

# TEACHERS GUIDE



**COLOR PADDLES**  
ITEM # 9994-18

## **LIGHT AND COLOR**

Demonstrate the principles of light and color mixing with these clear colored paddles. Each set of 6 includes the colors: blue, green, red, orange, purple, and yellow. Great for younger students for exploration with color mixing, and early lessons about the properties of light.

# Materials

- Color Paddles
- white and colored objects
- colored pencils/markers/  
crayons/paints
- flashlight
- Red-Blue 3-D images
- small mirrors
- cardboard
- white paper
- tissue paper
- prisms

# Goals & Objectives

*See page 7 for Next Generation Science Standards (NGSS)*

# INTRODUCTION

Include these color paddles in a unit about the properties of light and/or color theory. These paddles are useful tools for students to use when planning and conducting investigations of the color-mixing properties of light. While exploring how colors of light mix, students can compare the mixing of light to the mixing of pigments from paints or other coloring tools. After exploring the color-mixing properties of light, students can use these paddles in developing models that describe how light behaves when it hits various types of materials. More advanced or older students can investigate and develop a model that reveals how light reflecting from objects allows those objects to be seen



## How It Works

The color paddles are each made of a transparent plastic of a different color that affects the light that travels through the plastic. The light that exits the color paddles can be mixed together to produce different colors of light with the combination of Red, Green, and Blue lights producing White light.

# ACTIVITIES

- 1** Provide each student with a color paddle. Ask them to look at several objects in the room through the paddle and also look at the objects without it.
  - How do the objects viewed through the color paddle look different?

Ask students to plan and conduct an investigation using one white object and one colored object. This will help to describe why the color paddles affect how things look. To extend this investigation, ask students to predict, observe, and explain how viewing the same objects through different combinations of color paddles will change the appearance of the object.

The students should record their predications and observations in a chart that can later be used to compare the mixing of light versus the mixing of pigments. Often a surprising finding for younger students is that mixing of light colors does not behave the same as mixing of pigments!

- 2** Start the activity by shining a flashlight through a prism to show that white light is made up of many different colors of light. Provide a group of students with a set of color paddles and a flashlight. Ask students to place one or more of the color paddles in front of the flashlight

that is pointed toward a white surface. Have students observe the effect the paddle has on the color of light that hits the surface. Challenge the students to produce a certain color of light by mixing the color paddles.

- 3** In addition to the color paddles, also provide students with materials that are opaque and translucent. Ask students to investigate how each of these materials affects light differently. To show the results of their investigation, require students to create drawings that represent their findings.
- 4** Secret messages can be encoded in different colors! Ask students to write messages using different colors of crayons/ markers/pencils and then explore viewing those messages through the different color paddles. Some messages will change color while others will disappear!
- 5** Red and Blue 3-D glasses use the same principles of light that are demonstrated with the color paddles. Provide each student or group of students with one red color paddle and one blue color paddle. Show all of the students a Red and Blue 3-D image and ask them to describe the image as they see it: without the paddles, through the red paddle, through the blue paddle, and

# ACTIVITIES

## Activities continued

- 5 through the blue and red paddles simultaneously with the blue held in front of one eye and the red held in front of the other eye.

Ask students to draw a model of how light travels from the image and through the different colored paddles. See the Resources section for links on how Red and Blue 3-D glasses work as well as how to create Red and Blue 3-D images.

### \*Note

It is always wise to DO an experiment ahead of time to be able to best present it to the class.



# DISCUSSION

## Additional Discussion and Real Life Applications

- 1 How are colored plastics or colored glass used in everyday life?
- 2 How can you use colored plastics to improve something you use every day?
- 3 How is mixing different colors of light similar or different than mixing colors of paints?

# GLOSSARY

## Vocabulary:

- absorbed
- opaque
- reflected
- translucent
- transmitted
- transparent

# RESOURCES

- <http://www.optics4kids.org/home/content/classroom-activities/easy/>
- [http://american-scientific.com/DEMONSTRATOR\\_OF\\_COMBINATION\\_OF\\_3\\_BASIC\\_COLORS](http://american-scientific.com/DEMONSTRATOR_OF_COMBINATION_OF_3_BASIC_COLORS)
- <https://preschoolstem.wordpress.com/2012/03/15/colored-vision/>
- Red-Blue 3-D images can be found by searching for them on the internet or there are also brief instructions on the web for creating your own.
- <http://www.howtogeek.com/69368/how-to-make-3d-photos-out-of-any-image/>
- <http://science.howstuffworks.com/3-d-glasses2.htm> (image of how Red-Blue 3-D glasses work)

# Next Generation Science Standards

Students who demonstrate understanding can:

**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.

[Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).]

[Assessment Boundary: Assessment does not include the speed of light.]

**4-PS4-2.** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

[Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]

## Standards Key

**K** = Kindergarten

**3** = 3rd Grade  
(numbered by grade)

**MS** = Middle School

**HS** = High School

**PS** = Physical Science



**MS-PS4-2.** Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

[Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.]

[Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.]

