Activity Guide

Light, Color and Shadow Kit

What's in the kit

- One set of (3) Light Blox - red, green and blue
- 6 AA batteries
- One plastic stand
- One diffraction grating

What's else you'll need

- Blankets and boxes
- Aluminum foil
- Waxed paper
- A pencil
- White and black paper

Light Blox Instructions

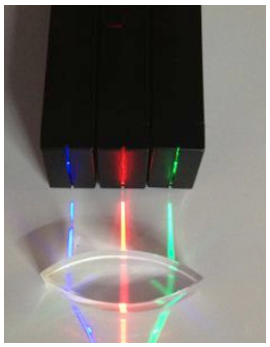
Light Blox are safe, durable, and long lasting LED's designed specifically for teaching and learning about light.

Batteries
Light Blox comes with 6 AA batteries. Install 2 AA batteries in each unit by sliding open the case and inserting batteries. Replace cover.

Operation
Turn Light Blox on with the switch on the side of the unit. Slide the switch to turn the unit on. The color of the switch matches the color of the light.

Removable Caps
Each Light Blox comes with a removable cap. When the cap is on, the units produce a ray of light for studying simple geometric optics such as reflection and refraction.

When the cap is removed, the units produce a block of light for studying color and shadows.

MORE Lessons and Activities!
For more ideas, lessons and activities for using Light Blox in the classroom, visit

LASER CLASSROOM™

www.laserclassroom.com

Big Ideas

Light allows us to see

Light originates from a source

NGSS Connection

1-PS4-2

Make observations to construct an evidence based account that objects in darkness can be seen only when illuminated.

What You'll Need

* Light Blox
* Blankets / Boxes
* Paper Doll Template
* Aluminum Foil
* Construction Paper (white and black)

Light is for seeing!

Classroom Cave, gives students a chance to use science to refine their understanding of light and sight. By predicting, testing, changing a variable and testing again, students learn the process of science along with the content: light allows us to see.

Begin a unit on light by having a classroom discussion that introduces the idea that light is what allows us to see.

First, close the shades, cover the windows and turn off all of the lights. Then invite students to complete a task, such as coloring or reading. When they complain that they can not - ask them why?

Ask students to brainstorm a list of dark places - cave, deep sea, movie theater... Ask student WHY those places are dark? Facilitate a conversation that leads students to realize that without a source of light, there is no light; and with no light, there is no seeing!

Once students are clear that light is what allows them to see, introduce them to the idea that light comes from a source. Brainstorm sources of light - candle, light bulb, sun...

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classroom cave instructions

This activity allows students to simply have the experience that a light source illuminates objects and allows us to see; it creates the foundation for the rest of the activities which lead students through the various properties of light and back around to how we see in our every day life.

1. Prepare a very dark “cave” in your classroom with blankets and/or boxes that students can easily climb in and block out light from the room. You can do this in advance, or have students brainstorm and create it with you, working together to make it as dark as possible.

2. Use the template on the next page and some construction paper to cut out 6 paper dolls: 2 white, 2 black and 2 aluminum foil.

3. “hide” one of each doll inside the cave.

4. Show students the dolls and invite them to predict which doll(s) they will be able to see inside the cave (without taking a light in with them). Write down their predictions.

5. Invite one or two students at a time to go into the dark cave without a light to look for the hidden dolls..

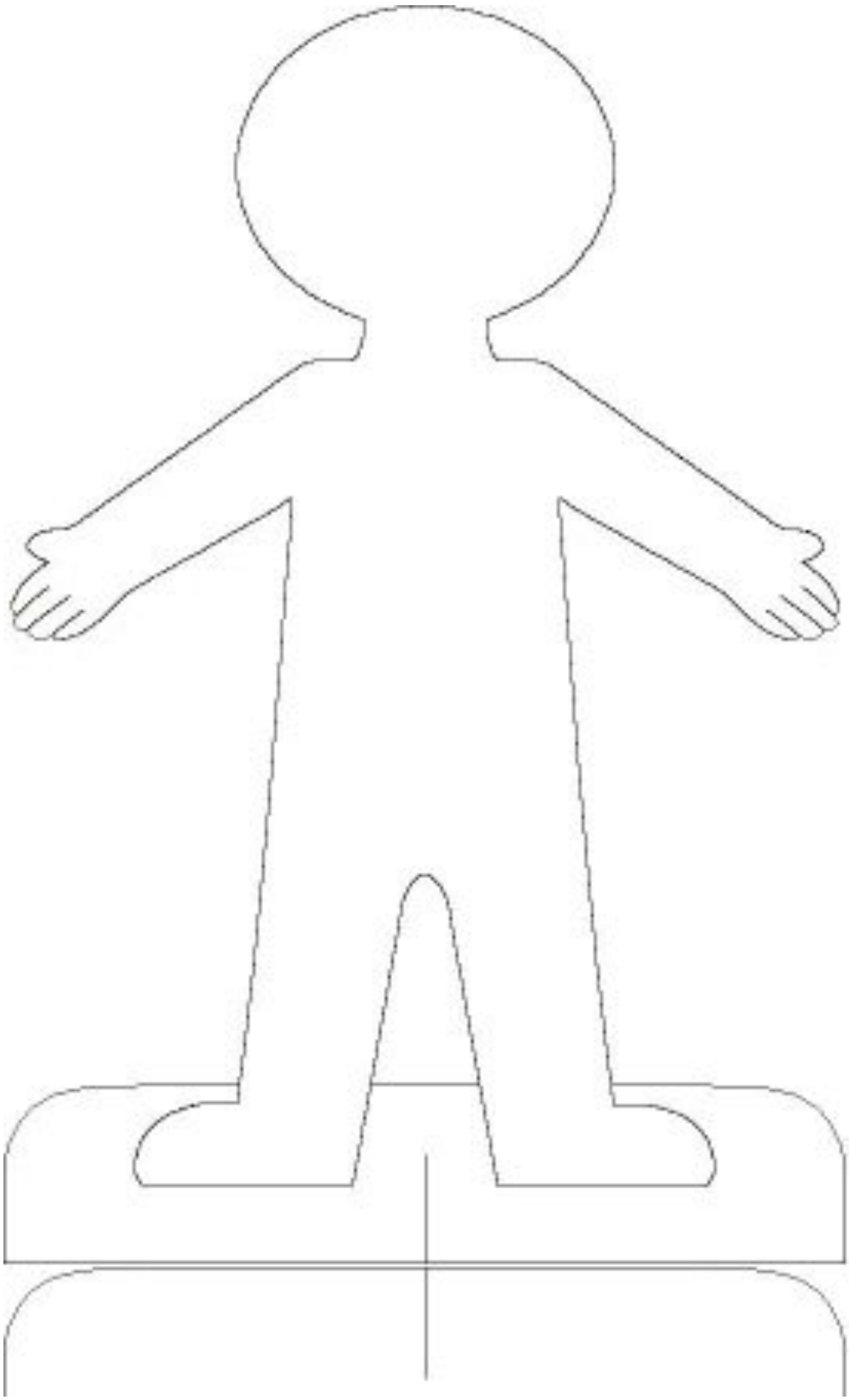
6. Soon, students realize, they can not find any dolls. Discuss what they predicted vs. what actually happened.

7. Ask, why they found no dolls. What do they need? LIGHT!

8. Invite students to predict which dolls they will find if they take a flash light with them into the cave?

9. Give each student or small group of students a flash light or LED and allow them to use the light to look for the hidden dolls.

10. Discuss both their findings and the process of predicting, testing, changing a variable (light) and predicting and testing again. THIS IS SCIENCE!!



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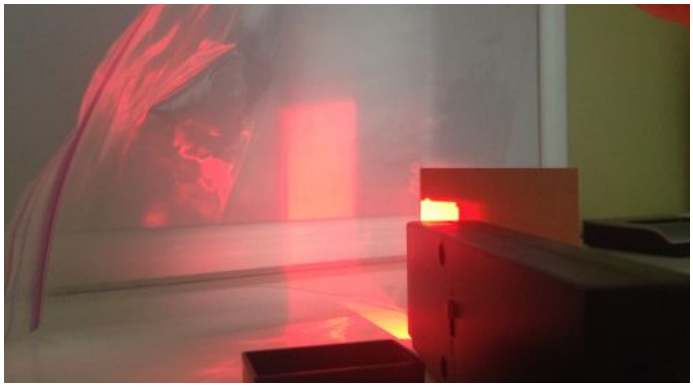

Big Ideas

Light does different things when it hits different kinds of materials.

Light can be absorbed (blocked by) or transmitted (passed through) a material

NGSS Connection

1-PS4-3

Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

What You'll Need

* Activity Sheets
* A clear baggie
* A piece of cardboard
* Waxed Paper
* A set of Light Blox
* A piece of plain white paper or a blank wall

Let the light shine!

Light travels until it encounters something. The following activity will allow students to explore some things that can happen to light when encounters matter: it can be absorbed (blocked) by a material, or it can be transmitted (allowed to pass through) the material.

Once students have completed the activities, hold a classroom conversation incorporating students' findings to cover the

Main Discussion Points

Light that is absorbed is blocked and creates a shadow.

A material that blocks or absorbs light is called **OPAQUE**

Some materials, like waxed paper will allow some light to pass through. These materials are called **TRANSLUCENT**

Other materials, like a clear baggie, will allow most light to pass through. These materials are called **TRANSPARENT**

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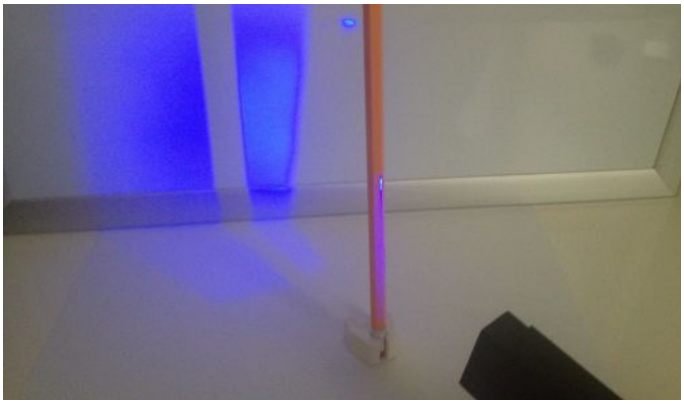
activity sheet 1

REMOVE the line cap from the front of the Light Blox

1. Turn on ONE Light Blox. Place the clear plastic baggie in front of the light and point it towards the table or the wall. What happens to the light when it hits the baggie?

2. Turn on ONE Light Blox. Place the piece of waxed paper in front of the light and point it towards the table or the wall. What happens to the light?

3. Turn on ONE Light Blox. Place the piece of cardboard in front of the light and point it towards the table or the wall. What happens to the light?



Big Ideas

Shadows are created when light is blocked.

Shadows change shape and size depending on the location of the light and the object.

NGSS Connection

1-PS4-3

Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

What You'll Need

* Activity Sheet
* A set of Light Blox
* A pencil or pen
* A plastic stand
* A piece of plain white paper or a blank wall

Shadows

Very young children think of shadows as actual objects. But by grade school, most kids will understand that a shadow is a phenomenon caused by blocking light. Most, however will not be able to articulate the relationship between the location of the light and the size and shape of the shadow. This exploration will give them a chance to develop an intuitive sense of light and shadow.

Set up each group of students with one materials and the worksheet. When worksheets are done, hold a classroom conversation that incorporates students' findings and covers

Main Discussion Points

A shadow "grows" in the same direction as the light travels. If you point the light from left to right, the shadow appears to the right of the object. If you point the light from right to left, the shadow appears tot he left of the object.

A shadow gets bigger as the light moves further from the object.

A shadow disappears when light strikes an object from directly above it.

activity sheet 2

REMOVE the line cap from the front of the Light Blox

Stand the pencil up with the mirror stand

1. Turn on ONE Light Blox. Shine the Light Blox at the pencil and observe the shadow. How can you make a shadow shine to your left?

_____

_____

2. How can you make the shadow bigger? How do you make the shadow smaller?

_____

_____

3. How can you make the shadow disappear while still shining the light on the pencil?

_____

_____

4. Turn on two Light Blox. Experiment with shadows made from two light sources coming from different directions. What do you notice?

_____

_____

Big Ideas

You can make new colors with light

White light is made up of many colors

NGSS Connection

1-PS4-3

Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

What You'll Need

* Activity Sheet
* A set of Light Blox
* A diffraction grating

Light and Color

Many students begin with the misperception that the light they experience everyday is "clear" and that things create color. In reality, everyday light is composed of many "colors" and the colors they see are the result of the interaction between light and matter.

There are many types of light, each with a different wavelength. Only a very small number of wavelengths are visible to the human eye. Microwaves and radio waves, for example are light waves that are not detected by the human eye.

Each of the wavelengths that are visible to the human eye are defined and experienced by us as a color. When waves of light interact with each other, they "change" color! When the three primary colors of light (Red, Green and Blue) are combined, they create white light.

The next activities familiarizes students with the basics of light and color. They focus on exposure, exploration and observation. Students record their observations and begin to make sense of their investigations by looking beyond the obvious to form their own conclusions.

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activity sheet 3

1. Hold the diffraction grating up to your eye and look through it towards the lights in the room (DO NOT LOOK AT THE SUN). Look to the edge of the slide - what do you see?

_____

_____

2. Remove the line caps from all three light blox; turn them on and set them on a piece of plain white paper so that you can see the colors.

3. Move the light blox so that two colors over lap to make a new color. What colors did you use to make a new color? What new color did you make.

_____

_____

4. How many new colors can you make? List the colors you used and the new color for each combination.

EXAMPLE: RED + GREEN = YELLOW

_____

_____

_____

4. What happens when you combine all three colors? Can you make “white” light?

LASER Classroom™ is the home of LASER Blox™ and of all the tools and resources you need to teach and learn about Light, Lasers and Optics.

LASER Classroom' mission is to create resources and partnerships that make teaching and learning about light, lasers and optics accessible, engaging and fun so that teachers and students are empowered and prepared to enter the 21st century workforce

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