Voice, Point of View, Tone, and Mood

Good readers recognize how an author's writing style and voice (personality) help shape the way in which the text communicates. For example, if the style is informal and the voice is flippant, the author may use hyperbole or understatement as rhetorical devices. Recognizing whether the author uses omniscient or limited point of view in the first, second, or third person will help the reader understand who knows what, and from what perspective in the reading. Identifying the tone helps the reader understand how something is being said. For example, if the tone is sarcastic, the reader must be alert for clues that the author is saying one thing, but meaning another. Identifying the mood of a literary work will enable the reader to see how the plot and characters shape the feeling of the writing. For example, knowing that the mood of a poem is dark allows the reader to identify the contrasting symbolism of a "shining light." In addition to applying the writing tools described above, good writers need to be aware of errors in writing style that do not match rules or format of certain forms of writing, such as the formal essay.

Strategy: Writing Style Errors

11. Teach Inferences

Both reading and writing is interpretive. Readers infer meaning, make interpretations, or draw logical conclusions from textual clues provided by the author. Writers imply, or suggest, rather than overtly state certain ideas or actions to build interest, create intentional ambiguity, develop suspense, or re-direct the reader.

Strategy: Inference Categories

12. Teach Metacognition and Critical Thinking

Reading and writing are thinking activities. Just decoding words does not make a good reader. Similarly, just spelling correctly, using appropriate vocabulary, and applying fitting structure to paragraphs does not make a good writer. Knowing one's strengths and weaknesses as a reader or writer helps one identify or apply the best strategies to communicate. Knowing how to organize thought through chronology, cause-effect, problem-solution, or reasons-evidence

rhetorical patterns assists both reader and writer to recognize and apply reasoning strategies. Knowing higher order questioning strategies, such as analysis, synthesis, and evaluation helps the reader and writer see beyond the obvious and explore issues in depth.

Strategies: Self-Questioning and Reasoning Errors"[15]

Resources

Although there are numerous resources to assist the classroom instructor, the following are a few websites to start with:

- Free Resources for Educational Excellence
  http://free.ed.gov/index.cfm
- PBS Teacher Source
  http://www.pbs.org/teachers
- Purdue University's OWL
  http://owl.english.purdue.edu/
- RAFTS Northern Nevada Writing Project
  http://www.unr.edu/educ/nnwp/index.html
- Teaching That Makes Sense
  http://ttms.org/
- ReadWriteThink
  http://www.readwritethink.org/
- National Council for Teachers of English
  http://www.ncte.org/kits/nonfictionlessons

[15] Pennington, M. Twelve Tips to Teach the Reading/Writing Connection (2009). Retrieved from the World Wide Web at: http://penningtonpublishing.com/writing/teaching-essay-strategies.html

Strategies for Mathematical Reasoning

Mathematical Reasoning

Mathematical reasoning refers to the logical thinking skills that individuals develop while learning mathematics. Developing mathematical reasoning skills enables students to gain skills in the classroom that they can then transfer to problem solving in all areas of their lives. Through mathematical reasoning, students learn how to evaluate a problem, design a plan to solve the problem, execute that plan, and then evaluate the results and make adjustments as needed. These same reasoning skills can then be applied to real-life problems on the job, at home, within the community, or in higher education and training programs.

Overview Mathematical Reasoning Test

The GED® Mathematical Reasoning Test focuses on two major content areas:

- quantitative problem solving – approximately 45%
- algebraic problem solving – approximately 55%

The area of descriptive statistics and basic inference are embedded primarily in the Science and Social Studies Tests. However, assessment targets in the area of data and statistics are also included in Mathematical Reasoning.

In addition to the content-based assessment targets, the Mathematical Reasoning Test also focuses on mathematical practices. Mathematical practices describe the types of behaviors in mathematics that are essential to mastering mathematical content. Modeling is one of the

most important behaviors, which emphasizes applying mathematics to real-life situations as well as to academic problems in other fields of study.

The Mathematical Reasoning Test features: multiple choice items, a variety of technology-enhanced item types, and drop-down items. A virtual scientific calculator, the TI-30XS MultiView™, is embedded in the computer-based delivery platform. Test-takers may also use a hand-held TI-30XS MultiView™ for the test. The calculator can be used for all but the first identified items on the test.

Mathematical Content Standards

Each assessment target on the Mathematical Reasoning Test corresponds with one or more domains from the Common Core State standards (CCSS) of Mathematic and a mathematical practice.

At the high school level, the Common Core State Standards for Mathematics are divided by:

- Content Standards (6)
- Practice Standards (8)

Mathematical Content Standards

- Number and Quantity
- Modeling
- Algebra
- Functions
- Geometry
- Statistic and Probability

Mathematical Practice Standards

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning

It's important to familiarize yourself with the various educational standards that are the foundation of the Common Core State Standards and the 2014 GED® test.

Resources

For additional information on the Mathematical Reasoning Assessment Targets, access the Assessment Guide for Educators, Chapter 2:

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/the-new-assessment-downloads

For additional information on the Florida GED® Curriculum Frameworks access:

- Florida's GED® Curriculum Frameworks
  http://www.fldoe.org/academics/career-adult-edu/adult-edu/2016-2017-adult-edu-curriculum-framewo.stml

Performance Level Descriptors for Mathematical Reasoning

Performance Level Descriptors (PLDs) explain the skills a test-taker generally demonstrates in order to score into one of the four performance levels on the GED® test and the skills they need to develop to advance their scores. PLDs provide us with the "stuff to teach" in our classrooms. The four performance levels for the GED® Mathematical Reasoning test are:

- Performance Level 1 – Below Passing
- Performance Level 2 – Pass/High School Equivalency
- Performance Level 3 – GED College Ready
- Performance Level 4 – GED College Ready + Credit

The primary focus of a GED® Preparatory classroom includes those skills or descriptors found in Performance Level 2 – Pass/High School Equivalency. It is important to remember that some students will need to be taught skills at Performance Level 1, while other students may have higher level skills, such as those found at Performance Levels 3 and 4.

Resources

For additional information on the Mathematical Reasoning Performance Level Descriptors, access the Assessment Guide for Educators:

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/the-new-assessment-downloads

Standards-Driven Curriculum

Standards provide adult educators with a starting point – a method for increasing awareness and understanding of the skills and knowledge that adult learners must have to be successful as they pursue postsecondary education and training and employment. Although standards do not tell individual schools or instructors in the classroom what they must teach, standards do provide a consistent, clear understanding of what students are expected to learn, so teachers know what they need to do to help their students.

The *College and Career Readiness (CCR) Mathematical Standards* identify three key shifts: focus, coherence, and rigor.

Shift 1 – Focus: Focusing strongly where the standards focus

This shift requires that classroom instruction focuses on:

- key ideas, understandings and skills identified by the standards
- deep learning of concepts
- learning fewer concepts with more depth, rather than learning the same skills repeatedly without mastery

Shift 2 – Coherence: Designing learning around coherent progressions level to level

This shift focuses on the need for classrooms to design learning around coherent progressions where similar standards exists between the different levels, but the focus and rigor change as students progress.

Shift 3 – Rigor: Pursuing conceptual understanding, procedural skill and fluency, and application

This shift focuses on the need for understanding and applying concepts. Rigor is more than just procedural skill and fluency. Rather, rigor is the understanding and application of conceptual knowledge that leads to students being able to reason abstractly.

CCR Mathematical Standards

Mathematical Practices

Mathematical practices refer to the way mathematics is made and used in real-world situations. Therefore, mathematical content needs to be taught through the practices - the way in which math is used in our daily lives. This provides real connections for learning and applying what has been learned.

There are eight mathematical practices – grouped as:

- *habits of mind*
  - make sense of problems and persevere in solving them
  - attend to precision
- *reasoning and explaining*
  - reason abstractly and quantitatively
  - construct viable arguments and critique the reasoning of others
- *modeling and using tools*
  - model with mathematics
  - use appropriate tools strategically
- *seeing structure and generalizing*
  - look for and make use of structure
  - look for and express regularity in repeated reasoning

Using standards to drive both curriculum and instructional strategies is important when developing a GED® preparatory program. Note that these are the same mathematical practices as those of the Common Core State Standards.

Resources

For additional information on the Florida GED® Curriculum Frameworks access:

- Florida's GED® Curriculum Frameworks
  http://www.fldoe.org/academics/career-adult-edu/adult-edu/2016-2017-adult-edu-curriculum-framewo.stml

Strategies for the Classroom

There is a proverb that states, "What I hear, I forget; what I see, I remember; what I do, I understand." This proverb is a fundamental principle of active learning. Extensive research has shown that students learn more rapidly, retain knowledge longer, and develop superior critical thinking skills when they are actively involved in the learning process. This is especially true with mathematics.

The premise that "students learn math by doing math, not by listening to someone talk about doing math" (Twigg 2005)[16] provides the approach for teaching mathematical reasoning skills. Successful instruction in quantitative reasoning and algebraic problem solving requires a

[16] Twigg, Carol A. (2005). Math Lectures: An Oxymoron? The National Center for Academic Transformation

progressive approach where instruction connects content to real-life situations with an emphasis on a deeper understanding of concepts, rather than facts, and then applying those concepts to real-world situations.

Teaching Mathematics: An Introduction

- Students are often fearful regarding mathematics. Research states that it is both the most disliked and the most loved subject area. It is important to address and evaluate student attitudes and beliefs regarding both learning math and using math. Prior to any true learning taking place, discuss with students how methods of teaching mathematics may have caused them to develop a negative attitude.

- Determine what students already know about a topic before instruction. Use an informal discussion of what students already know about a topic prior to teaching. Formal assessment instruments do not always provide an accurate picture of a student's real life knowledge or thinking processes. For example, if discussing positive and negative integers, discuss a bank account and the concept of being "overdrawn" or in the negative category.

- Develop understanding by providing opportunities to explore mathematical ideas with concrete or visual representations and hands-on activities. Students will learn more effectively if they can visualize concretely an abstract concept (If you can “see” it, you can solve it).

- Use manipulatives such as Cuisenaire rods, fraction circles, geoboards, algebra tiles, or everyday objects such as coins, toothpicks, etc. to help students explain how mathematical rules and concepts work. Start with concrete objects to move to abstract ideas.

- Encourage the development and practice of estimation skills and mental math. Although not directly assessed on the Mathematical Reasoning Test, these skills are useful both in determining the reasonableness of an answer, as well as during everyday life when one does not always use "exact" math.

- Integrate problem-solving abilities. Word problems or real-life problems must be a significant part of instructional time. Have students write their own word problems to reinforce the connection between mathematical content and real-world application.

- Encourage use of multiple solution strategies. Teach students how to solve problems in different ways. Ensure that more than one strategy is used to solve a problem so that students are comfortable in integrating different problem-solving solutions. Categories of problem solving skills include:
    - Drawing a picture or diagram
    - Marking a chart or graph
    - Dividing a problem into smaller parts

- Looking for patterns
- Using a formula or written equation
- Computing or simplifying
- Using the process of elimination
- Working backwards

- Help students understand the process required in problem solving. Use a strategy that is adapted from the Polya Problem Solving Strategy:
  - Understand the problem
  - Devise a plan
  - Carry out the plan
  - Look back[17]

- Provide opportunities for group work. Develop a project where a group effort is appropriate. An example would be to organize an activity where the development of a plan, schedule, budget, needed business materials, and a report would be required. As with all group activities, clear goals and rules must initiate the project. A rubric would be helpful in providing students with the structure to assess their own progress as a group.

- Provide problem-solving tasks within a meaningful, realistic context in order to facilitate transfer of learning. Students need to view math as a necessary skill in their lives. Assist transference through the use of problem-solving tasks such as finding the best mortgage deal or comparing the cost of different types of transportation.

- Develop students' skills in interpreting numerical or graphical information appearing within documents and text. Math does not always take the form of computation. Graphs, tables, text, payment schedules, and contracts are just a few of the ways in which text is filled with mathematical concepts. Strategies to use in teaching students how to accurately interpret such documents can include having students graph information from their lives for the last 24 hours. Pictorial, circle, line, or any type of graph can be used to visually document numerical information. Another activity would be to have students critique and discuss an article filled with numerical information such as an employee benefit statement.

Math Journals in the GED® Classroom

Writing activities can help students better understand the material they are trying to learn and ultimately can shift students from looking at math as a series of formulas that have to be solved or computations that must be completed to recognizing that mathematics is a process. Most GED® students do not recognize that mathematics is a process; rather, they see each problem

[17] Polya, G. (1954). *How to Solve It*. (2nd ed.). Princeton, NJ: Princeton University Press
Polya. G. (1980). *On Solving Mathematical Problems in High School*. In S. Krulik (Ed.), Problem Solving in School Mathematics. Reston, VA: NCTM

with a specific answer and no real relationship among the wide range of problems that they encounter in the classroom, on tests, or in the real world.

Math journals can be used for many purposes. Look at math journals as variables rather than constants, providing opportunities for students to:

- Increase their feelings of confidence in being able to learn and use mathematical concepts and skills to solve a wide range of problems and thus help alleviate math anxiety.
- Be more aware of what they do and do not know.
- Make use of their own prior knowledge when solving new problems.
- Identify their own questions about an area with which they are less familiar.
- Develop their ability to think through a problem and identify possible methods for solving it.
- Collect and organize their thoughts.
- Monitor their own progress as they gain higher-level problem-solving skills and are able to work with more complex problems.
- Make connections between mathematical ideas as they write about various strategies that could be used for problem solving.
- Communicate more precisely how they think.

In *Writing in the Mathematics Curriculum* (Burchfield, Jorgensen, McDowell, and Rahn 1993), the authors identify three possible categories for math journal prompts. These categories include:

- Affective/attitudinal prompts, which focus on how students feel.
- Mathematical content prompts, which focus on what the material is about.
- Process prompts, which require students to explain what they are thinking and doing.

Using Affective/Attitudinal Prompts in Math Journals

Many adult learners are math phobic or, at least, fearful of trying and failing to solve problems. Their own feelings of inability to learn mathematics get in their way and, in essence, become a self-fulfilling prophecy. The more anxious the learner becomes, the less he/she is able to focus on the math content. Affective/attitudinal math journal prompts enable students to express their feelings, concerns, and fears about mathematics.

The following are a few examples of affective/attitudinal prompts:

- Explain how you feel when you begin a math session.
- One secret I have about math is . . .
- If I become better at math, I can . . .
- My best experience with math was when . . .
- My worst experience with math was when . . .
- Describe how it feels if you have to show your work on the board . . .
- One math activity that I really enjoyed was . . .

Using Mathematical Content Prompts in Math Journals

When working with math content, most adult learners expect merely to perform a series of computations and provide a specific answer. Rarely have they been asked to explain what they did to find an answer. Mathematical content prompts provide learners with an opportunity to explain how they arrived at a specific answer, thus enabling them to begin making connections between what they have done and the math content itself. These types of prompts also enable students to support their point of view or to explain errors they made in their calculations.

Mathematical content prompts can be as simple as students writing definitions in their own terms, such as defining providing math examples of what variables are and why they are used.

The following are a few examples of mathematical content prompts:

- The difference between . . . and . . . is . . .
- How do you . . .?
- What patterns did you find in…?
- How do you use … in everyday life?
- Explain in your own words what . . . means.
- One thing I have to remember with this kind of problem is . . .
- Why do you have to . . .?

Using Process Prompts in Math Journals

Process prompts allow learners to explore how they go about solving a problem. It moves them from mere computations to looking at math problem solving as a process that, just as in solving real-life problems, requires a series of steps and questions that must be analyzed and answered.

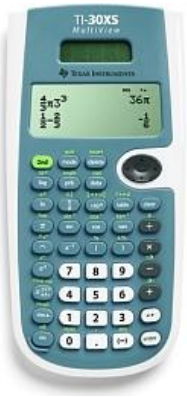
Process prompts require learners to look more closely at how they think.

The following are examples of process prompts:

- How did you reach the answer for the problem about . . . ?
- What part in solving the problem was the easiest? What was the most difficult? Why?
- The most important part of solving this problem was . . .
- Provide instructions for a fellow student to use to solve a similar problem.
- What would happen if you missed a step in the problem? Why?
- What decisions did you have to make to solve this type of problem?
- When I see a word problem, the first thing I do is . . .
- Review what you did today and explain how it is similar to something you already knew.
- Is there a shortcut for finding . . .? What is it? How does it work?
- Could you find the answer to this problem another way?
- To solve today's math starter, I had to . . .
- The first answer I found for this problem was not reasonable, so I had to . . . [18]

[18] Math Journals for All Ages. http://math.about.com/aa123001a.htm

The Tools of Math – Using the TI-30XS MultiView™ Calculator



The tools of math are everywhere. We use calculators, spreadsheets, databases, software, and notebooks. Think about how these tools are used in daily life, in the workplace, and in academic settings.

It's important to remember that the GED® test is designed to reflect what graduating seniors know and can do. The use of the scientific calculator is common in most high school level math courses. The 2014 GED® Mathematics Test allows the use of the TI-30XS MultiView™ calculator on all but the first five test questions. Students are provided with directions on how to use the basic functions of the calculator. However, it is important that students be familiar with this important tool.

Resources

For additional information on the TI-30XS MultiView™ calculator, access the following sites for free tutorials, videos, teacher guides, and lesson plans:

- GED Testing Service® – Videos on the TI-30XS MultiView™ calculator
  http://www.gedtestingservice.com/testers/calculator

- Texas Instruments – Teacher Guide for the TI-30XS MultiView™ calculator
  http://education.ti.com/en/us/guidebook/details/en/62522EB25D284112819FDB8A46F90740/30x_mv_tg

- Texas Instruments – Free lesson plans for the TI-30XS MultiView™ calculator
  http://education.ti.com/en/us/activity/search/subject?d=2717022CF3A841848A4DEF66BB848B88&s=B843CE852FC5447C8DD88F6D1020EC61

- Atomic Learning® TI-30XS MultiView™ calculator
  http://www.atomiclearning.com/k12/en/ti30xs

Burchfield, P.C., Jorgensen, P.R., McDowell, K.G., and Rahn, J. (1993). *Writing in the Mathematics Curriculum*

Countryman, J. (1992). *Writing to Learn Mathematics.* Portsmouth, NH: Heinemann

Whitin, Phyllis and Whitin, David J. (2000). *Math Is Language Too: Talking and Writing in the Mathematics Classroom.* Urbana, IL: National Council of Teachers of English, and Reston, VA: National Council of Teachers of Mathematics

Using Manipulatives in the Classroom

A mathematical manipulative is defined as any material or object from the real world that students move around to show a mathematics concept. Research indicates that students of all ages can benefit by first being introduced to mathematical concepts through physical exploration. By planning lessons that proceed from concrete to pictorial to abstract representations of concepts, you can make content mastery more accessible to students of all ages.

With concrete exploration (through touching, seeing, and doing), students can gain deeper and longer-lasting understandings of math concepts. For example, students can explore the concept of least common multiple with integer bars. They can place the integer bars side by side, experiment, and discover how to create a combination of bars that are the same length. Once students have a concrete understanding of the concept of greatest common factor (GCF) as matching lengths, they will find it easier to use a number line or make lists to identify the GCF. Similarly, if students use grid paper, pencils, and scissors to discover the formulas for computing the areas of parallelograms, triangles, or trapezoids, the formulas will make sense to them and they will be more likely to remember the formulas.

Using manipulative materials in teaching mathematics will help students learn:

- To relate real-world situations to mathematics symbolism
- To work together cooperatively in solving problems
- To discuss mathematical ideas and concepts
- To verbalize their mathematics thinking
- To make presentations in front of a large group
- That there are many different ways to solve problems
- That mathematics problems can be symbolized in many different ways
- That they can solve mathematics problems without just following teachers' directions

Managing Manipulatives

Using manipulatives can present classroom management challenges. Teachers find that manipulatives can get lost or broken. Students sometimes use manipulatives for other than the intended purpose. Distributing the manipulatives can take time, but the following guidelines can assist the teacher in using them more effectively.

- *Set Up Simple Storage Systems* - Set up a simple system to store the manipulatives. Some teachers arrange shelves or cupboards with plastic boxes or snap-and-seal bags. Others place their materials in the center of tables or desks. Clearly label your storage containers. Make sure students understand the system and have easy access to it.
- *Establish Clear Rules* - Prior to your first use of manipulatives, discuss a clear set of rules for using the manipulatives with your students. You may want to explain what manipulatives will be used for and include the following information:
    - appropriate uses for learning

- handling
- storage
- distribution and return
- student roles and responsibilities

Structured Learning Experiences

The key to successful hands-on activities is to provide a structured learning experience in which students learn how to use manipulatives. To maximize learning, always provide three levels of practice.

- Modeled Tasks - Before distributing materials, provide clear instructions and model the tasks the students will carry out. If it is appropriate, you can invite students to help you model. For example, if the students are going to use fraction bars to complete addition problems, you might have students model using overhead bars and how they completed the process.
- Guided Practice - Give students opportunities to practice prior to working individually or in small groups. If this is the first time the student is handling the manipulative, consider allowing extra time for exploration. You might ask the students to construct the largest possible right angle on a geoboard and give them time to figure out how to work with the pegs and rubber bands. Monitor student practice during this phase to give them the support they need to be successful when they work independently.
- Independent Work - Once students know how to use manipulatives, they can complete problems on their own or in small groups with less support. This is an excellent time to informally assess learning and provide intervention as needed.

Resources

For additional information on manipulatives, access:

- National Library of Virtual Manipulatives for Math
  http://nlvm.usu.edu/en/nav/index.html

- Algebra 4 All
  http://a4a.learnport.org/page/algebra-tiles

- Working with Algebra Tiles
  http://mathbits.com/MathBits/AlgebraTiles/AlgebraTiles.htm

Evidence-Based Practices for the Math Classroom

The following is an overview of evidence-based practices for effective math instruction.

Instructional Element	Recommended Practices
Curriculum Design	Ensure mathematics curriculum is based on challenging content Ensure curriculum is standards based Clearly identify skills, concepts and knowledge to be mastered Ensure that the mathematics curriculum is vertically and horizontally articulated
Professional Development for Teachers	Provide professional development which focuses on: Knowing/understanding standards Using standards as a basis for instructional planning Teaching using best practices Multiple approaches to assessment Develop/provide instructional support materials such as curriculum maps and pacing guides and provide math coaches
Technology	Provide professional development on the use of instructional technology tools Provide student access to a variety of technology tools Integrate the use of technology across all mathematics curricula and courses
Manipulatives	Use manipulatives to develop understanding of mathematical concepts Use manipulatives to demonstrate word problems Ensure use of manipulatives is aligned with underlying math concepts
Instructional Strategies	Focus lessons on specific concept/skills that are standards based Differentiate instruction through flexible grouping, individualizing lessons, compacting, using tiered assignments, and varying question levels Ensure that instructional activities are learner-centered and emphasize inquiry/problem-solving Use experience and prior knowledge as a basis for building new knowledge Use cooperative learning strategies and make real life connections

	Use scaffolding to make connections to concepts, procedures and understanding Ask probing questions which require students to justify their responses Emphasize the development of basic computational skills
Assessment	Ensure assessment strategies are aligned with standards/concepts being taught Evaluate both student progress/performance and teacher effectiveness Utilize student self-monitoring techniques Provide guided practice with feedback Conduct error analyses of student work Utilize both traditional and alternative assessment strategies Ensure the inclusion of diagnostic, formative and summative strategies Increase use of open-ended assessment techniques

Geometric Thinking Skills

Geometry is the attempt to understand space, shape, and dimension. It's about the properties of objects (their angles and surfaces, for instance) and the consequences of how these objects are positioned (where their shadows fall, how people must move around them).

Spatial understandings are necessary for interpreting, understanding, and appreciating our inherently geometric world. Insights and intuitions about two- and three-dimensional shapes and their characteristics, the interrelationships of shapes, and the effects of changes to shapes are important aspects of spatial sense. Students who develop a strong sense of spatial relationships and who master the concepts and language of geometry are better prepared to learn number and measurement ideas, as well as other advanced mathematical topics.

The Development of Geometric Thinking

Geometry curriculum is often presented through the memorization and application of formulas, axioms, theorems, and proofs. This type of instruction requires that students function at a formal deductive level. However, many students lack the prerequisite skills and understanding of geometry in order to operate at this level.

The work of two Dutch educators, Pierre van Hiele and Dina van Hiele-Geldof, has had a major impact on the design of geometry instruction and curriculum. The van Hiele's work began in 1959 and has since become the most influential factor in the American geometry curriculum.

The van Hiele model is a five-level hierarchy of ways of understanding spatial ideas. Each of the five levels describes the thinking processes used in geometric contexts. The levels describe how one thinks and what types of geometric ideas one thinks about, rather than how much knowledge one has. Remember that the levels are not age dependent, but are rather sequential in nature.

Level 1: Visualization

The objects of thought at level 1 are shapes and what they "look like."

Students recognize and name figures based on the global, visual characteristics of the figure—a gestalt-like approach to shape. Students operating at this level are able to make measurements and even talk about properties of shapes, but these properties are not thought about explicitly. It is the appearance of the shape that defines it for the student. A square is a square "because it looks like a square." Because appearance is dominant at this level, appearances can overpower properties of a shape. For example, a square that has been rotated so that all sides are at a 45° angle to the vertical may not appear to be a square for a level 1 thinker. Students at this level will sort and classify shapes based on their appearances—"I put these together because they all look sort of alike."

The products of thought at level 1 are classes or groupings of shapes that seem to be "alike."

Level 2: Analysis

The objects of thought at level 2 are classes of shapes rather than individual shapes.

Students at the analysis level are able to consider all shapes within a class rather than a single shape. Instead of talking about *this* rectangle, it is possible to talk about *all* rectangles. By focusing on a class of shapes, students are able to think about what makes a rectangle a rectangle (four sides, opposite sides parallel, opposite sides same length, four right angles, congruent diagonals, etc.). The irrelevant features (e.g., size or orientation) fade into the background. At this level, students begin to appreciate that a collection of shapes goes together because of properties. Ideas about an individual shape can now be generalized to all shapes that fit that class. If a shape belongs to a particular class such as cubes, it has the corresponding properties of that class. "All cubes have six congruent faces, and each of those faces is a square." These properties were only implicit at level 0. Students operating at level 2 may be able to list all the properties of squares, rectangles, and parallelograms but not see that these are subclasses of one another that all squares are rectangles and all rectangles are parallelograms. In defining a shape, level 2 thinkers are likely to list as many properties of a shape as they know.

The products of thought at level 2 are the properties of shapes.

Level 3: Informal Deduction

The objects of thought at level 3 are the properties of shapes.

As students begin to be able to think about properties of geometric objects without the constraints of a particular object, they are able to develop relationships between and among these properties. "If all four angles are right angles, the shape must be a rectangle. If it is a square, all angles are right angles. If it is a square, it must be a rectangle." With greater ability to engage in "if-then" reasoning, shapes can be classified using only minimum characteristics. For example, four congruent sides and at least one right angle can be sufficient to define a square. Rectangles are parallelograms with a right angle. Observations go beyond properties themselves and begin to focus on logical arguments *about* the properties. Students at level 3 will be able to follow and appreciate an informal deductive argument about shapes and their properties. "Proofs" may be more intuitive than rigorously deductive. However, there is an appreciation that a logical argument is compelling. An appreciation of the axiomatic structure of a formal deductive system, however, remains under the surface.

The products of thought at level 3 are relationships among properties of geometric objects.

Level 4: Deduction

The objects of thought at level 4 are relationships among properties of geometric objects.

At level 4, students are able to examine more than just the properties of shapes. Their earlier thinking has produced conjectures concerning relationships among properties. Are these

conjectures correct? Are they “true”? As this analysis of the informal arguments takes place, the structure of a system complete with axioms, definitions, theorems, corollaries, and postulates begins to develop and can be appreciated as the necessary means of establishing geometric truth. At this level, students begin to appreciate the need for a system of logic that rests on a minimum set of assumptions and from which other truths can be derived. The student at this level is able to work with abstract statements about geometric properties and make conclusions based more on logic than intuition. This is the level of the traditional high school geometry course. A student operating at level 4 can clearly observe that the diagonals of a rectangle bisect each other, just as a student at a lower level of thought can. However, at level 4, there is an appreciation of the need to prove this from a series of deductive arguments. The level 3 thinker, by contrast, follows the argument but fails to appreciate the need.

The products of thought at level 4 are deductive axiomatic systems for geometry.

Level 5: Rigor

The objects of thought at level 5 are deductive axiomatic systems for geometry.

At the highest level of the van Hiele hierarchy, the object of attention is axiomatic systems themselves, not just the deductions within a system. There is an appreciation of the distinctions and relationships between different axiomatic systems. This is generally the level of a college mathematics major who is studying geometry as a branch of mathematical science.

The products of thought at level 5 are comparisons and contrasts among different axiomatic systems of geometry.

Teaching Geometric Thinking: A Few Strategies

Research has shown that the use of the following strategies is effective in assisting students to learn concepts, discover efficient procedures, reason mathematically, and become better problem solvers in the areas of geometry and measurement.

Have high expectations for all students. Ensure that students’ learning styles are addressed in teaching geometry. By varying instructional strategies and presenting content in a range of formats, teachers can better meet the needs and address the learning styles of individual students. Incorporate academic standards so that lessons can be selected that are necessary for the student to learn.

Base practice on educational research. Incorporating research results and findings is a way to profit from the work of others. Research indicates that students benefit from cooperative learning types of activities with the opportunity to connect those activities to real-world situations.

Integrate content areas. The learning of geometric ideas becomes more meaningful for students when it is presented in contexts beyond individual lessons. Mathematics should be connected in three ways:

- within mathematical concepts;
- with other disciplines; and
- to real-world situations.

All of these, in different ways, help students to establish a framework of strategies that students can call upon in order to solve new problems and learn new concepts and algorithms. Integrating mathematics into real-world situations also assists students to better "connect" to what is being taught and to answer the question of "Why do I need to learn this?" It is also important to incorporate the best possible materials into the geometry curriculum, drawing from resources available as well as real-world materials.

Encourage cooperative learning and collaboration with others. Research supports that students learn best when they have time to explore and discover concepts. Cooperative learning is a valuable tool for learning, as students learn both from the teacher and from each other. Cooperative learning also actively involves students in the learning process and encourages them to communicate mathematically. A teacher who promotes mathematical reasoning and problem solving also tends to create a classroom that is a supportive and collegial community of learners.

When a teacher poses challenging problems to a class, students benefit from working in small groups to explore and discuss ideas and then reporting their findings to the class. It is also effective to put students into groups, in which they compare and contrast the ways they approached problems and arrived at a solution. These strategies support the sharing of diverse kinds of thinking, place value on listening to and learning from others, and help students to develop ways to solve future problems. Cooperative learning also prepares students to work as a team, which is something that many employers will expect from them later, as employees.

Use technology as a tool. Technology provides a unique opportunity to improve student performance in mathematical reasoning and problem solving. In geometry, interactive software can enhance student understanding of such things as multi-dimensional shapes and their properties. Virtual manipulatives allow students to better understand specific topics in the area of geometry. The Internet also provides an excellent tool for students and teachers to use to access information and to communicate with others.

Use inquiry-based learning. Teaching is most engaging for students when their own thoughts, opinions, and curiosities are addressed in the subject at hand. The best way to

ensure that students feel they have a stake in their own learning is to create a classroom that values exploration, where teacher and students alike can support, discuss, and evaluate ways of thinking in an open and ongoing way.

The difference between traditional and inquiry-based learning in a geometry classroom would be as follows:

In a traditional classroom, students first learn about discrete concepts and procedures, such as the perimeter and area of a rectangle. They would then learn how to use the formula "A = L x W" to find the area of a rectangle, given its length and width. Later, students would learn about the area of a triangle and how to find the area using a formula. Eventually, students would apply this knowledge to determine the area of a figure composed of a rectangle and triangle.

When a teacher uses inquiry-based learning, the process is reversed. The teacher presents a problem first, such as, "If you want to paint the front of a house, how much area must you paint?" Students then explore the problem and – and with the teacher's guidance – discover that they need to understand how to cover an area with a standard-size unit. After solving the problem, students look for efficient procedures for finding the area and then develop formulas accordingly.

Promote mathematical reasoning and problem-solving skills. Critical thinking is a crucial component of learning. Students should be encouraged to justify their thinking, rather than merely providing a correct answer to a problem. Through encouraging mathematical reasoning and problem solving, students will increase their ability to solve problems, which in turn builds confidence. A teacher should:

Use problems from a variety of sources to introduce new geometric concepts

- Pose questions frequently
- Encourage students to think for themselves
- Present problems that are open-ended (whenever feasible), to allow for multiple problem-solving approaches.

Use hand-on activities to model topics. Use hands-on activities to model concepts in geometry and measurement and to help students better understand the concepts of mathematics. Students grow to understand concepts when they have first experienced concepts on a concrete level. Students' long-term use of concrete instructional materials and manipulatives supports achievement in mathematics.

Cluster concepts. When students learn concepts and relationships in isolation, they often forget these ideas or are slow in making the connections among them. A thinking process

called "clustering," used to group, unify, integrate, and/or make connections among concepts, is something that students and adults use routinely, often without even realizing it. A teacher can use this approach to cluster mathematical ideas, concepts, relationships, and objects in order to reveal common characteristics. This presentation in turn helps students to categorize and classify those ideas or objects and to remember properties and attributes, which makes the learning more meaningful. An example would be to teach quadrilaterals as a unifying concept where students compare and contrast all quadrilaterals according to their attributes so that students can internalize the idea and develop a hierarchy based on the figures' properties.

Reflect on learning. Metacognitive strategies increase students' learning. Have students reflect on and communicate what they have learned and what is still unclear. To assist students in "thinking about their thinking," have them:

- Make connections between new information and known ideas
- Choose appropriate thinking strategies for a particular use
- Plan, monitor, and assess how effective certain thinking processes were

One way of accomplishing this kind of reflection is through the use of student-created portfolios. Even the process of selection that goes into making portfolios helps the student to build self-awareness and ultimately gives the student more control over her or his own learning. Writing encourages students to analyze, communicate, discover, and organize their growing knowledge.

Integrate assessment and instruction. Ongoing classroom assessment promotes the learning process. Combine traditional modes of assessment with geometry assignments that require open-ended answers and constructed responses. The latter encourage students to:

- Incorporate higher-order thinking and skills into their solutions
- Communicate their geometric thinking
- Explore various strategies to a solution
- Apply their existing knowledge
- Organize, analyze, and interpret information
- Create a mathematical model
- Make and test predictions

Use of Manipulatives and Real-World Scenarios

Teachers are always interested in looking for ways to improve their teaching and to help students understand mathematics. Research in England, Japan, China, and the United States supports the idea that mathematics instruction and student mathematics understanding will be more effective if manipulative materials are used.

A mathematical manipulative is defined as any material or object from the real world that students move around to show a mathematics concept.

Research indicates that students of all ages can benefit by first being introduced to mathematical concepts through physical exploration. By planning lessons that proceed from concrete to pictorial to abstract representations of concepts, you can make content mastery more accessible to students of all ages.

Long-Lasting Understandings

With concrete exploration (through touching, seeing, and doing), students can gain deeper and longer-lasting understandings of math concepts. For example, if students use grid paper, pencils, and scissors to discover the formulas for computing the areas of parallelograms, triangles, or trapezoids, the formulas will make sense to them and they will be more likely to remember the formulas.

A Sample Activity

Have students "build" the ideal school. Building uses many of the geometric formulas and applications with which students need to be familiar. Begin by having students think about what it takes to build a school. Have them develop questions that must be asked, such as:

- What shape will the building be?
- How many classrooms are needed?
- How many square feet are required for the appropriate number of classrooms?
- How many and what size of windows and doors will be used?
- What size parking lot is needed?

Have students develop a blueprint that includes their ideas for the "perfect school."

Algebraic Thinking

Algebra is fundamental to understanding mathematical thought. Algebraic thinking includes:

- "looking for structure (patterns and regularities) to make sense of situations
- generalizing beyond the specific by using symbols for variable quantities
- representing relationships systematically with tables, graphs, and equations
- reasoning logically to address/solve new problems"[19]

Most people recognize that algebra is needed by scientists or engineers, but algebraic thinking and reasoning is also used by health care providers, home builders, graphic designers, and in daily life. Algebraic thinking is necessary – not just for a few professions – but for today's workforce. Blanton and Kaput (2003) stated that teachers must find ways to support algebraic thinking and create a classroom culture that values "students modeling, exploring, arguing, predicting, conjecturing, and testing their ideas, as well as practicing computational skills."

[19] National Institute for Literacy. Algebraic Thinking in Adult Education. (2010). Washington, DC

How does one get started “algebrafying” the adult education classroom? Think about transforming current activities and word problems from a single answer to opportunities to discover patterns and make generalizations about mathematical facts and relationships. Use prompts that extend student thinking, such as:

- Tell me what you were thinking.
- Could you solve this in a different way?
- How do you know that is true?
- Does that always work?

This type of relational thinking is necessary for students in the GED® preparatory classroom, as well as for adults in the workplace.

The Big Ideas

The key prerequisites for students to be successful in the study of algebra are to understand the big ideas of algebra – variable, symbolic notation, and multiple representations. When teaching algebra, use practical experiences that go beyond the mere computation required by equations.

When developing practice activities in the algebra classroom, be sure to:

- Develop processes/procedures for students to use when approaching algebraic tasks
- Create authentic exercises that highlight the critical attributes related to the concept being taught
- Provide opportunities for students to verbalize the task and predict what type of answer is expected
- Offer opportunities for students to discuss and write responses to questions dealing with key concepts being learned
- Select authentic exercises that anticipate future skills to be learned
- Design authentic exercises that integrate a number of ideas to reinforce prior learning as well as current and future concepts

Create exercises that highlight the critical attributes related to the skill or concept being taught:

- Provide opportunities for students to verbalize about the task and predict what type of answer is expected
- Offer opportunities for students to discuss and write responses to questions dealing with key concepts being learned
- Select exercises that anticipate future skills to be learned
- Design exercises that integrate a number of ideas to reinforce prior learning as well as current, and future concepts

As students learn algebraic concepts, they need to develop different procedures to use. Being able to recognize a pattern is an important critical thinking skill in solving certain algebraic problems.

- **Finding** patterns involves looking for regular features of a situation that repeats.

- **Describing** patterns involves communicating the regularity in words or in a mathematically concise way that other people can understand.
- **Explaining** patterns involves thinking about why the pattern continues forever, even if one has not exhaustively looked at each one.
- **Predicting** with patterns involves using your description to predict pieces of the situation that are not given.

A Sample Activity

Provide students with real-world problems that can be solved using algebraic thinking skills, such as the following problem.

My Ford Bronco was fitted at the factory with 30 inch diameter tires. That means its speedometer is calibrated for 30 inch diameter tires. I "enhanced" the vehicle with All Terrain tires that have a 31 inch diameter. How will this change the speedometer readings? Specifically, assuming the speedometer was accurate in the first place, what should I make the speedometer read as I drive with my 31 inch tires so that the actual speed is 55 mph?

CTL Resources for Algebra. The Department of Mathematics. Education University of Georgia
http://jwilson.coe.uga.edu/ctl/ctl/resources/Algebra/Algebra.html

Resources

Although there are numerous resources to assist the classroom instructor, the following are a few websites to start with:

- Annenberg Learner
  http://www.learner.org/index.html

- Illuminations
  http://illuminations.nctm.org

- Inside Mathematics
  http://insidemathematics.org/index.php/home

- Khan Academy
  http://www.khanacademy.org/

- The Math Dude
  http://www.montgomeryschoolsmd.org/departments/itv/MathDude/MD_Downloads.shtm

- Math Planet
  http://library.thinkquest.org/16284/index_s.htm

- Geometry Center
  http://www.geom.uiuc.edu/

- Online Resources for Teaching and Strengthening Fundamental, Quantitative, Mathematical, and Statistical Skills. NICHE
  http://serc.carleton.edu/NICHE/teaching_materials_qr.html#partone

- Key Elements to Algebra Success
  http://ntnmath.keasmath.com/

- Algebra Nation
  http://www.algebranation.com/

Strategies for Social Studies

Integrating Social Studies

The purpose of social studies instruction is the promotion of civic competence. Having a true conceptual understanding within the different areas of social studies enables greater engagement in public life.

Understanding allows us to understand change, where we come from, and helps us to make decisions. History can be inspirational – showing us how a single individual, such as Dr. Martin Luther King, Jr., can change the world. Economics enables us to understand the benefits and challenges of a free enterprise system. Understanding civics and government allows and encourages us to become active participants in our democracy. Geography helps us understand our place in the world and in this fast-paced and growing global economy helps us learn how to best compete.

Inclusion of instruction in the concepts and ideas of social studies is an essential component of a well-rounded education. However, beyond the teaching of concepts and ideas is also the opportunity to help students:

- become more effective readers
- develop critical thinking skills
- become more effective decision-makers
- enhance their problem-solving skills

Incorporating social studies instruction in the classroom helps students gain the skills they will need as they enter the workforce, participate in higher education and training, and become involved in their own communities.

Overview of Social Studies Test

The 2014 GED® Social Studies test assessment targets focus on four content domains:

- Civics and Government – approximately 50%
- U.S. History – approximately 20%
- Economics – approximately 15%
- Geography and the World – approximately 15%

Civics and government assumes a large role in the Social Studies test. This content area includes topics such as:

- Types of modern and historical governments
- Principles that have contributed to the development of American constitutional democracy
- Structure and design of the United States government
- Individual rights and responsibilities
- Political parties, campaigns, and elections in American politics
- Contemporary public policy

The area of U.S. history includes content topics such as:

- Key historical documents that have shaped American constitutional government
- Revolutionary and early republic periods
- Civil War and Reconstruction
- Civil Rights
- European settlement and population of the Americas
- World Wars I & II
- The Cold War
- American foreign policy since 9/11

The area of economics focuses on key economic issues that have shaped American government and policies as well as fundamental economic concepts at the micro and macro levels. Included are topic areas such as:

- Relationships between political and economic freedoms
- Consumer economics
- Economic causes and impacts of wars
- Economic drivers of exploration and colonization
- Scientific and Industrial Revolutions

The area of geography includes content topics such as:

- Development of classical civilizations
- Relationships between the environment and societal development
- Borders between peoples and nations
- Human migration, including immigration, emigration, population trends and issues

The *Assessment Guide for Educators* includes subtopics to provide additional information on the types of content that can be assessed.

To provide an overall structure for the social studies test, the key concepts assessed in social studies focus on two major themes:

- Development of Modern Liberties and Democracy
- Dynamic Responses in Societal Systems

These two themes have application across all domains of social studies and provide a way of linking the difference content areas assessed. Each item on the Social Studies test is aligned to a social studies content area and a focusing theme, as well as a social studies practice.

An Overview of the Connection Between Content Topics and Focusing Themes

		Social Studies Topic Matrix			
		Civics and Government (50%)	**U.S. History (20%)**	**Economics (20%)**	**Geography and the World (15%)**
Focusing Themes	***Development of Modern Liberties and Democracy***	• Types of modern and historical governments • Principles that have contributed to development of American constitutional democracy • Structure and design of U.S. government • Individual rights and civic responsibilities	• Key historical documents that have shaped American constitutional government • Revolutionary and Early Republic Periods • Civil War and Reconstruction • Civil Rights Movement	• Key economic events that have shaped American government and policies • Relationship between political and economic freedoms	• Development of classical civilizations
	Dynamic Responses in Societal Systems	• Political parties, campaigns, and elections in American politics • Contemporary public policy	• European population of the Americas • World War I and II • The Cold War • American foreign policy since 9/11	• Fundamental economic concepts • Micro- and macro-economics • Consumer economics • Economic causes and impacts of wars • Economic drivers of exploration and colonization • Scientific and Industrial Revolutions	• Relationships between the environment and societal development • Borders between peoples and nations • Human migration

Social studies practices are those skills that are necessary to reasoning in both textual and quantitative contexts. The practices describe skills that are essential for reasoning in a social science context and that correspond with the Common Core State Standards (CCSS) for Literacy in History/Social Studies, the CCSS for Mathematics, the National Curriculum Standards for Social Studies (NCSS), and the National Standards for History.

The social studies practices that are assessed on the 2014 GED® test include:

- Drawing conclusions and making inferences
- Determining central ideas, hypotheses, and conclusions
- Analyzing events and ideas
- Interpreting meaning of symbols, words, and phrases
- Analyzing purpose and point of view
- Integrating content presented in different ways
- Evaluating reasoning and evidence
- Analyzing relationships between text
- Reading and interpreting graphs, charts, and other data representations
- Measuring the center of a statistical dataset

It's important to remember that the social studies content topics describe key concepts that are widely taught in a variety of high school-level courses and are relevant to the lives of GED® test-takers, while the social studies practices draw on reasoning, problem-solving, and decision-making skills needed to use that content.

Performance Level Descriptors for Social Studies Test

Performance Level Descriptors (PLDs) explain the skills a test-taker generally demonstrates in order to score into one of the four performance levels on the GED® test and the skills they need to develop to advance their scores. PLDs provide us with the "stuff to teach" in our classrooms. The four performance levels for the GED® Social Studies test are:

- Performance Level 1 – Below Passing
- Performance Level 2 – Pass/High School Equivalency
- Performance Level 3 – GED College Ready
- Performance Level 4 – GED College Ready + Credit

The primary focus of a GED® Preparatory classroom includes those skills or descriptors found in Performance Level 2 – Pass/High School Equivalency. It is important to remember that some students will need to be taught skills at Performance Level 1, while other students may have higher level skills, such as those found at Performance Levels 3 and 4.

Resources

For additional information on the Social Studies Performance Level Descriptors, access the Assessment Guide for Educators:

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/the-new-assessment-downloads

Integration of Skills

In real-world situations specific skills are rarely used in isolation. Reviewing a bar graph calls on a variety of skills: reading titles, recognizing the importance of the axes of the graph, interpreting the graph, determining the data that each bar represents, understanding the scale that is used, and drawing conclusions based on the information presented.

In the GED® Social Studies test, skills, concepts, and tools from other disciplines are integrated. Visuals, graphs, charts, and tables are not new to social studies. However, the level of interpretation requires that students have a greater depth of knowledge and understanding in these areas and may require the use of mathematical skills.

Strategies for the Classroom

Getting Started

As with the other modules of the 2014 GED® test, social studies requires that students must use reasoning and problem-solving skills. Helping students make a connection between social studies and real life is the key to engaging students in actively learning.

- Be *explicit* about how activities and content can be transferred to real-life situations
- Help students build "habits of mind" – strategies that they can use in a variety of situations and settings
- Integrate questions, such as: "How does history impact what I do?" "How do the concepts of civics and government or economics impact my life?" "What impact do the founding documents have on me?"
- Use photos, videos, maps, and other graphics to teach concepts
- Provide time for hands-on activities, group interaction, and class discussion

Adult educators are often limited in the time necessary to provide social studies instruction. It is important to identify the "Big Ideas" of social studies, including both content and practices. Start

with the focusing themes of social studies. Make use of the World Wide Web as an engaging resource to provide students with background knowledge about specific concepts. Let students "hear" voices from the past to make history real by using the National Archives or the History Channel audio and video files. Make use of the technology that students have and consider having them use the GPS feature on their smartphones to learn the basics of geography. Whether electronic or print, incorporate newspapers and newsmagazines to show students how principles and concepts of economics impact their buying power as consumers.

Remember that much of the information consumed in daily-life is presented through the use of visuals – charts, tables, graphs, maps, photographs, and even editorial cartoons. Consider having a segment in your class entitled "Graphic of the Day." During each class session, involve the entire class in reading and interpreting some type of graphic information. It's a great way to get the brain going and also increases the energy and engagement of the students.

Effective Reading Strategies

The Social Studies test requires that students be able to read strategically. In the chapter devoted to Reasoning through Language Arts, you had an opportunity to review a number of effective practices designed to help students become more proficient readers. In addition to those practices, students must also have strategies that enable them to read and understand primary source text(s).

Reading Primary Source Text(s)

The Common Core State Standards have established ambitious goals for students, including the ability to cite textual evidence that supports arguments, consider authors' perspectives, corroborate among competing accounts, and develop written arguments. With the correlation of the 2014 GED® test to the CCSS, it is essential that instructors initiate new strategies to help students master these skills. One such strategy is the use of primary sources to help students build their reading and reasoning skills.

In history, students often have to read primary sources. Primary sources are sources that were created during the historical period which is being studied and that provide a first-hand account of what life was like during that timeframe. Primary sources provide a window into the past. Allowing students to come into contact with primary sources gives them a real sense of what it was like to be alive in an earlier era.

Primary sources can help students:

- engage with and relate in a personal way with events of the past;
- develop critical thinking skills; and
- construct knowledge through informed, reasonable conclusions based on evidence.

Primary sources include:

- Official documents, such as the Declaration of Independence, Bill of Rights, etc.
- Letters, diaries, journals, and other items written by individuals
- Photographs from that time period
- Newspapers, magazines, and other news sources of the time period

Reading primary sources is different than reading a textbook or a secondary source. The author of a primary source was not thinking about people in the future who would read his/her text. Thus, there may not be the clear road map presented to the reader that is often found in a textbook. As a result, the reader may have some difficulty extracting from the text what is important.

Dr. Anita Gelburd, lecturer in history and collaborator with the Office of Learning Resources at the University of Pennsylvania, has identified three steps students should use to approach reading primary sources:

Preparation

Explain to students that learning is a process of hanging new information on a framework of their existing background knowledge. Before reading primary sources, students need to ask the following questions to connect what they are going to read with their personal background knowledge:

- What do I already know about this subject?
- What do I know about the historical context of this source?
- When was the source produced and how does the timeframe impact the historical perspective that will be given?
- What do I want to get out of this reading?

While Reading

It is important that students think critically while they are reading a primary source. To do this, students need to ask themselves the following questions:

- What is the author saying?
- What does the author imply?
- What does the author assume?
- Is the argument valid?
- How does the author support the argument?

After Reading

After students have read the material, they need to reflect on what they have read. As part of the reflection process, students need to ask themselves the following questions:

- Can I repeat in a concise statement the author's main argument and the evidence used to support that argument?
- Could the author's argument be extended to other circumstances?
- Has my understanding changed based on the author's argument or does my original opinion remain the same based on my background knowledge?
- What other questions could I explore based on the primary source?
- What questions would I ask, if I participated in a group discussion about the primary source?
- What do I not understand after a close reading of the text?

Currently there are limited resources, especially those focusing on primary sources, available to instructors in GED® programs. However, the Library of Congress has a wide range of materials available for instructors to help students build their social studies content knowledge and their reasoning skills.

Building Social Studies Vocabulary

Understanding the diverse vocabulary of social studies is important to the comprehension of social studies text. Activate students' knowledge of social studies terms by having them brainstorm words they know about each subject area or have them use the words in a narrative chain. Some basic activities to get you started in teaching social studies vocabulary are provided.

Building Word Lists

An excellent list of social studies vocabulary words may be found in *The Reading Teachers' Book of Lists, 4th Edition* by Edward Fry. The book is published by Jossey-Bass and may be purchased online or in local bookstores. However, you may also want to locate lists of words from each of the areas of social studies that you will be teaching, including: government, history, geography, and economics. Have students build their own word lists by writing unfamiliar terms on a chart that is posted in the room.

Find the Words

Provide students with specific letters of the alphabet. Tell them that their task is to create as many words as possible from the letters in the area in which they are studying. They cannot use other letters, but they can repeat letters from the list as often as necessary to create a vocabulary word. If challenged, students should be prepared to state how the word is related to the selected topic.

Example:

Provide a group of students with the letters: a, c, d, e, g, h, j, i, l, m, n, o, p, r, s, t, u. Have them come up with as many vocabulary words in the area of the geography as possible from the list of letters provided. Remember, they cannot use other letters, but they can repeat letters within

words as often as necessary. If challenged, they should be prepared to state how the word is related to the map skills in geography.

Sample words: map, compass rose, hemisphere, latitude, longitude

K. I. M. (Key Idea – Information - Memory Clue)

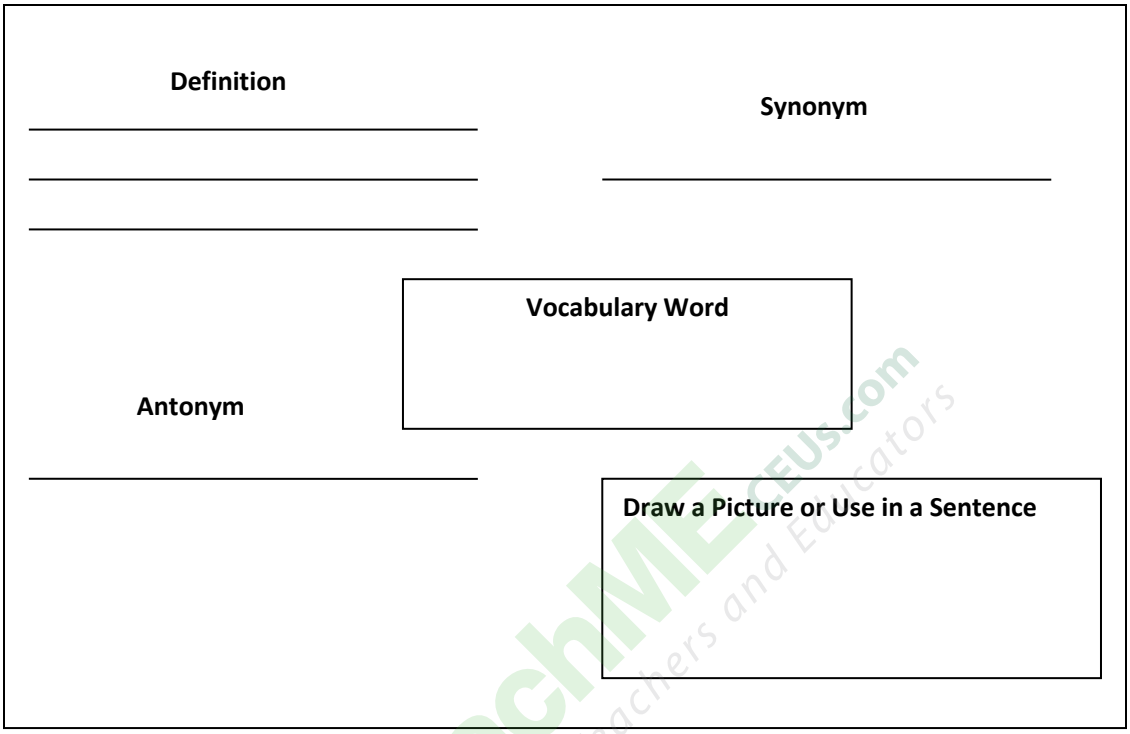
K. I. M. is a great strategy for new words or concepts. Write the term or key idea (K) in the left column, the information (I) that goes along with it in the center column, and draw a picture of the idea, a memory clue, (M) in the right column.

The key idea may be a new vocabulary word or a new concept. The information may be a definition or it may be a more technical explanation of the concept. The memory clue is a way for students to integrate the meaning of the key idea into their memories. By making a simple sketch that explains the key idea, students synthesize and interpret the new information, making it their own. Then, students can reference their drawings to easily remember new key ideas.

K (Key Idea)	I (Information)	M (Memory Clue)
latitude	measurement on a globe or map of location north or south of the Equator	

Vocabulary Word Maps

A vocabulary word map is a visual organizer that helps students engage with and think about new terms or concepts in several ways. The new term goes in the middle of the map. Students fill in the rest of the map with a definition, synonyms, antonyms, and a picture to help illustrate the new concept. The following are examples of vocabulary word map.



Summarizing Text

Summarizing text is an essential skill for students. The "While the Somebody-Wanted-But-So" strategy (MacOn, Bewell & Vogt, 1991) is most often used during and after reading to help students understand conflicts and resolutions in literary text, it is also a great summarization technique for social studies. In U.S. history and civics and government much of what is learned is based on the wants and needs of humans. Students complete the strategy on a chart or on a folded piece of paper.

Students use the graphic organizer to identify each of the following:

- Who wanted something
- What they wanted
- What conflict arose
- How was it the conflict resolved

The following is a sample completed Somebody-Wanted-But-So graphic organizer using a variety of historical situations.[20]

[20] West Virginia Department of Education's Strategy Bank. Retrieved from the World Wide Web at: http://wvde.state.wv.us/strategybank/Somebody-Wanted-But-So.html

Somebody	Wanted	But	So
Christopher Columbus	To sail to India to buy spices	He ran into the Caribbean Islands	He claimed the area for Spain.
Anne Frank	To hide from the Nazis	Someone turned her in	She died in a concentration camp.
Adolf Hitler	To control all of Europe	The Allies fought against him	He killed himself when Germany was defeated.
Thomas Edison	To invent the incandescent light bulb	His light bulb blackened (the Edison effect)	It later led to the electron tube, the basis of the electronics industry
British	To raise money by taxing the colonists	The colonists revolted against the tax	The tax was repealed

Guided Reading and Summarizing Procedure

The Guided Reading and Summarizing Procedures (GRASP) helps students to summarize independently as they learn to recall, organize, and self-correct information before composing a summary. To make the process more concrete for students, Ryder and Graves (2003) suggest that the instructor revise his/her own summary of an excerpt based on suggestions from students. This provides a visible record for students. This process is especially helpful for students as they read more complex excerpts from social studies that may include concepts or even vocabulary that is not known to them.

Use the following graphic organizer to take students through multiple readings of a given excerpt. The graphic organizer can be developed as a table.

- Have students do an initial reading of the excerpt and write down what they remember. (Remember to have students cover up or turn over the excerpt, so they do not try to look back at this point for information.)
- Have students re-read the excerpt. This time they should look for any information that they missed, need to elaborate on, or should be deleted because it is inaccurate.
- Have students list the additions or corrections in the second column
- Have students organize the ideas into main ideas and details
- Write a summary passage based on the information obtained, and then edit and revise as needed

Guided Reading and Summarizing Procedure

Details Remembered from Reading	Additions/Correction
Main Ideas from Reading	

The Reading/Writing/Discussion Connection

Students need content literacy, not just the literacy of decoding words and understanding sentences. Content literacy supports the view that students construct knowledge through activities that include reading, writing, and discussion. Students need the opportunity to think about, read about, talk about, and write about information in order to synthesize it and retain it.

In the social studies classroom, students need to write to learn and also write to apply. Writing to learn encourages students to write about what they are thinking and learning. This type of writing includes:

- Journal entries
- Reflections
- Reading responses
- Question-answering
- Personal notations

Write to learn activities need not be graded. However feedback and comments should be made. The purpose of writing to learn is to promote active learning, encourage discussion, engage students, and most of all encourage thinking

Writing to apply activities are more formal. In this type of activity, students are expected to:

- analyze and synthesize information, and then
- communicate their thoughts in a coherent and organized manner.

These activities are meant to be assessed at multiple levels, including the student's ability to identify the issues and respond appropriately as well as produce a formal written response that is free of structural, organizational, and grammatical errors. Although the Social Studies test does require written responses, this type of writing does assist students in better understanding the concepts of social studies.

The missing element in the Reading/Writing/Discussion Connection in many adult education classrooms is discussion. Instructors should incorporate time each day for students to talk about what they are reading, what questions they have, what they do and do not understand, and how what they have learned will impact them on a daily basis.

Incorporating the World Wide Web in Social Studies Instruction

The Internet provides incredible opportunities to engage students in learning about the "big ideas" in social studies.

Using the Internet meets two purposes:

- the ability to access a wide range of information (historical and current) that can be used in the classroom and
- an opportunity to enhance students' technology skills – something they can take and use in many aspects of their lives.

The following is an example of an internet-based lesson.

Comparing and Contrasting U.S. Presidential Campaign Ads from the Cold War

Lesson Overview

This lesson is adapted from the National Council of Social Studies and enables students to:

- learn more about time, continuity, and change;
- understand civic ideas and practices, including the complexity of campaigns and their historical context; and
- understand a complex concept – the Cold War.

For this lesson, students will need to access *EASE History* an online learning environment that supports the teaching and learning of U.S. History. *EASE History* has three entry points: Campaign Ads, Historical Events, and Core Democratic Values. This lesson helps students acquire conceptual understanding by:

- Looking at multiple cases related to the Cold War
- Placing events in context
- Reviewing events from multiple perspectives

Instructional Steps

Students should work in teams of two. Each team will need access to a computer, high-speed Internet, and two sets of headphones. If computer access is not available for individual teams, conduct the session as a group activity, using an LCD projector and computer to project the ads.

1. Go to the EASE History website at http://www.easehistory.org/ and review the key features.
2. Provide each team with a compare and contrast worksheet.
3. Have teams examine at least twelve Cold War ads from the 1960s.
4. Assign each team two ads.
5. Have students view the ads and compare and contrast using the worksheet.
6. Have students come back together as a whole group and discuss how they compared and contrasted the ads and how their understanding of the Cold War has changed.

Comparing and Contrasting Campaign Ads Worksheet

Ad #1	**Ad #2**
Title Candidate Year Party Do you think that this source is reliable? Rate from 1 2 3 4 5 (circle one) Why did you give the source this rating?	Title Candidate Year Party Do you think that this source is reliable? Rate from 1 2 3 4 5 (circle one) Why did you give the source this rating?
First Impressions What is the first ad about? What is the second ad about?	
Looking Back (Review the two ads again.) After looking back, what did you notice that you didn't notice the first time? Ad #1 Ad #2	

Multiple Goals

How does each ad highlight the candidate's strengths and compensate for the candidate's weaknesses?

	Case 1	Case 2
How are the candidate's strengths highlighted?		
How does the ad compensate for the candidate's weaknesses?		

Multiple Perspectives

Think about the campaign ads from different perspectives. With your partner discuss how each ad could be viewed based on each of the following perspectives.

Perspective #1 National Security	**Perspective #2: Patriotism**
Perspective #3: Common Good	**Perspective #4: Freedom**

And the Best Supported Argument Is . . .

After completing the analysis of the two ads, determine which argument is best supported by the evidence provided in the ad. Incorporate relevant and specific evidence from each ad to support your argument. Your response should take about 25 minutes to complete.

The following are Campaign Ad pairs that you may wish to use in the lesson:

- Pair 1. Richard Nixon's 1960 "Important" ad and John F. Kennedy's 1960 "Issue" ad
- Pair 2. John F. Kennedy's 1960 "Issue" ad and Richard Nixon's 1968 "Leadership" ad
- Pair 3 Lyndon Johnson's 1964 "Daisy" ad and Richard Nixon's 1968 "Chicago" ad
- Pair 4 Barry Goldwater's 1964 "March" ad and Barry Goldwater's 1964 "Reagan" ad
- Pair 5 Hubert Humphrey's 1968 "Bomb" ad and Lyndon Johnson's 1964 "Cone" a
- Pair 6 Richard Nixon's 1968 "Percy" ad and Lyndon Johnson's 1964 "Poverty" ad[21]

[21] Adapted from *Comparing and Contrasting U.S. Presidential Campaign Ads from the Cold War* developed by Brian P. Collins, Rand J. Spiro, and Aparna R. Ramchandran, Digital Age: Technology-Based K-12 Lessons Plans for Social Studies, National Council for the Social Studies, 2007

Using Podcasts in the Social Studies Classroom

Podcasts are another technological tool that can be used in and out of the classroom. Podcasts are available from many different sources and rarely require any fees. A podcatcher is an application that can be used to subscribe to podcasts and automatically download them. iTunes is the most widely-used podcatcher. However, there are other podcatchers available, such as Juice, jPodder, and Doppler. All are free and downloadable.

Podcasts are widely available from the news media. The *Washington Post, The New York Times,* the *BBC*, and *NPR* all provide podcasts on current events. Most of these sites involve news stories that can also be found in text format. However, these sites also provide background information and interviews in audio form. Podcasts are also available from both the legislative and executive branches of the federal government.

Podcasts can be used in the classroom to initiate discussion or students can listen to podcasts on their own as a follow-up to a lesson conducted in the classroom.

Summing It Up

To get started integrating social studies into the GED® preparatory classroom,

- Incorporate small and large group sessions, focusing on social studies concepts that will help students gain core knowledge they will need on the test and for life.
- Use the local newspaper or *USA Today* to provide students with an opportunity to interpret graphic-based material, including graphs, charts, maps, editorial cartoons, and photographs. The newspaper is an excellent resource for information related to civics and government, economics, and geography. Use articles to connect concepts with real-life, current events.
- Integrate reading and writing for better conceptual understanding. Use the local newspaper or *USA Today* to identify letters to the editor on similar themes or topics. Have students read the letters and determine which is best supported by the evidence presented and why.
- Use Internet resources such as the Basic Readings in U.S. Democracy from the U.S. Department of State. This resource includes short excerpts from U.S. history that can be used in the classroom to build conceptual understanding.
- Use the GPS feature on smart phones to teach the basics of map reading.
- Make use of technology available in your program or through your students' smartphones.
- Provide students with increasingly more complex reading materials. High expectations lead to high achievement.

Resources

Although there are numerous resources to assist the classroom instructor, the following are a few websites with which to begin:

- The Library of Congress
  http://www.loc.gov/teachers/

- Teaching with the Library of Congress - Blog
  http://blogs.loc.gov/teachers/

- Classroom Materials – Primary Source Sets from the Library of Congress
  http://www.loc.gov/teachers/classroommaterials/

- Four Reads: Learning to Read Primary Documents
  http://teachinghistory.org/teaching-materials/teaching-guides/25690

- National Public Radio (NPR) Podcast Directory
  http://www.npr.org/rss/podcast/podcast_directory.php

- Basic Readings in U.S. Democracy
  http://usinfo.org/enus/government/overview/demo.html

Strategies for Science

Integrating Science

Science is everywhere. It is an integral part of each of our lives. From the time we turn off the alarm clock in the morning to when we watch the stars twinkle at night, there is science.

Physics, for example, teaches us how mirrors work, how glasses can aid one's vision, and how heat can provide a safe and clean environment in our homes. Chemistry discusses the principles of matter, like atoms, molecules, and compounds. These atoms, molecules, and compounds make up the water we drink, the food we eat, the air we breathe, and even the medicines that we take. Life science teaches us how all living things are categorized and why we need what we need to survive in our world.

In fact, the word science comes from a Greek word, "scientia," which means "knowledge." Science is a combination of process (how we learn about science) and content (the knowledge, concepts and understandings of science). So, teaching the concepts of science in our classrooms is an important part of a complete education – one needed by our students as they enter postsecondary education and the workplace.

Overview of Science Test

The 2014 GED® Science test assessment targets focus on three content domains:

- life science – approximately 40%
- physical science – approximately 40%
- Earth and space science – approximately 20%

Life science continues to be an integral part of the science test. This content area includes such topics as:

- Human body and health
- Relationship between life functions and energy intake
- Energy flow in ecologic networks (ecosystem)
- Organization of life
- Molecular basis for heredity
- Evolution

The area of physical science includes such content topics as:

- Conservation, transformation, and flow of energy
- Work, motion, and forces
- Chemical properties and reactions related to living systems

Earth and space science incorporates the world around us, from natural hazards to characteristics of our Earth to how our solar system impacts our world through tides and eclipses. Included are topic areas such as:

- Interactions between Earth's system and living things
- Earth and its system components and interactions
- Structures and organization of the cosmos

Within the Assessment Guide, subtopics are included to provide additional information on the types of content that could be assessed.

To provide an overall structure for the Science test, the key concepts assessed in science focus on two major themes:

- Human health and living systems
- Energy and related systems

These two themes have application across all domains of science and provide a way of linking the difference content areas assessed.

An Overview of the Connection Between Content Topics and Focusing Themes

		Science Content Topics		
		Life Science (40%)	**Physical Science (40%)**	**Earth & Space Science (20%)**
Focusing Themes	***Human Health and Living Systems***	• Human body and health • Organization of life • Molecular basis for heredity • Evolution	• Chemical properties and reactions related to human systems	• Interactions between Earth's systems and living things
	Energy and Related Systems	• Relationships between life functions and energy intake • Energy flows in ecologic networks (ecosystems)	• Conservation, transformation, and flow of energy • Work, motion, and forces	• Earth and its system components • Structure and organization of the cosmos

Not only is each item aligned to a science content area and a crosscutting theme, but each item on the Science Test is also aligned to a science practice.

Science practices are those skills that are necessary to scientific reasoning, sometimes referred to as inquiry. The practices describe behaviors that scientists engage in as they investigate and build models and theories about the natural world. The term practices is used to emphasize that engaging in scientific investigation requires not only skills, but also knowledge that is specific to each practice.

The basic scientific practices that are assessed on the 2014 GED® test include:

- Comprehending scientific presentation
- Designing investigations
- Reasoning from data
- Evaluating conclusions with evidence
- Working with findings
- Expressing scientific information
- Understanding and applying scientific theories
- Using probability and statistics in a science context

It's important to remember that the science content topics describe key concepts that are widely taught in a variety of high school-level courses and are relevant to the lives of GED® test-takers.

Performance Level Descriptors for Science Test

Performance Level Descriptors (PLDs) explain the skills a test-taker generally demonstrates in order to score into one of the four performance levels on the GED® test and the skills they need to develop to advance their scores. PLDs provide us with the "stuff to teach" in our classrooms. The four performance levels for the GED® Science test are:

- Performance Level 1 – Below Passing
- Performance Level 2 – Pass/High School Equivalency
- Performance Level 3 – GED College Ready
- Performance Level 4 – GED College Ready + Credit

The primary focus of a GED® Preparatory classroom includes those skills or descriptors found in Performance Level 2 – Pass/High School Equivalency. It is important to remember that some students will need to be taught skills at Performance Level 1, while other students may have higher level skills, such as those found at Performance Levels 3 and 4.

Resources

For additional information on the Science Performance Level Descriptors, access the Assessment Guide for Educators:

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/the-new-assessment-downloads

Integration of Skills, Concepts, and Tools

Just like in real-world situations, skills, concepts, and tools from other disciplines are integrated. When test-takers describe a data set statistically, they may need to first complete a series of mathematical calculations based on an equation or formula. Mathematical reasoning skills and the use of a calculator may be needed to solve a science problem. Therefore, the TI-30XS MultiView™ calculator is provided, as needed, on the GED® Science test.

Another area of integration is the use of two short answer (SA) items. Strategies for teaching students how to answer these types of inquiry questions is similar to the process taught for the extended response questions on both Reasoning through Language Arts and Social Studies tests.

Each short answer (SA) item is scored on a three-point scale. For some items, the three points are accumulated when the test-taker identifies or analyzes up to three specific details or correct

answers. One point is provided for each “correct” response. Individual scoring guides are developed for each short answer question on the Science Test to ensure an accurate assessment of the writing samples.

Resources

For additional information on GED® course code numbers and curriculum frameworks, access the:

- Adult Education Curriculum Frameworks
  http://www.fldoe.org/academics/career-adult-edu/adult-edu/2016-2017-adult-edu-curriculum-framewo.stml

For additional information on the rubric for the short answer responses on the Science Test, access the Constructed Response Resource Guides and Scoring Tools

- GED Testing Service® website
  http://www.gedtestingservice.com/educators/assessment-guide-for-educators

Strategies for the Classroom

Getting Started

As with the other tests of the 2014 GED® test, science requires that students use critical thinking and problem-solving skills, as well as inquiry. Making science real is the first step in Integrating science in the GED® preparatory classroom.

- Be *explicit* about how activities and content relate to the nature and process of science
- Model scientific behaviors, strategies, language
- Integrate questions, such as: “How do I use science?” “How do others use science?” “How do we know this?”
- Use photos, videos, graphics to teach concepts
- Provide time for hands-on science activities and discussion

So, what are some ways that you incorporate the teaching of science into your program? First identify the “Big Ideas” of science, including both content and practices. For these items, use hands-on demonstrations and experiments to help students “see” science concepts at work. Don’t forget that the World Wide Web is a wonderful resource to provide students with real-world experiences in science. From science museums to following endangered species via

webcams to researching the latest information on a topic of interest, it's important for students to connect to the science of everyday life.

Of course, don't forget graphic literacy. Have students conduct surveys and construct tables and graphs as well as interpreting those already created.

Just like in our workplaces and daily lives, sometimes there is not just "one answer" to a science-oriented problem. Provide students with a current problem, e.g., how to clean up oil spills in the gulf. Use open-ended questions within the classroom and have students share the evidence or rationale that was used to develop a reasonable answer.

Don't forget to integrate writing as a tool for reading comprehension and of course, don't forget the resources provided through the GED Testing Service® website. Develop questions for class discussion and teacher-created assessment tools that are of the same cognitive rigor as the 2014 GED® test. A good place to begin is a thorough review of the Assessment Guide and the Item Samplers.

Ideas to Teach Science Vocabulary

Understanding science requires understanding the basic concepts of science as well as the vocabulary that is frequently used in the areas of physics, chemistry, life science, and earth and space science.

Research shows that it is easier to learn vocabulary when it is linked to prior or background knowledge. This helps to reach all types of learners including kinesthetic and visual learners as well as auditory learners. Background knowledge is not only important for vocabulary learning, but also for overall comprehension of what is being read.

Understanding the diverse vocabulary of science is extremely important to the comprehension of scientific writings and text. Activate your students' knowledge of science terms by having them brainstorm words they know about each subject area or to use the words in a narrative chain. Some basic activities to get you started in teaching science vocabulary are provided.

Before and After Vocabulary Grids

Give each student a list of key words or science concepts with two blank columns. In the first column, the students write the meaning of each word/concept or what they guess the meaning is. As they come across the word/concept later during the lesson, students can revise their original definition. Discuss new words and concepts as a group.

Word/Concept	What I think it means	Revised definition

Analyzing Prefixes and Roots

Sixty percent of English words are formed of roots and prefixes. When students come across a common prefix and/or root form, write the word on a sheet of paper and generate more words, first from the prefix and then with the root. List them on the paper. Discuss the definitions and the relationship of the words to each other. Science is filled with words that use the same root form, such as acid, which then can be used to writing such words as acids, acidic, and acidity.

The Narrative Chain

A narrative chain requires that students link words in a list together into a sentence or paragraph. By using the words and associating them they create a firmer connection between the new words and those already stored in their memory.

Science Narrative Chain Example: Provide students with the words: temperatures, southern, glacier, earth, tropical, rainforest, jungle, ice cap, moderate

A sample narrative chain might be as follows:

Although some of the places on the earth experience moderate temperature changes throughout the year, there are also areas where the temperatures are quite drastic. In some of the southern regions, one might experience a tropical rainforest or jungle-like atmosphere which is very hot and humid. Some parts of the earth are very cold all year long and are composed of glaciers or ice caps.

Classroom Questioning

Questions are central to the understanding of scientific concepts. When asking questions:

- Ask clear specific questions. If students have to guess at what you are asking, they are likely to remain quiet and not engage in the thinking you are expecting.
- Use cueing vocabulary that is familiar to students. By using the vocabulary they are used to students can better answer the question.
- Ask follow up questions to get at students' real understandings. Asking a second question can reveal the difference between a student's accurate understanding and misconceptions.
- Remember "wait time." Provide at least five seconds of thinking time after a question and after a response. Students need time to think and organize their response. Waiting lets students know that you are serious about wanting an answer to your question.
- Create a climate that supports risk taking. Establish eye contact and withhold judgment. Let students know that there is not a single correct answer for some questions.
- Allow students to ask their own questions. This often will further develop a topic and let students know you are interested in their reasoning.
- Listen to the answer and ask clarification questions as needed.

The following chart provides sample questions for guiding scientific thinking in the GED® preparatory classroom.

Sample Questions for Guiding Scientific Thinking

Question Type	Sample Question Starters
Recalling	Who, what, when, where, how ____?
Comparing	How is _____ similar to/different from_____?
Identifying Attributes & Components	What are the characteristics/parts of _____?
Classifying	How might we organize _____ into categories?
Ordering	Arrange _____ into sequence according to _____.
Identifying Relationships & Patterns	Develop an outline/diagram/web of _____.
Representing	In what other ways might we show/illustrate _____?
Identifying Main Ideas	What is the key concept/issue in _____? Retell the main idea of _____ in your own words.
Identifying Errors	What is wrong with _____?
Inferring	What might we infer from _____? What conclusions might be drawn from _____?
Predicting	What might happen if _____?
Elaborating	What ideas/details can you add to _____? Give an example of _____. Summarizing Can you summarize _____?
Establishing Criteria	What criteria would you use to judge/evaluate _____?
Verifying	What evidence supports _____? How might we prove/confirm _____?

Visual/Graphic Literacy

Visual (sometimes referred to as graphic) literacy continues to be an integral part of various types of texts, as well as media. It's often said that one picture is worth a thousand words. Think for a moment about all of the different types of graphs and charts that are included in the sample GED® test items.

One strategy for improving visual literacy is QAR (Question and Answer Relationships). This strategy is often used to improve reading comprehension skills, but it can also be used in analyzing different visuals.

The Question-Answer Relationships framework was first developed by Taffy E. Raphael (1982, 1986). QAR helps students increase reading comprehension by recognizing different types of questions and understanding where the answers to those questions can be found. When adapting the framework to graphics, students analyze the visual and ask themselves questions about where to find specific information.

The types of questions asked through the QAR strategy can be divided into two broad categories: *In the Book* (text explicit) or *In My Head* (text implicit) types of questions. *In the Book* questions are generated directly from a reading selection or a graphic. These explicit questions fall into two subcategories: *Right There* questions found in one place in a selection and *Think and Search* questions built around cumulative information found throughout a document.

In My Head questions are created by the reader when confronting a text or graphic. These questions are not explicitly found in the reading; rather, these questions arise as the reader engages the selection's content through active thought, comparison, synthesis, analysis, and evaluation. These implicit questions fall into two subcategories: *Author and You* questions that the text provokes in the reader and *On My Own* questions arising from the reader's prior knowledge and experiences.

QAR has four types of questions that are either *In the Book* or *In Your Head* types of questions:

Right There
Right there questions will have answers in the text or graphic. Right there questions often begin with "Who is", "What is", "When is", "What kind of", "Name", or "List". These questions are answered by locating or recalling the information.

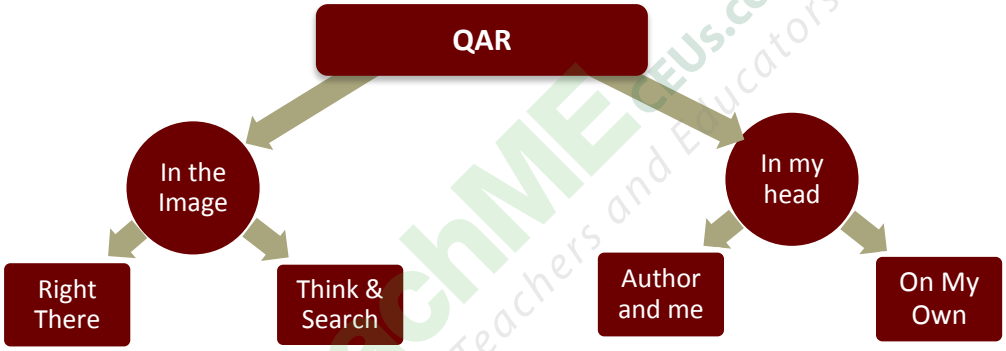
Think and Search
Think and search questions require reading several sentences or sections of text and/or graphics and combining the information together. These questions often begin with "Summarize", "What caused", "Contrast", "Compare", or "Explain". Students need to put information from several locations together in a way that is meaningful to answer the question.

Author and Me
Author and Me questions require that students answer with information beyond what is in the

text or graphic. The basic material to be elaborated on must be read and understood before students can add additional information to it. A typical question in chemistry might be "How could you tell if a substance is a metal or nonmetal?" The question assumes that students know the properties of metal and nonmetals and will be able to generate a lab test based on these properties.

On My Own

On my own questions require answers not in the text or graphic. These questions require that students use background knowledge to support their opinions. A typical On My Own question might be "How can plastics be most effectively designed to serve society rather than harm it?"



Summing It Up

To get started with integrating science into the GED® preparatory classroom,

- Incorporate small and large group session, focusing on science concepts and principles that will help students gain core knowledge they will need on the test and for life.
- Use the local newspaper or *USA Today* to provide students with an opportunity to interpret graphic-based material, including graphs, charts, maps, etc. The newspaper is an excellent resource for information related to the environment and health issues. Many newspapers include a health section. Use articles to discuss issues such as diet, exercise, disease prevention, medical advances, etc.
- Have students conduct surveys about environmental, health, or other science issues that affect their daily lives. Have the students construct graphs to report their results. If students understand when and why they should use line graphs versus bar graphs versus circle graphs, it will help them interpret the graphs included on the test.
- Use weather maps in the local newspaper to track weather trends and changes. Have students make predictions based on the information provided on the maps.
- Use the Internet to expose students to new material. Capture their interest through the exploration of websites that focus on various aspects of science.

- Provide opportunities for students to solve real-world science problems, such as how to best clean up an oil spill.
- Use experiments (hands-on activities) for students to predict or hypothesize about an answer and then to complete the scientific process to determine a correct hypothesis or the need for changing their initial prediction.

Resources

Although there are numerous resources to assist the classroom instructor, the following are a few websites to start with:

- **Cells Alive**
  http://www.cellsalive.com/toc.htm

- **Discovery Channel**
  http://dsc.discovery.com/

- **Exploratorium Online**
  http://www.exploratorium.edu/

- **Franklin Institute**
  http://www2.fi.edu/

- **How Stuff Works**
  http://science.howstuffworks.com/

- **Newton's Apple**
  http://www.tpt.org/newtons/

- **PBS: Science & Nature**
  http://www.pbs.org/topics/science-nature/

Integrating Technology into the GED® Classroom

Integrating Technology – An Important First Step

We live in exciting times with access to powerful tools that can create opportunities for instruction that is more rigorous and motivating and that builds global connections. It seems as if there is a constant onslaught of new tools for the classroom that arrive via the internet on a daily basis. From wikis to blogs to podcasts to videos to social media to the vastness of information on the World Wide Web, the internet offers powerful and varied ways for students and teachers to interact and to learn. Then there are all of the various types of digital learning. No longer is communication tied to print media, land lines, and fax machines. Rather a multitude of different tools are available, such as mp3 players, iPods, E-book readers, tablets, computers, and even smart phones.

Introducing technology into the curriculum means more than just making it work. The principles of adult learning theory can be used in the design of technology-based instruction to make it more effective.

Advantages for Students

Adults need to know why they should learn something or how it will benefit them. The design of technology-based lessons should meet the student's need.

The integration of technology also assists in moving students from current habits and into new patterns of learning where they become self-directed, taking responsibility for their own learning. Short, directed, concrete online tasks help the adult learner see the relevancy of technology and learning.

Integrating technology into the classroom also provides students with a wider variety of real-life examples and situations that they may encounter in their life or on the job. The multi-media and multi-sensory approach using technology also provides an intrinsic motivation to learn – an important part of the learning process.

Finally, today's learners expect technology to be an integral part of life. In a study from Conole in 2006, he stated: "They [learners] have an expectation of being able to access up-to-date and relevant information and resources and see this as vital. They don't see technology as anything special…just another tool to support their learning."[22]

Keys to Integrating Technology in the Classroom

When developing technology enhanced lessons, whether using cell phones or the World Wide Web or social media, it takes time. However, it is important to understand the difference between accessing technology and integrating technology into the classroom. A clear alignment of technology with curriculum is important as tools and resources are leveraged in a meaningful and productive way. The key to integrating technology is to ensure the following steps are taken:

- **Planning:** like any other new teaching tool, technology takes flexibility, creativity, and forethought in order to be successful. Ensure that there is a clear alignment between the standards being taught and the technology being used.
- **Engagement**: use the new tool as a means to engage students with the material and ideas, not as an end unto itself.
- **Responsibility**: make expectations about how students will use the technology – and how they *won't* use it – clear and consistent.
- **Innovation**: be open to finding other uses for the tools than the ones envisioned.
- **Teacher as learner**: admit what you don't know, let students teach you.
- **Reflective practice**: assess what you're doing, build on what works, and fix or discard what doesn't.

[22] LXP: Student Experiences of Technologies – Final report (Conole et al., 2006)

So, why integrate technology in the adult education classroom? Using different types of technology:

- Helps motivate students
- Builds collaboration skills for students
- Requires higher-order thinking, problem-solving skills
- Provides for multiple intelligences, learning styles
- Enables teachers to move from a lecturer role to a creator of a student centered/directed classroom

Using Task Cards

One technique for initiating technology-enhanced lessons is to develop task cards for each activity. A task card is simply a developed activity for a specific website that is to be used with the class.

Task cards can be used:

- As a resource for teaching using technology
- For a classroom activity
- For individualized instruction
- For students who were absent for a lesson
- To differentiate instruction

Although there are many ways to integrate technology, developing task cards can get you started. The following is an example of a simple task card in the area of science.

Task Card – GED® Science: Physics

Topic: Recognize simple machines (i.e., inclined plane, lever, and pulley)

Website URL: http://www.edheads.org/activities/simple-machines/index.htm

Activity: You will need a pencil and paper for this activity. To begin, click on the button that looks like this picture: Move your mouse on the House. Select one of the places to visit. Click on the *Start* button to begin. Identify the Simple Machines by clicking on them. Answer the questions that go along with the items you clicked. Click on the *Continue* button at the bottom until all questions are answered. Now click on another item. Take notes of the different types of machines and objects that you identify.

Follow-Up Activity: Go back to your seat and draw three types of simple machines that you found in the lesson. Make a list of the six different simple machine types. Name three items in your own home that are simple machines. When you are done, place your work into the work basket.

Computer Skills for the 2014 GED® test

Although concerns were expressed about moving toward a computer-based test, it is important to note that approximately 96% of GED test candidates are either Millennials or GenXers. This means that they have grown up with some type of technology. More and more of our GED® students are computer savvy. Many have grown up with computers and feel comfortable with them. Many have never known a world without 24/7 technology. However, there is a need to teach the skills that students will need to be successful on not only the GED® test, but also in their daily lives and the workplace.

The 2014 GED® test uses a variety of item types to provide an improved assessment process. Students must understand how to complete technology-enhanced items, use basic keyboarding skills, and access tools.

Students do not need to have an extensive knowledge of word processing, but they do need to have basic keyboarding skills. In both the extended response and the short answer items, students will need to be able to keyboard their answers. The tools that test-takers have available include: cut, copy, paste, undo, and redo. The scroll bar allows the test-taker to easily move to different parts of his or her answer for review and editing.

Technology- enhanced items require that students be able to click on multiple-choice and hot spot items, drag-and-drop items, fill-in-the-blanks, and access drop-down items and menus. Students will also need to be able to use directional tools and mathematical tools such as the calculator.

To get started, begin teaching mouse and keyboarding skills in your adult education program. Integrate the use of technology as a “normal” part of the curriculum. Remember, technology is more than just the ability to use a computer. Many of your students already use today’s technology, such as a smart phone.

There are numerous resources to assist you in the transition to computer-based testing, as well as integrating technology into the classroom.

Resources

For additional information on integrating technology in the classroom, as well as tutorials on basic software programs, access:

- actDEN (Digital Education Network)
  http://www.actden.com/

- GCFLearnFree.org®
  http://www.gcflearnfree.org/topics

- The Global Schoolhouse
  http://www.globalschoolnet.org/index.cfm

- Concept to Classroom
  http://www.thirteen.org/

- 4Teachers.org
  http://www.4teachers.org/

- Edudemic
  http://edudemic.com/

- T.H.E. Journal
  https://thejournal.com/Home.aspx

- Internet4Classrooms
  http://www.internet4classrooms.com/ct-it.htm

- TypingWeb
  http://www.typingweb.com

- Shambles.Net
  http://www.shambles.net/pages/staff/keybskills/

Accommodations

Accommodations and Modifications for the Classroom

What does it mean to say that a person has a learning difference or a disability? There is no single common profile for an adult education student with a learning difference – it is an extremely heterogeneous group. Some students in the GED® preparation classroom may have diagnosed or undiagnosed learning disabilities, whereas other students may exhibit Attention Deficit Disorder, either with or without hyperactivity. Other students may have cognitive deficits, visual or auditory impairments, or emotional handicaps.

The important thing to remember is that all students in adult general education programs benefit from the use of effective instructional practices. Although much attention is paid to the unique characteristics of a disability, it is important to remember that changes may be needed in the way lessons are taught and assessment tools are administered when working with individuals with disabilities.

For students with documented disabilities who meet minimum program eligibility requirements, federal law guarantees them the necessary modifications and accommodations that will allow them to participate and receive benefit of instruction. Such modifications, accommodations, and support services are not designed to give students an advantage over classmates or to lower the expected program standards. Instead, they are simply designed to minimize the disability and allow students the fullest opportunity to compete equally.

So, what is an accommodation? An accommodation is an alteration in the way learning tasks are undertaken so that

students with learning differences can complete the same type of tasks as other students in the classroom.

Strategies for the Classroom

Research has provided the adult educator with evidence-based interventions and practices to assist students in the learning process. The following are a few evidence-based instructional techniques to assist students with learning differences, specifically those students with learning disabilities.

Strategy Instruction

Students with difficulty learning benefit from the explicit teaching of various learning strategies. Strategy instruction uses a top-down approach to emphasize processes applicable across different settings. Transferable strategies include such skills as summarizing strategies. It is important to realize that many students have never been taught "how" to learn. Explicit instruction of strategies provides them with skills necessary for success.

To implement explicit instruction:

- provide clear explanations of content, skills, learning routines, and strategies
- model the cognitive and metacognitive behaviors associated with the learning task
- co-construct with students the strategies and routines to make learning efficient and effective
- engage students in extensive practice that includes guided and independent activities and elaborated feedback on each performance
- provide support for generalizing skills, knowledge, and strategies for learning

Direct Instruction

Direct instruction uses a bottom-up approach of teaching subskills to master basic skills and/or concepts. This strategy actively involves students through frequent responding and participative activities. With direct instruction, the goals and objectives of the lesson should be clearly stated at the beginning of class, tying the material to real-world situations.

Direct Instruction Model

Task	Explanation
Provide objectives, establish expectations, and introduce the skill/concept	Activate background knowledge, involve students, relate to real life, label the learning, and set goals
Introduce and the model the skill/concept	Teacher performs the skill (students use eyes and ears). Teacher performs the skill; students help (students use eyes, ears, and voices). Students perform the skill; teacher helps (students use eyes, ears, voices, and materials, e.g., pencils, manipulatives, etc.). Students perform the skill (students use materials).
Use guided practice with feedback	Students use their new skills with teacher supervision. Can use peer tutoring or cooperative learning.
Close the lesson	Students tell someone what they have learned, show what they have learned, and practice once more.
Use independent practice and generalization.	Students practice independently, completing a problem every day. Discuss how the skill/concept can be transferred to other settings.

Integrating strategies and direct instruction provides the foundation that many students with learning difficulties require in order to be successful.

Other Strategies

Help students identify techniques that might be helpful in accommodating their learning differences by integrating the following types of strategies.

Introduce lessons effectively

- Tape record or videotape the instructions
- Make announcements in both oral and written forms, especially changes in schedule, directions, assignments, or exams
- Have a model of the finished product available for review
- Show by example
- Make directions specific, concrete, and understandable
- Tell student what the whole lesson will concern, and explain what will be done first, second, and so on
- Give a number of options for completing assignments
- Review major points of previous sessions
- Preview main points to be covered
- Outline points in several ways written on the board, presented orally, and outlined in a handout
- Make clear transitions from one task to another

Identify and employ methods that work for adults

- Build on strengths rather than repeating weaknesses
- Make eye contact frequently to help maintain attention and encourage participation
- Teach new concepts by relating them to practical applications
- Be sure reading material is at the right level for the learner
- Be sure print type is large enough
- Relate material to everyday situations
- Use language experience approaches and reading materials from the home and work environment to stimulate interest
- Build on what the student knows, making learning developmental, not remedial
- Probe “incorrect” responses to discover thought processes
- Teach students to correct their own mistakes
- Do not assume that the learner knows something until you ask or teach it
- Be creative and attempt to vary your teaching style
- Encourage students to sit in the front of classroom where they can hear well and have a clear view of the chalkboard
- Keep the learning environment free of visual and auditory distraction
- Establish a routine; this promotes organization and consistency
- Use multi-sensory strategies to present materials: many learners must see, say, hear, and touch before they develop full mental images that make sense

Identify and employ methods that work to reach adult learners

- Provide short-term tasks with short breaks between tasks.
- Be flexible with time schedules; work quotas should be adjusted to fit the work speed of each learner.
- Repeat the activity until learning is accomplished and provide opportunities to review.
- Vary your lessons, re-teaching and reviewing in varieties of ways.
- Respect different learning styles.
- Use materials that relate to individuals' experiences.
- Change an activity when it is not working.
- De-emphasize timed tests.
- Use formulas or rhymes to assist with memory.
- Use color whenever possible for visual impact.
- Work with other teachers/professionals and ask for ideas or opinions.
- Incorporate keyboards (word processors or typewriters) into the lessons as much as possible. Studies show that some learners can produce more writing with a word processor than they can with a pencil or pen.
- Encourage the use of learning aids and tools (e.g., record, calculators, highlighter pens, extra worksheets, computerized learning programs, tape recorders, films, demonstrations maps, charts, experiences fingers, rulers).
- Provide the student with opportunities to repeat verbally what has been taught as a check for accuracy.
- Encourage the learner to find a mentor in addition to the tutor to review information and apply classroom skills to practical situations.
- Talk with students about their learning process. Ask them what does and does not work for them.
- Suggest reinforcement activities to be used at home, e.g., posting new words on refrigerator door, repeated listening to a tape vocabulary words, watching recommended educational television programs.

Create a positive environment that fosters self-esteem in students and encourages them

- Do not embarrass, insinuate laziness or discourage an individual publicly or privately.
- Reduce emphasis on competition and perfection.
- Praise the learner's accomplishments at the end of every session.
- Communicate to students that you value them through smiling, listening, and eye contact.
- Incorporate a sense of humor into the learning process.
- Praise what you might consider small or minor successes.
- Reinforce the effort and progress of the student.
- Teach to each student's strengths and make each student a "star."

Identify and Adapt to Learning Styles

It is important to use the previous strategies when making modifications for adult students with learning disabilities. Remember to use those strategies that work best in relation to the student's learning style. Keeping students' preferred learning style in mind and pairing that information with strategies that enhance strengths and minimize deficits will increase opportunities for success.

Resources

For additional information on accommodations and modifications for students with disabilities, access:

- Accommodations and Modifications for Students with Disabilities in Career Education and Adult General Education
  http://www.fldoe.org/core/fileparse.php/7690/urlt/0070068-311201_acmod-voc.pdf
- Adult Basic Education Disability Manual. Minnesota's LD Portal
  http://manual.abedisabilities.org/
- Learning to Achieve. LINCS
  http://lincs.ed.gov/programs/learningtoachieve/materials.html
- National Center for Learning Disabilities
  http://www.ncld.org/
- National Attention Deficit Association
  http://www.add.org/

Accommodations for the GED® test

The purpose of accommodations is to provide candidates with full access to the GED® test. However, accommodations are not a guarantee of improved performance or test completion. The GED Testing Service® (GEDTS) is committed to ensuring access to the GED® test for all individuals with disabilities and supports the intention of the Americans with Disabilities Amendments Act, known as ADAAA.

Every candidate for the GED® test should have a fair opportunity to demonstrate his or her knowledge and skills under reasonable and appropriate test conditions. For some candidates, a disability may interfere with their ability to fully demonstrate what they know under standard testing conditions.

Learning disabilities, for example, can affect a person's ability to store, process, and/or produce information. A learning disability can also affect the ability to read, write, speak, do math, and socialize. Many physical disabilities can affect a person's ability to sit for long periods of time, to write using a pencil and paper, or to read normal-sized print.

Accommodations are available for candidates who have diagnosed physical, mental, sensory, or cognitive disabilities and who provide the appropriate documentation.

To receive accommodations on the GED® test, students must ensure that the appropriate accommodations request form is completed. This information is located on the GED Testing Service® website at: http://www.gedtestingservice.com/testers/accommodations-for-disability

Common Accommodations for the GED® Test

What accommodations are available on the GED® test for people with disabilities? The following are common accommodations for each of the specific areas of disabilities.

Physical/Chronic Health Condition

- 25%, 50%, or 100% extended time
- Private room
- Supervised breaks
- Audiocassette
- Braille GED® test
- Scribe
- Talking calculator

Learning and Other Cognitive Disabilities

- Extended time – 25%, 50%, or 100%
- Supervised breaks
- Audiocassette with extended time
- Scribe
- Talking calculator

Emotional/Psychological/Psychiatric Disabilities

- Extended time – 25%, 50%, 100%
- Private room
- Supervised breaks

Attention Deficit/Hyperactivity Disorder

- Extra time - 25%
- A 10-minute break for each test-section
- Use of large print

Intellectual Disabilities

- Extended time – 25%, 50%, or 100%
- Supervised breaks
- Audiocassette with extended time
- Scribe
- Testing in a private room or reduced-distraction room

It's important to remember that in order to obtain accommodations, students must have a diagnosed disability that requires specific accommodations and must complete the appropriate forms. Test accommodations are individualized and considered on a case-by-case basis. Consequently, no single type of accommodation (e.g. extra time) would necessarily be appropriate for all individuals with disabilities. Simply demonstrating that an individual meets diagnostic criteria for a particular disorder does not mean that the person is automatically entitled to accommodations.

Remember that whatever accommodations are allowed on the GED® test should also be implemented in the classroom.

Resources

For additional information on accommodations from the GED Testing Service®, access:

- Accommodations from GED Testing Service®
  http://www.gedtestingservice.com/testers/accommodations-for-disability

"This document was developed from the public domain document: Florida's Instructor Handbook for GED® Preparation - Revised March 2016 – Adult and Family Literacy Act, Florida Department of Education and Division of Career Adult Education."