LIGHTen Up!

Pre-Visit Activities
Grades 3-5

VIRGINIA
AIR & SPACE
CENTER

Activity 1: Getting the Bright Idea

** A slinky is required for this activity

Begin by asking students “What is light?” Take different answers from the students and then explain to them that the light we see (i.e. visible light) is a combination of several different wavelengths of light traveling together. Continue by saying, like sound, light travels in waves.

Review the parts of a wave by requesting a volunteer and the use of a slinky. Hand the volunteer one end of the slinky while you hold onto the other end, then back away allowing for the slinky to stretch. Once there is a reasonable distance between you and the volunteer (about 6 feet), move the slinky up and down to form waves. Explain to the class that the wavelength is the distance between the peaks (the top of the wave). Also include that the bottom of the waves is known as the trough. Move the slinky slower to show longer wavelengths and faster for shorter wavelengths.

Extension: Let the whole class try and have them take turns creating the waves and holding the slinky.

Activity 2: Making the Rainbow Connection

To begin the activity, ask students “Who has seen a rainbow?” Continue by asking the students to name the colors of the rainbow. When most of the colors have been named, introduce the concept of ROY G. BIV to the students as a memory mechanism. Next, have the students count off according to the acronym, for example, the first student will be ROY, the next G, and then BIV. Group all of the ROY’s, G’s, and BIV’s together and inform them that they are going to be completing a group assignment on the history of light and the color spectrum based on their groups. If groups are quite large, feel free to divide them into groups of more functional sizes (about 4-5).

Let each group create a hypothesis based on the given scenarios (feel free to create your own) and then hold a class discussion on how to fix them. After you receive answers from the different groups, tell them the solutions to see if their predictions were correct.

Scenario 1: Imagine that you are nearsighted, what type of lens would you use to make your glasses, convex or concave? What if you were farsighted, which lens would you use and why?

- ***Solution*:** Nearsighted – Concave because it helps your eyes focus, Farsighted – Convex because it widens the vision area

Scenario 2: If you were to look through a concave lens and a convex lens that is placed 12-14 inches above the concave lens, what would you see? Would things far away look bigger or smaller?

- ***Solution*:** You would see that things far away suddenly looked closer and bigger. This was the first spyglass (or telescope) used by Galileo.

Scenario 3: If you were to shine a beam of white light into a lens or prism, what will happen to the light? Would you be able to see other colors or would it still be white light?

- ***Solution*:** The white light will refract and break up into the colors of the visible spectrum, as according to Newton's theory. This is how we see the colors of the rainbow.

Scenario 4: The lens that you used in Scenario 2 results in a blurry picture and the lenses act like a prism, how would you fix this? Would using a mirror help? Why?

- ***Solution*:** Fix this by using a concave mirror and a flat diagonal mirror to create a Newtonian or Reflecting Telescope. Mirrors reflect light rather than refract it and will not break the white light into different colors. The image comes in from the tube, hits the concave mirror which reflects to the flat diagonal mirror back up to the eye piece. (Illustrate this on board for better understanding).

Wrap up by elaborating more on the history of Light by adding information about Robert Hooke and Anton van Leeuwenhoek's use of the first microscopes to study microorganisms.

LIGHTen Up Pre-Visit Activity

C R E F R A C T I O N D M I C Q T G T I
P O A R T O I T H V T I M O F E R J H Y
W C N N O K R I N R P F K X W E G X I E
D A B C X K B R A E N F A W E W K R A L
S L V D A E M N I O R R V N O D Z E S L
P X N E O V S K I M W A U I E M U Q N O
M B M N L L E T O B E C P R O Q T D E W
Q S K M U E C L E Y S T C S A L A K L I
H M D C W E N Q E U H I L P N A E L X D
U R E V L K H G P N Y O O R Q A E T E R
J N I F D X N T T R S N F D I S R S V U
T B E O G I D N I H U N M S I R P T N C
G R C O R A N G E R X O E Q G Y O Q O D
V I S I B L E S P E C T R U M A L R C R
K T H S N A R G K A T W D V L R Q P W A
W D O P O Y S O V Z I E X M L B Z B E I
D R Z E Q R Y W X R M N P Z C P S Q L N
B Y K J D E T T I M S N A R T Y T N X B
E P M S R R B V C G R W J L N N J Z N O
X J Q V P O L M P T P G S I I U C R D W

Absorb	Indigo	Rainbow	Transmitted
Blue	Mirror	Ray	Transparent
Concave Lens	Newton	Red	Violet
Convex Lens	Opaque	Reflection	Visible Spectrum
Diffraction	Orange	Refraction	Wavelength
Green	Prism	Translucent	Yellow

RESOURCES

http://www.pbs.org/wgbh/nova/galileo/telescope.html

http://www.learner.org/teacherslab/science/light/

http://science.hq.nasa.gov/kids/imagers/ems/visible.html

http://www.rockingham.k12.va.us/resources/elementary/5science.htm#3sol

http://step.nn.k12.va.us/elemscience/PPT/Light_faking_it.ppt