

What exactly IS science?



Science is more than a classroom... it's actually pretty difficult to define. Science is not about what we know, but rather about how we face what we *don't* know. It's not a textbook of principles, set of rules, or collection of factoids. It's a process, a *thing* you do. Science is what happens when you ask questions, get back answers, and try to figure and make sense of it all.

Science gives you a way to ask questions and get back answers. There are many different ways to do this, the Scientific Method being only one of the ways of sorting and sifting through the information as you go along. We'll be teaching about several different methods as we go along in our eScience program and highlighting which methods are most used by real scientists and engineers. (Guess what?? It's *not* the scientific method!)

Believe it or not, there's a straightforward method to doing science. You can't just sit around and argue about how things work, but you actually have to do experiments and be able to measure your results. And other people have to get be able to get those same results on their own, too! While this sounds basic, it wasn't until the 1500s when Tycho Brahe suggested that people do experiments to figure things out instead of discussing (and arguing) about the way things should be.

What we don't know is *just* as important as what we do know. But how do we fit all of these things together? We can break science down into three basic questions:

1. What IS it? What is it made of, look like, act like? (This is where you describe it.)
2. How does it work? Why is it that way? What are the physics behind it?
3. How does it move through time? How did it start, develop through time, and end? What are the laws of physics that determine how things unfold in time?

Most things in science do not yet have answers to all three of these questions! Sometimes parts of learning is *unlearning* some of the things you think you know. Things that you're pretty sure are right! Scientists have struggled with this for When you really think about it, a lot of science is actually *unlearning*. Science challenges you to rethink what you think you already know:

“It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so.” ~Mark Twain

Sometimes unlearning the 'absolute truths' that have stood for thousands of years is part of the science process. Here are a few examples: the Sun revolving around the Earth; the ocean was bottomless; there's no life in Antarctica; the Earth is flat...

So how do we establish what we do and don't know? One of the most surprising things we've learned is that although the Universe is incredibly vast (it's way bigger than any human being), *but* it still able to be understood.

“The most incomprehensible thing about the universe is that it is comprehensible.” ~Albert Einstein

When you first start out doing real science, it may seem awkward, disjointed, difficult, even a bit weird. But that's just because you're new at it. People aren't instant experts at new stuff, and you shouldn't expect to master something in a heartbeat that is going to last you a lifetime.

“It will seem difficult at first, but everything is difficult at first.” ~Naomoto Musashi

Some of this science stuff we're going to cover will be new to you, unfamiliar, even off-putting. (*What do you mean lightning strikes twice in the same place?*) But just stick with it and I guarantee that it will pay off. You'll notice this when things start to 'snap' into place as you gain an amazing understanding of not only the rules of the universe, but how to think and question new stuff that comes your way.