

Introduction to science learning & Smartivity- 10 minutes

Introduce yourself. Tell the children your name, your field of study, and a list of superlatives they must use when addressing you, such as _____

Who is a smart kid?

Gather answers from students and then tell them **the definition of a smart kid.**

What is smartivity?

What is science?

Science refers to a system of acquiring knowledge. This system uses observation and experimentation to describe and explain natural phenomena.

What is technology?

Technology is the application of science, or scientific knowledge for everyday use... or what we call practical purposes.

What is engineering?

Engineering is the branch of science and technology that deals with the design, building, and use of engines, machines, and structures...

What is mathematics?

Mathematics is not just about numbers and addition and subtraction and multiplication and division... Math and science go hand in hand. Math is a subject that helps us think about and experiment with science, technology and engineering concepts, before we actually build something.

What is STEM?

STEM is a shortform of Science, Technology, Engineering and Math... all the modern advances that we as humans have made is a result of these four subjects. These four subjects not only help us discover and invent new things, but also help us look at life in a different way - help us question why and why not... show us a way to find new solutions.

What is a Scientist?

"A scientist is a person who asks questions and tries different ways to answer them."

Then I show a PowerPoint I made, **What is a Scientist?**

Science in Life- 10 minutes

Science has invaded every branch of modern life. It is the noise of machines, cars, mills and factories, etc. which awakens us every-day in the morning. The food we eat, the clothes we wear, the books and papers we read, the recreations we enjoy, the games we play – all have something or other to do with the application of science.

Every person feels the effects of science in every sphere of life. It is not merely the electric light or the electric fan, the radio or the cinema that displays the power of science in our daily life, but everything we do or is done to us is in some way or another connected with science.

The things that we use in our daily life are mostly due to science. Our forefathers put on clothes woven by hand. Our clothes are made in large factories where scientific methods are used. We get so much paper to write on only because the paper mills can turn out huge quantities of it. Cloth and paper we had even before science came on the scene but no one could then think of the huge quantities in which they are produced now.

Science has conquered time and distance. We can travel from one place to another with a quickness which our forefathers could not have dreamt of. In the morning, we get news of events that happened yesterday in all parts of the world. Why should we talk of yesterday? With the help of the radio, we can listen to an American speaking. It would seem that he is before us and we are part of his audience. If we want to send a message to a person in America, we can send an email and he will get it in a few hours. If we want to speak to our friends far from us, there is the telephone that will connect us.

Effect of science of human life: It is, indeed, true that science has added tremendously to the comforts and conveniences of mankind. Unless one is an ascetic, one has no reason to reject the things science offers. By conquering time and distance science has brought mankind together and so far made life richer. By inventing medicines it has made our day-to-day existence relatively free from disease, and has, indeed, added to our length of life.

Examples of use of Science in everyday life: This fan and light works from the application of electricity. Electricity is one of the wonders of modern science. The bus which has an engine works with petroleum. The train is driven by the power of coal. This is possible only because of the application of science. My doctor gives certain injections and the patient soon well enough to come here. Medical science is another achievement of modern science, the marvel of medicine.

From the above, it is clear that science is playing an important part in our everyday life.

Scientists Stay Safe

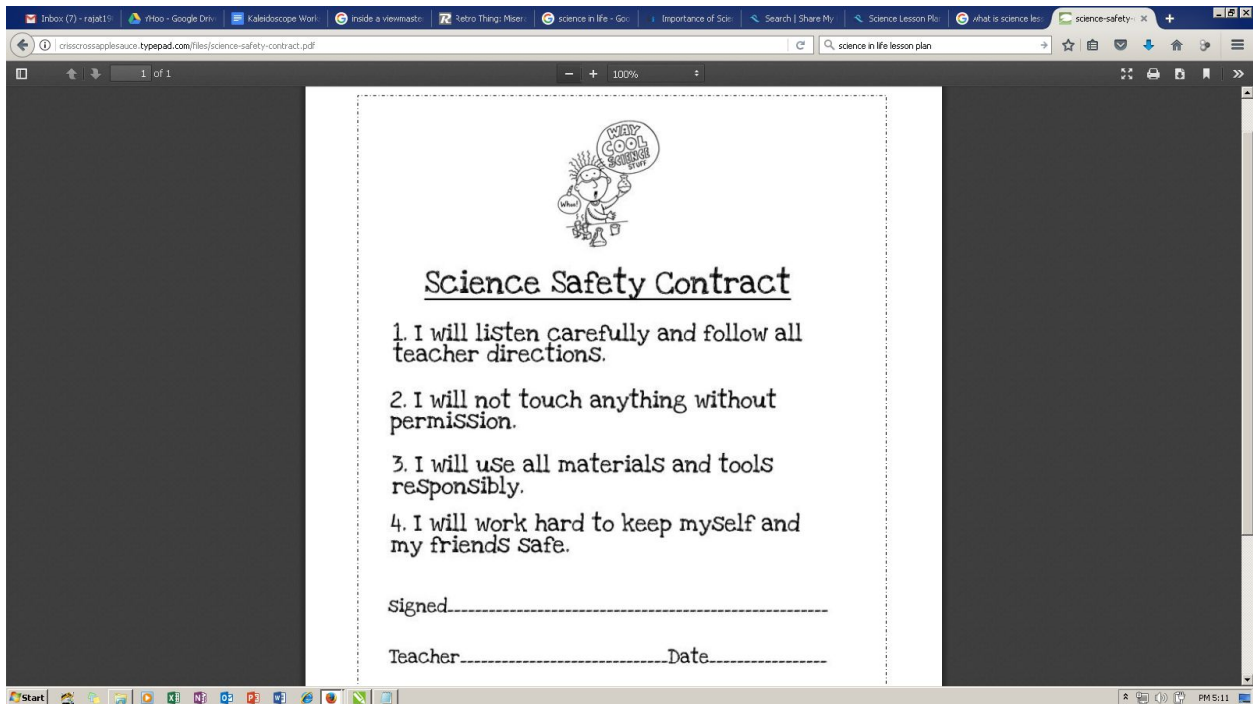
Today we take some time to go over all of the safety expectations in the [Science Safety Contract](#). I start by asking the kids "Why is it important for scientists stay safe? What kinds of things do scientists do to stay safe?"

We watch the PowerPoint [What is a Scientist?](#) again. I ask the kids to look for things that these scientists are doing to stay safe. (The chemist is wearing gloves and goggles; The geologist is wearing a hard hat; etc.)

Then I ask the kids about specific slides, for example-- "Do you think the volcanologist plays around with the hot lava? Do you think the chemist tastes the chemicals? Why not?"

We take a few minutes to discuss all the horrible catastrophes that could befall these scientists if they are not safe (the kids are very imaginative that way!) Then I tell the kids that, although we will not be near any volcanoes or tornados, it is still very important that **we** stay safe while doing science!

I hand out the [Science Safety contracts](#). We go over each expectation--one by one. We talk about why that expectation is important and what could happen if we didn't follow them. When we are done, we sign them and glue them in our notebooks!



The screenshot shows a PDF document titled "Science Safety Contract" displayed in a web browser. At the top of the document is a cartoon illustration of a scientist with a speech bubble that says "WHY COOL SCIENCE?". Below the illustration, the title "Science Safety Contract" is centered and underlined. The document lists four safety expectations:

1. I will listen carefully and follow all teacher directions.
2. I will not touch anything without permission.
3. I will use all materials and tools responsibly.
4. I will work hard to keep myself and my friends safe.

At the bottom of the document, there are lines for signing: "Signed _____" and "Teacher _____ Date _____". The browser's address bar shows the URL "crisscrossapplesauce.typepad.com/files/science-safety-contract.pdf".

CONCEPTS EXPLAINED - 10 Minutes

Guide students to the scientific concept they will be learning through the activity which is

Video: <https://www.youtube.com/watch?v=YismwdgMIRc>

Today's lesson is all about ANIMATION and GEARS.

Persistence of vision: You've probably done that trick where you make a **flick book** (sometimes called a flip book) by drawing little stick people on the corner of a pad of paper and flicking them with your fingers so fast that they hop, skip, and jump. When your eye sees a series of still images (or "frames") in quick succession, it holds each image for a little while after it disappears and even as the next one starts to replace it. In other words, each picture leaks into the next one, so they blur together to make a single moving image. This is known as the persistence of vision and it's the secret behind every movie you've ever seen.

It's not just flick books that use persistence of vision. Before movie cameras and projectors were invented, 19th-century toy makers were using the same idea to make relatively crude animated films. A typical toy from this era was called the zoetrope. It was a large rotating drum with thin vertical slits cut into its outer edge. Inside, you placed a long strip of paper with small colored pictures drawn on to it. Then you rotated the drum to make the pictures blur together (just like a flick book) and looked down through one of the slits to watch them.

Reading Instruction Manual and identifying parts

(5 minutes)

Constructing the RETROSCOPE - 125 minutes

PLAYTIME - 10 minutes

Gears - Learner's log

ACTIVITY

ACTIVITY

ACTIVITY

ACTIVITY

ACTIVITY

Colouring a project - 20 minutes

Pop Quiz - 10 minutes

- 1) What is the drawing of little stick people on the corner of a pad of paper and flicking them with your fingers so fast that they hop, skip, and jump, called? (a)
 - a) Flip book
 - b) Moving pictures
 - c) Animated book

- 2) What is the series of still images in quick succession also called? (b)
 - a) Pixels
 - b) Frames
 - c) Objects

- 3) The process where each picture leaks into the next one, so they blur together to make a single moving image. This is called _____. (b)
 - a) Tunnel vision
 - b) Persistence of vision

c) Multi-framing

4) What is the best example of the process described in question 3? (a)

- a) A movie
- b) A still image
- c) Both of the above
- d) None of the above

5) What was a toy used to make animated films before projectors and cameras called? (c)

- a) zootopia
- b) flash
- c) zoetrope
- d) macromedia

6) What did the toy look like? (b)

- a) A box
- b) A drum
- c) A passage

7) What type of slits did the toy have ? (a)

- a) Vertical
- b) Horizontal
- c) Diagonal

8) You placed a long strip of _____ inside the toy. (b)

- a) Film
- b) Paper
- c) Photos

9) What were the pictures used to create the film drawn on? (b)

- a) Film
- b) Paper
- c) Photos

10) In which century was the toy used to create animated movies before projectors? (d)

- a) 18th century
- b) 16th century
- c) 17th century
- d) 19th century