TeachME PROFESSIONAL DEVELOPMENT

CEUs for Teachers and Educators

Teaching Science to Elementary Students

Introduction

If you're an elementary school teacher, you might teach many subjects. Even if you believe that you have a specialty based on your interests or academic background, you're likely charged with teaching your students about a wide array of topics. One of these is science.

Science can seem like an esoteric subject, one helpful only to future doctors or nurses. However, this could not be further from the truth. Science is interwoven into many different facets of being a capable adult and an upstanding citizen. Learning how to navigate scientific theorems can help your students understand their world and how best to help those around them.

Learning these ways of thinking starts early. In this course, we'll go over why teaching science to elementary students is so important - and several ways that you can practically do so in your classroom, even if science isn't something that comes naturally to you.

Section 1: The Importance of Integrating Science into Elementary School Education

Why science? Why is it important that each student knows the ins and outs of biology, or how to balance a chemical reaction? While it might not be vital that every student have the periodic table memorized, learning about scientific theories and other bases of knowledge can impart a great deal of very important information to your students. First, we'll discuss a few reasons that it's important to introduce scientific concepts early in your classroom.

Why is it Important to Teach Science at All?

There could be an argument that science instruction should be left to those who wish to specialize in the sciences or to pursue a profession in health management or research. In other words, the utility of science as a common educational priority is often underplayed. In this section, we'll discuss why it's important that every child receive a basic education in scientific subjects.

First of all, we are increasingly surrounded by the products of scientific research and advancement in our day-to-day lives. We live more and more in a technology-based society; we read about cures to diseases in the paper; we debate the benefits of solar

energy for increasing the sustainability of our communities. It is impossible to escape these types of conversations or decisions in modern life. Even seemingly non-scientific decisions such as political debates often direct future health guidance or environmental initiatives in our community. More and more often, simply to survive or succeed in our increasingly technological world, children will need to be at least somewhat scientifically literate (The University of Texas at Arlington, 2017).

For every student to have the logical and rhetorical ability to solve problems, learn new concepts, think critically about their decisions, and otherwise make good choices as they grow, they will need to have some idea of the scientific method. The scientific method is, after all, simply a logical way to learn from what's happening around us. Even an unconscious familiarity with the common steps of productive investigations will help your students buy better houses, choose better diets, enjoy intelligent relationships, and generally make better decisions as they move throughout their lives (The University of Texas at Arlington, 2017).

In order to see scientific instruction as a very practical matter - as important as learning to type, learning English, or learning civics - perhaps it would be a good idea to go further into how scientific literacy impacts our day-to-day life.

How Science Is Involved in Student's Everyday Lives

In today's world, everyone comes into contact with the result of scientific progress hundreds of times daily. If your student rode a bus to school, they interacted with a modern marvel of engineering. If your student chats with others on a phone or via video chat when he gets home from school, that's the result of decades of digital innovation.

If you look outside your window, you can see photosynthesis in action, the potential for agriculture investment, and even the process of evolution happening (extremely slowly) before your eyes. However, merely being surrounded by scientific concepts might not be enough of a reason to justify hours (and years) of targeted science education. How does investing in science education from a young age for every student specifically make their lives better? We'll list a couple of reasons next:

- **Comfortability with Scientific Inquiry and the Scientific Method:** Everyone needs to have a good way to make decisions. Making decisions, after all, constitutes much of how we can shape our own lives. Making good decisions is one of the most important skills a person can have, one that will literally make the difference, in many cases, between success and failure. Being able to evaluate alternatives, investigate potential courses of action, and eliminate plans that will not work for our benefit goes a long

way toward making those good decisions. These skills are part of the scientific method. Using the scientific method, even unconsciously, can help students form relevant questions, find evidence-based answers and explanations, and communicate their decisions rationally to other people (The University of Texas at Arlington, 2017).

- **Enhancing the Critical Thinking Capabilities of Children:** Even more fundamental to the scientific process, as well as successful living in modern society, is the ability to think critically. As you and your students go about your days, the various problems you encounter will naturally lead to questions on your part. Without consciously being aware, you (and your students) will ask questions to investigate these problems, make hypotheses as to what caused the problem, and make an evidence-based plan to create a solution…which you will then evaluate critically. This seems like a very formal process, but it can be used for everything from choosing the right house to making a delicious pizza for dinner. The abilities used in this very common, yet very critical process, are central to science. Problem-solving and critical thinking remain two of the most important fundamental skills that children can learn in school. One of the ways that students can most effectively learn these skills is by putting them to the test in scientific experiments at school. When they grow their confidence in these type of risk-free trials, they will feel more empowered to make nuanced decisions and take control of their lives outside of academic scenarios (The University of Texas at Arlington, 2017).

Even if your students aren't planning on a career in the sciences, the principles used in science education will follow them throughout their entire lives. Making sure that your students are comfortable with scientific literacy and the scientific process will enhance their ability to make good, nuanced decisions and observations in every aspect of their eventual careers and lifestyles.

Why Elementary School is a Good Time to Focus on Science Instruction

It's important to teach science, but when? In this section, we'll make the case that starting students on basic scientific instruction early on is important for good outcomes.

Your students enter a world in which scientific literacy is crucial - and that starts at a young age. Especially as the society in which we function becomes more digital and tech-based, the very way in which we communicate is based on some sort of logic and science. In a real sense, the future of our communities depends upon the next generation being as conversant in scientific literacy as they are with their native language. Just like learning a language, this innate familiarity takes years to build.

Therefore, it's important to start as early as possible - even if the payoff isn't for a decade or more (Cafaralla, Mucculloch, and Bell, 2017).

Thinking about the investment in years is likely a good strategy: Learning scientific literacy takes a long time. There's a lot of ground to cover - 'science', after all, encompasses almost uncountable sub-disciplines. These topics tend to be very nuanced, detailed, and complex, as well, which means that students do need to spend more time with them as they work toward mastery. However, that time is currently not being given to children. According to a recent study, the amount of time that is dedicated to science instruction in elementary schools is actually decreasing significantly year by year. Because science requires time to master, a reduction of instructional time will not lead to favorable outcomes in this respect (Cafaralla, Mucculloch, and Bell, 2017).

Even though the amount of time devoted to science instruction is decreasing, there is no evidence that justifies this from a psychological or neurological level. Studies on the intricacies of the neurochemistry of elementary student's brains indicate that early elementary school (or anytime in the K-12 window) is a wonderful time for student's natural brain activity. Their reasoning skills are just beginning to grow, and at this age, children are naturally curious about the mechanisms of the world surrounding them. We should be taking advantage of this time to teach children about science - not saving these more difficult subjects for 'later on', or if a child specifically shows interest in specializing (Cafaralla, Mucculloch, and Bell, 2017).

Section 1: Summary

It can be easy to discount science as an esoteric or niche subject. The fact that it can be difficult to teach and learn does not help in this respect. However, scientific literacy is an increasingly valuable aspect of a good education. As we progress towards a more and more tech-based society, scientific literacy will be an invaluable skill in any field - not just traditionally scientific ones.

Moreover, studies show that even though science education requires an investment from both teacher and student, there are significant payoffs. Elementary-school children have more bandwidth than we think they do, and a specific curiosity for the way their world works. Prioritizing scientific education while our students are young, therefore, needs to be a focus in years to come.

Section 2: How to Teach Science to Elementary Students

We've made it clear that science is a vastly important topic for your students to know more about. However, it might not be the easiest to pass on to your classroom. Why? As important as it is, science is still complex. It can seem esoteric. It may not come naturally to some of your students.

As a teacher, it's your job to overcome those barriers. Yet you don't want to make your students feel like they're suffering as they learn these concepts - or reduce the concept of scientific education to the memorization of a few flashcards about types of rock formation or cell reproduction.

Techniques for Effectively Teaching Science

In this section, we'll go over a few ways you can prioritize teaching these difficult subjects to your students in a way poised to help them understand that science is an essential subject—one that's possible to enjoy, even if it's hard.

- When you're putting together your science lessons and activity plans, make sure that you prioritize doing experiments that optimize the students' use of their senses. Working with outcomes and materials that they can smell, touch and taste will help even older children feel more excited about getting their projects done! More than just increasing their sense of 'fun', strategically incorporating the senses in these ways can help your students remember your lessons with much better clarity. For example, if you're teaching a lesson in biology about seeds, bring in a sampling of different types of nuts and seeds that your students can handle (and perhaps even safely taste) (HomeScience, 2017).
- Science comes with a vocabulary as involved as learning a different language. Many of the words that populate science lessons are extremely long and unwieldy. Devote a small part of your lesson time to just clarifying scientific vocabulary. Break down longer words into two words, each of which you can define in an easy way. (For example, the longer word 'photosynthesis' can be broken down into 'photo' and 'synthesis'. After you explain that 'photo' means 'light' and 'synthesis' refers to the process of making something, the concept of photosynthesis becomes much easier to remember). Teach the vocabulary of science just as you would vocabulary in a new

language: Spelling it out slowly, breaking it down, using it in conversation, and even coming up with silly songs about the concept. In the past, this part of science instruction has been glossed over, reinforcing the expectation that students naturally be able to pick up these difficult words. As this won't be the case, helping your students over that obstacle will make teaching science much easier (HomeScience, 2017).

When you're teaching science, there are going to be three basic types of lesson plans that will be particularly attractive to students and extremely effective for teaching, as long as you harness them well. These three activities involve:

- **Experiments:** One obvious way to get children more effectively onboard with science is to include them in the full scope of the experimental process. This involves treating the experiment as far more than just a fun in-class activity. The experimental process includes identifying a specific problem or question, formulating a hypothesis - or a guess as to why something happens the way it does, coming up with an organized way to test whether or not that guess is correct, and following through on that process. Few children really understand the logic behind that experimental flow, but it's a very intuitive way to get your students involved in the true meaning of every science experiment. Even very simple experiments, such as determining whether an object will sink or float, or building a diorama of a volcano, will become much more interesting to even young students if they have a grasp on why they are completing the experiment in question. If teachers can ensure that they match every experiment to a step of the scientific process, so the utility and direction of each activity are clear, this will lend a sense of urgency and importance to your students. Having your students work to formulate their own opinions before sharing in a group might also help make this process more interactive and fun (SHARE Team, 2020)!

- **Projects:** Interested in cultivating your students' sense of responsibility and ownership while deepening their appreciation for science at the same time? A good project can work toward both objectives simultaneously. Hosting a classroom science fair where you task students with creating their own projects will allow them to do a deep-dive on something that interests them specifically. For example, students who are interested in astronomy could do a solo project on charting constellations or learning about expeditions to the moon; students who find themselves fascinated with biology could grow different plants under different conditions to explore the efficacy of different environmental factors on photosynthesis. The goal would be to allow students to do something that excites them specifically—something that they're

naturally going to want to do a good job in pursuing! In addition to learning a lot about their specific subject, the students will receive a high-level education from their peers' projects and thought processes. You'll also be able to integrate many other skills, such as presentation and project organization, in this framework. No matter how you look at it, investing in personal projects is a good way to get even the most reticent of students on board (SHARE Team, 2020).

- **Nature:** Finally, if you're at a loss for how to get your students interested in science, go on a brief field trip outside. Children are always interested in completing their studies in any place that isn't their classroom (or their dedicated space to getting work done at home). Arrange your lesson plans so you can concentrate on demonstrating the type of science that occurs just outside your door. For example, you could consider taking your students to a nature center, where you could easily coordinate with a professional to help you explain some of the scientific processes that relate to animals and plants found outdoors. If that isn't an option, you might take your students on a nature hike, and simply ask them to observe the types of plants, trees, and animals that they see. You could take samples of leaves and water (if that's allowed in your area) to examine when you're back in your classroom. You could point out frogs and butterflies and use that as a conduit to talk about the ways various animals mature. When you're back in your classroom, you could create a window ledge where you could grow seeds, or ask students to recount what they saw in scientific detail. No matter the way you plan to capitalize on the experience, sometimes a simple shift in scenery can help students appreciate science a little bit more than they would otherwise (SHARE Team, 2020).

Looking for even more practical tools and resources you can use to create captivating classes for your students? We've corralled a list of specific starting points you can use whenever you need to generate a perfect lesson plan:

- **Inquiry-Based Science Lessons:** Inquiry-based science lessons are uncomplicated. In essence, you can simply begin each of these types of lessons with a question that will get your students wondering why a specific process occurs. For example: Why do the planets go around the sun? How do airplanes stay up? What makes leaves turn red in the fall? After you pose the initial question, you can give students an opportunity to posit and explore any possible solutions they'd like. They can try to develop any explanation - no matter how unlikely! You can then discuss any proposed investigations, and talk about the types of processes that they'd like to go through in order to support a final conclusion. Just working through the scientific method in a

high-overview style like this will give your students the tools to answer questions in any field later on in life (Crawley, 2018).

- **Video-Based Science Lessons:** Many elementary students have short attention spans as well as highly visual memories. You can ameliorate and take advantage of this by offering short lessons punctuated by dynamic, attention-grabbing videos. You might have noticed that if you teach your students by having them read straight from a textbook, you're likely having a hard time keeping their focus. Instead of using primarily written text, incorporate videos whenever possible: Time lapses of plants growing or animals maturing, animations of the water cycle or chemical processes, or anything else! These videos can help introduce more complex topics or help ramify the information you've already provided for your students.

- **Ask Your Students:** If you're wondering which scientific topics to introduce to your students, the answer might be simple: Ask them what they want to hear! Not only will they be much more involved in the resulting lessons, answering a specific curiosity your students have in your classes will make them feel more relevant, exciting, and interesting. If asking your students for any topic feels like it could result in off-topic or unhelpful suggestions, a good compromise might involve student selection of future topics. Write a list of approved scientific topics on the board at the front of your room, and ask your students to vote (either by hand or by paper to keep it anonymous) on what they'd like to learn next. Then, when you begin to introduce the decided-upon topic, you can start with a discussion as to why your students are interested in the topic (Crawley, 2018)!

- **Connect Your Lessons to Your Students' Experiences:** Your students are very practical people. In order for them to be interested in what you're teaching them, it needs to connect, and it must 'make sense' for them. When you're framing your lessons, try to do them in the context of your student's worlds. For example, if you want to talk about the rotation of the planet or the science underlying Daylight Savings Time, you can easily start by asking your students if they know why it's dark when they wake up in the morning, but light when they go home from school - or why it's cold one day and not another; or where the rain goes when the storm's done (for example). If you can frame your lessons as if they're answering hot-button issues in your student's lives, they'll be much more interested in tuning in (Zimny, 2018)!

- **Prioritize Active Learning:** Everyone, your students included, is more likely to learn by 'doing' than simply passively taking information in. However, many traditional classroom techniques tend to prioritize practices like lecturing from the front of the

room and reading straight from textbooks. This is boring (for both the teacher and the listener!) and, as a result, isn't very effective. To turn this around, think about prioritizing 'hands-on' lessons. This doesn't have to cost much: One teacher decided to invite her students to engage more with her topic by instituting "Take Apart Fridays" - wherein her students brought in small appliances from their homes that no longer worked and were going to be thrown away. The students dismantled them in class, collaborated with other students to rebuild them, and learned a lot about safe engineering and other STEM practices along the way (Zimny, 2018)!

- **Emphasize the Need for More than Simple, Parroted Answers:** Science, as with many subjects, can be boiled down to mere memorization. Like other subjects, any real learning of the topic likely needs more involvement than that! While there are parts of scientific lessons that may simply need to be memorized, see if you can get students to talk about their learning in a way that makes it clear that they're understanding the topic at hand. Simply asking them what they're thinking can help. If they get stuck, let them know that you are there to help guide them through the topics that may be confusing them. Another good strategy is to ask your students to explain the concepts in question back to you in their own words - specifically avoiding any memorized phrases. This will help make sure that they really get the topic at hand (Zimny, 2018)!

- **Give Your Students a Social Learning Experience.** Just as your elementary school students are likely to be more visual, active learners, there's a good chance that they are social learners as well. This means that if your students get the chance to discuss or present what they're learning, it'll "stick" in their memories much better! In order to facilitate this type of learning in your classroom, break your students up into pairs or small groups to discuss sections from the textbook, points from videos that you watched as a class, or the results of any experiments or investigation stations that they recently experienced. This will have the dual effect of helping your students better learn the scientific concept as well as increasing your student's communication and collaboration skills (Zimny, 2018).

- **Make a Point to Use Scientific and Mathematics Language.** For years, instructors have - with the best of intentions - decided to translate scientific concepts into everyday English, in order to help their students better understand. Unfortunately, this just increased the reputation that scientific language has for being hard to use and understand. While it can sometimes represent a bit of a learning curve, in the beginning, being able to converse with the correct scientific terms will do a lot for

your students in the long term. Try to use scientific vocabulary every day - and not just in science lessons. Weave these concepts and terms throughout your students' entire classroom experience in an effort to make these concepts a part of your students' "real life" - not just something they have to study for a few isolated minutes of the day (Zimny, 2018).

- **Consider integrating STEM strategies into your students' current lessons:** Instead of reinventing the wheel and coming up with brand-new strategies for your students' lessons, try to incorporate STEM (or Science, Technology, Engineering, and Math) concepts, vocabulary, and strategies into scientific or non-scientific lessons. Start by simply asking yourself how you can make your student's lessons more hands-on and meaningful. This may require creativity, but it will always pay off for your student's classroom experiences! For example, if you're going to be teaching your students about the best ways to collect and record data, don't give them a presentation or worksheet about it - have them bring in rocks or leaves from their homes to compare and analyze with data-driven observations (Zimny, 2018).
- **Try to be aware of any bias that you or your teaching materials may have when you're presenting lessons.** Your students who are persons of color or females might not have as much representation in the sciences, or in traditional tools used to teach and speak about science. This can be uncomfortable and alienating toward students in your classroom, who may feel like this is a good enough reason to stop paying attention to your lessons in class. Try to compensate for any inadequate representation by finding diverse examples to add to the text, or by using pronouns that make it clear that anyone can be a scientist. This will feel more welcoming and inclusive - and will act as both an invitation and an expectation that makes it clear that everyone should be participating in class (Zimny, 2018).

Making Science Fun and Engaging for Your Students

Unfortunately, many of your young students may have a preconceived notion that science cannot be fun or dynamic. In fact, they have a perception of scientific research and study as being dry and boring. As with all other subjects, how exciting science can be is directly proportional to how much you, as the teacher, invest in a creative lesson plan.

Consider taking advantage of the following ideas to make your students naturally excited about the opportunity to learn more about the world around them:

- **Give your students science notebooks.** A blank notebook presents a world of opportunity to students - and, by encouraging your students to fill the pages of a personal notebook with observations about the world that naturally interest them, you're sharpening their observational and writing skills in addition to their scientific literacy. Ask your students to use them as half-journals, half-reporting assignments: They should write down questions that they have, ideas for projects that they want to complete, and more! Even any drawings that your students would like to include of natural phenomena they see around them would be great. It's crucial that you make it clear to your students that these notebooks belong to them, and they can do what they want - as long as they fill the pages! Then, perhaps in one-on-one mentoring sessions with them as the year progresses, use some of the observations and questions they have put in their science notebooks to guide a specific-to-them project delving into a concept they thought of themselves (Teachersbrain, 2018).

- **Consider creating investigation stations.** During your science class, refer to your students as 'scientists' and invite them to study concepts in an official capacity in investigation stations around your classroom! At each of several different locations, set up small activities involving easy-to-complete objectives, such as measuring a few objects, reading a brief paragraph, or taking a short quiz. Making sure that the stations, when all taken together, all have different types of actions in them will make this type of lesson more effective and engaging for all of your students! If you can find a few old button-up lab coats or goggles, so much the better to help your students feel as scientific as possible. After the students have each attended all of the investigation stations, you could use the end of the class or even the next class period to allow the students to reflect or present on what they have learned (Teachersbrain, 2018).

- **Make sure that you encourage your students in their pursuit of an independent investigation.** If you're teaching elementary school students, you're teaching students that have a natural inclination toward investigating the world around them. Take advantage of that! Harness your students' natural curiosity by providing them with common (yet "fun") scientific tools, such as magnifying glasses, magnets, and beakers. These, combined with safe household items that your students can mix and observe (such as vinegar, baking soda, and Alka-seltzer), can help your students become more aware of the inherent excitement of exploration. Allowing your students to take the reins and follow their own instincts can also help nourish their confidence in their own observational skills. Offer your students guidance when

appropriate, and assistance when requested, but otherwise allow them to make their own discoveries (HomeScience, 2017).

- **Give your students visual examples of the concepts you're explaining whenever it's possible for you to do so.** For example, instead of telling your students that the earth moves around the sun, have one student sit in the center of the room - and have another student spin around that individual. This will get the entire classroom involved in the teaching concept, and it will be much easier for your students to understand and remember the lesson when it was acted out in such a physical way. Whenever possible, get your students up and moving: Use oranges and beach balls to talk about atoms, protons, and electrons, or have your students care for a tadpole, watching as it turns into a frog (HomeScience, 2017).
- **Ask your students questions as often as you can - and encourage them to ask questions as well.** Instead of providing a very discrete exam, for example, you could simply walk around and ask them assessment questions while they're engaged in their independent investigations. Whether you use the assessment for official purposes or not, simply asking your students to tell you what's happening before them can help you gauge how well they know their concepts - which, in turn, can help you design future lesson plans to meet your students where they actually are. Some good questions to include might be: What did you see happening? Is there anything you don't see happening? Why do you think this is happening? Have you seen this happen before? Does what's happening here remind you of anything else you've seen recently? Just helping your students make these kinds of connections on their own will be much more powerful than simply telling them what the connecting concept is (HomeScience, 2017).

Integrating Science into Other Types of Instruction

Scientific concepts are a very real part of our lives that touch every facet of our everyday. Furthermore, science is definitely not a subject that should stay neatly in one hour of your students' days; instead, it can easily be incorporated into other types of instruction. There are a couple of benefits to proactively doing this: To the extent that science can sometimes be considered more exciting and immersive, it can help make other subjects more interesting - and, of course, if you're able to help normalize scientific literacy and vocabulary, that will help immensely when it's time to delve back into scientific instruction.

Integrating subjects is a very timely focus for educators today. Here, we'll focus on a few different ways to integrate science into other types of instruction.

- **Start by recalling STEM guidelines.** STEM, as the general grouping of Science, Technology, Engineering, and Math, has several goal-and-outcome-oriented guidelines that can help you craft your lessons - even if the content isn't specifically science-related. According to Stem By Design, the STEM criteria include:
    - Addressing a problem that your students are likely to understand or at least recognize from their real-life (this will help them feel the lesson is applicable and engaging!);
    - Trying to drive the lesson with an engineering, scientific, or mathematical process in mind, if at all possible;
    - Getting your students to work together, to increase your students' communication and collaboration skills (skills which are vitally important to every workplace today!);
    - Celebrating the fact that a single problem may have multiple different approaches to get to the same answer - or, indeed, several different answers that might be considered correct;
    - Using primarily inquiry-based learning and teaching models for your classroom, in which you allow your students to ask questions, ask questions of your students and use those questions as jumping-off points for respectful dialogue
    - Prioritizing creativity and ownership as much as you can while in class, and even guiding your students to entrepreneurship by giving them open-ended projects and materials with which they are expected to create solutions
    - Helping your students physically build something as often as you can (STEM by Design, 2016)!

Even if the lesson you're teaching isn't specifically a scientific one, if you're able to incorporate some of the above national STEM guidelines into your lesson plan, you'll be at least familiarizing your students with the way science works in real-time for professional scientists - and giving them some of the skills that they'll need to succeed in their future careers, no matter what they may be (Jolly, 2016).

One fantastic way to integrate STEM concepts and problem-solving training into lessons from other disciplines - for example, history, literature, and social studies - is to examine the way that various historical engineers have had to solve problems since the dawn of time. Throughout many historical events, engineers and their predecessors have invented creative technologies in order to solve the main problems of their day.

As one example, you could discuss, in history class, the practical difficulties that the ancient Egyptians faced when they were building their famous pyramids to celebrate their pharaohs and queens. They needed an efficient but noteworthy way to mark tombs - and they decided that a pyramid was the best shape.

Why was the pyramid the best solution to the problem the ancient Egyptians faced? History teachers could incorporate a STEM focus into this lesson by asking questions like:

- What types of engineering problems did the Egyptians have to solve when they were building their pyramids? (Any answer is a good one, but some relevant ones might include the weight of the stones, the distances from which the stones had to be transported, the logistics of getting the heavy stones from the base of the pyramid to the top, and making sure that the often-delicate burial chambers were protected while construction was going on).
- What would you have done if you were working on a pyramid if you'd been alive back then? This is where you can let your student's minds run wild - or you could even let your students work in teams to put together a solution for any of the identified problems.

If you're thinking about ways to incorporate technology and scientific angles into literature or art subjects, you can always lean into digital avenues for sharing and presenting. Consider allowing your students to blog or vlog during their participation in a project. If you help them learn how to edit their work, safely share it and present it well, that's more than just a soft skill: Being able to market digital products well is a skill that will serve them in their eventual career, no matter what they end up doing!

Ultimately, as you try to get your students involved in science, there are just a few key tips to keep in mind - whether you're teaching science in its own right or are trying to find ways to integrate it into other topics:

- **Start with small changes.** Instead of investing in all-new lesson plans or creating new curricula, simply take a lesson that you already know how to teach well and just incorporate one or two new questions, problems, or aims.

- **Go to the Internet for ideas.** Pinterest, Twitter, and other social media networks are full of ideas from teachers who are trying to do the same things you are!
- **Use materials that you already have around.** Don't spend too much! One of the ideas that STEM (and, particularly, science) thrives upon is thriftiness and creativity. You don't need to spend extra money to make your science classes (or integration) effective.

Finally, if your experiments with scientific integration don't work the first time, don't sweat it! Science is full of trial and error (in fact, that's basically what the scientific process is). Learning how to make the most of mistakes will be a lesson in and of itself; embrace it!

Conclusion

If you're interested in increasing the amount of time your students spend with scientific vocabulary or subjects, you will have to invest some time and effort into creative, engaging lesson plans. However, it doesn't have to be difficult or expensive to do so. By making sure that your lessons are practical, integrative, and engaging, your students will naturally be more interested in learning even the most difficult subjects.

There will be a great payoff for your students if you help them learn more about scientific subjects. Scientific literacy will help them be successful for the rest of their lives! It just means that right now, while your students are young, you have a window of opportunity to help them understand these esoteric topics.

References

Cafaralla, Mucculloch, and Bell. (January 2017). Why Do We Need to Teach Science in Elementary School? Stem Teaching Tools. http://stemteachingtools.org/brief/43

The University of Texas at Arlington. (September 8, 2017). Importance of Science Education in Schools. The University of Texas at Arlington Online. https://academicpartnerships.uta.edu/articles/education/importance-of-science-education.aspx

Teachersbrain. (November 28, 2018). Strategies for Teaching Science in Elementary School. Teacher's Brain Blog. https://teachersbrain.com/strategies-for-teaching-science-in-elementary-school/

HomeScience. (2017). Tips for Teaching Science to Elementary Students. HomeScience Tools. https://learning-center.homesciencetools.com/article/tips-for-teaching-science-to-elementary/

SHARE Team. (2020). Three Ideas for Teaching Science to Elementary Students. Resilient Educator. https://resilienteducator.com/classroom-resources/3-ideas-for-teaching-science-to-elementary-students/

Crawley, R. (March 22, 2018). 5 Easy Ways to Teach Science in the Elementary Classroom. iAchieve Learning. https://iachievelearning.com/2018/03/5-easy-ways-to-teach-science-in-the-elementary-classroom/

Zimny, J. (May 30, 2018). 12 STEM Tips for Elementary School Teachers. SEEN. https://www.seenmagazine.us/Articles/Article-Detail/ArticleId/6974/12-STEM-Tips-for-Elementary-School-Teachers

STEM by Design. (July 5, 2016). The 8 Criteria for Authentic STEM Programs. STEM by Design. http://www.stem-by-design.com/the-8-criteria-for-authentic-stem-programs/

Jolly, A. October 17, 2016. How Do We Integrate STEM Across Subjects? MiddleWeb. https://www.middleweb.com/33039/how-do-we-integrate-stem-across-subjects/