

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- 5 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

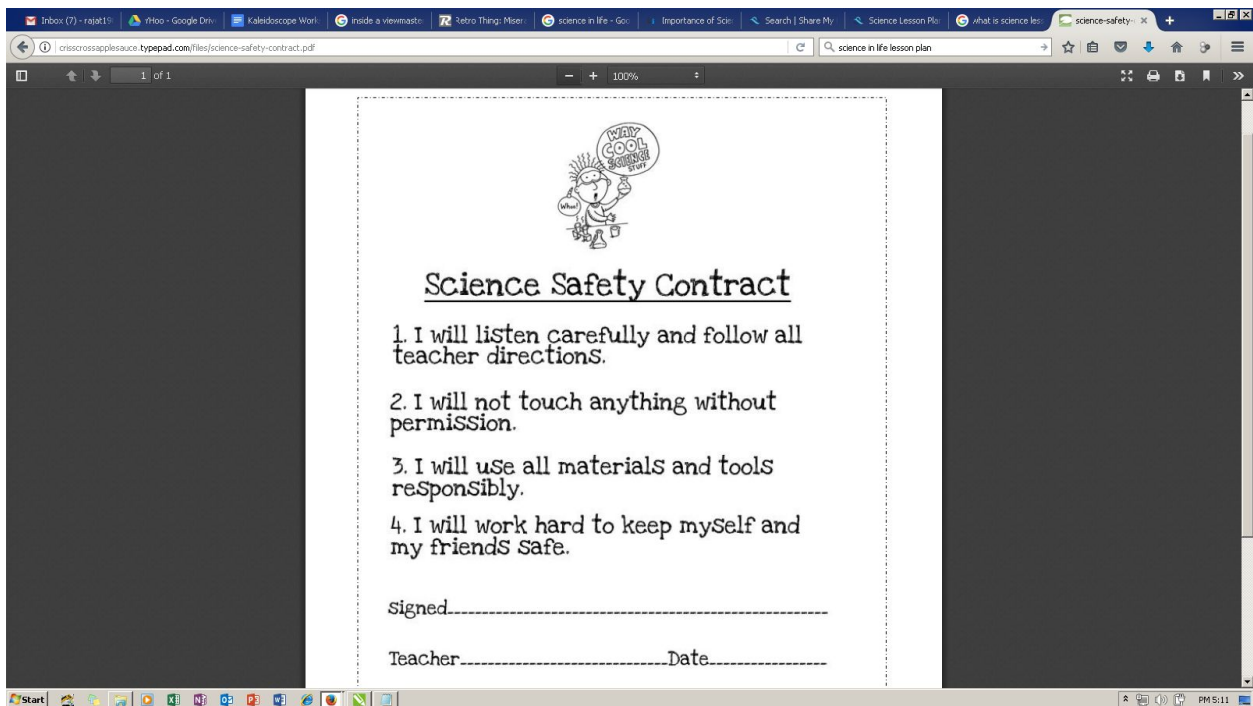
Today we take some time to go over all of the safety expectations in the [Science Safety Contract](#). I start by asking the kids "Why is it important for scientists stay safe? What kinds of things do scientists do to stay safe?"

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!



Guide students to the scientific concept they will be learning through the activity which is **OPTICS: Light, Properties of light, REFLECTION, Transparent opaque and translucent materials, patterns mixing of colours.**

Reading Instruction Manual and identifying parts for the DRUM

(5 minutes)

TRANSPARENCY CONCEPT EXPLAINED - 15 minutes

Introduce the words: translucent, transparent, and opaque

Transparent:

Translucent:

Opaque:

Write these words on an anchor chart and tell the students that we are using these words today in our lesson.

Show examples of each of our new vocabulary words (transparent, translucent and opaque) and together with the students infer the meaning of the word.

Say: Boys and girls, I have three very important words for you to know: translucent, transparent, and opaque. Do you see the trays I have on the counter? The first tray has items that are Transparent.

Place the word transparent on the tray.

Say: This next tray has objects that are Opaque.

Place the word opaque on the tray.

Say: How are these two trays are different?

Engage children scientific discourse with their turn and talk partners. Record their thinking on anchor chart: clear, you can see through it, you cannot see through it, etc.

Say: Boys and girls you just discovered that when something is transparent you can see through it and when something is opaque you cannot see through it. Very good! Now look at this tray. These objects are Translucent. How would you describe things that are translucent?

Say: Today we are going to use objects that are transparent, translucent and opaque to learn more about light beams or light rays.

Say: Today your job is to find an answer to this question: What do different types of material do to the beam of light?

Ask them to open their packets.

Say: In your packet you have objects that are opaque, translucent and transparent. How might you use these objects to study the beam of light?

Give them the recording sheet.

Object	Prediction What do you think will happen?	What happened to the beam of light?	What kind of material is it? <input type="radio"/> Transparent <input type="checkbox"/> <input type="radio"/> Translucent <input type="checkbox"/> <input type="radio"/> Opaque <input type="checkbox"/>
			<input type="radio"/> Transparent <input type="checkbox"/> <input type="radio"/> Translucent <input type="checkbox"/> <input type="radio"/> Opaque <input type="checkbox"/>
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			<input type="radio"/> Transparent <input type="checkbox"/> <input type="radio"/> Translucent <input type="checkbox"/> <input type="radio"/> Opaque <input type="checkbox"/>

Say: This recording sheet has a box for you to make predictions. Before we get started you will fill in the first boxes with the names of the objects on your tray. Next write your prediction or best guess for each object. You will write what you think will happen to the beam of light when that object is put in its path.

Say: Remember we are going to answer this question: What do different types of material do to the beam of light? We need to know, what does an opaque object do to the beam of light? What

does a translucent object do to the beam of light? What does a transparent object do to the beam of light?

Once they have recorded the predictions, ask them to point those materials at the sources of lights in the room.

Ask: What do different materials do to the beam of light?

Record their thinking on the anchor chart about the beam of light.

Show Video on transparency.

Build the drum of your kaleidoscope.

Constructing the DRUM - 20 minutes

REFLECTION CONCEPT EXPLAINED - 15 minutes

Say: Light can travel from one place to another. If you turn on a flashlight and point it at the wall, the light will travel from the flashlight all the way to the wall. The light beam travels in a straight line. I want you to look at these pictures. What do you notice about the light beams.

I want my students to point out that the beam travels in a straight line. I take a flashlight and point to the wall.

Say: Boys and girls do you think I can point this flashlight at the wall in front of me the light can turn and touch the wall to the left of me? Light travels in a straight line but do you think we can bend the beam of light? Today I want you to try and discover more about the beam of light. As you work you will try and answer this question:

Say: Today we are going to answer the question: Can the beam of light bend? If yes, how? As you are working I want you to think hard about this question and see what you can discover!

Hold the flashlight straight and hold the hand sideways and try to bend the light.

Hold the mirror straight and then shine the flashlight at an angle and see what happens.

Put the mirror at the edge of the flashlight and then shine the flashlight onto the mirror and see if it goes to the ceiling.

Point the flashlight at the mirror and see if it bounces back.

Shine the flashlight at the mirror and see what happens.

Say: Boys and girls you learned all about ways to bend light beams today. I want to teach you a new word. It is called reflection. Can you say reflection? Great! Reflection happens when you shine a narrow beam of light at something, you get a beam of light reflected back off it. For example when you shined the flashlight into a

mirror, you got a beam of light bouncing back towards you. Have you ever heard the word reflection? What does this make you think of?

Video: <https://www.youtube.com/watch?v=cxsl0Av5624>

Say: Boys and girls in this video you learned a lot about light reflection. We have learned that you can reflect light off of a pond, a mirror and even a tray. Can you think of some other examples where light is reflected?

Record their thinking on our "Reflections" anchor chart.

Build the Tube of your kaleidoscope.

Constructing the TUBE - 60 minutes

When the tube is made, ask the students to draw patterns on a sheet and view their drawn patterns and surroundings from the tube. What do they observe?

What happens when they place one hand on the other end of tube? Light blocked, nothing visible.

Connect TUBE to DRUM and play - 20 minutes

Colouring a project - 20 minutes

Pop Quiz - 10 minutes

1. An object is called _____ when you are not able to see through it. (c)
 - a) Transparent
 - b) Translucent
 - c) Opaque
 - d) Solid
2. Which of these items are opaque? (d)
 - a) Wood
 - b) Mirror
 - c) Apple
 - d) All of the above
3. Which of these items are transparent? (a)
 - a) Clear fish bowl
 - b) Butter paper
 - c) White sheet of paper

d) Mirror

4. Which of these items are translucent? (d)

a) Butter paper

b) Sunglasses

c) Frosted glass

d) All of the above

e) None of the above

5. An object that allows light to pass partially but doesn't allow us to see detailed shapes is called? (c)

a) Opaque

b) Transparent

c) Translucent

d) None of the above

6. Light has no _____. (b)

a) Particles

b) Mass

c) Colour

d) All of the above

7. The bouncing back of light is called _____. (a)

a) Reflection

b) Refraction

c) Retraction

d) Shadow

8. The bending of light when it passes from one medium to another is called _____. (b)

a) Reflection

b) Refraction

c) Retraction

d) Shadow

9. A Kaleidoscope is a _____ instrument. (a)

a) Optical

b) Sensory

c) Both a and b

d) None of the above

10. The mirrors in a Kaleidoscope reflect a _____ pattern. (b)

a) Asymmetrical

b) Symmetrical

- c) Random
- d) Fixed