



Color Beams



Essential Question

- How do artists and designers learn from trial and error?
- Can I use light to communicate?

VOCABULARY

transparent light
opaque dark
translucent abstract art
reflective
tone

Materials List

- colored plastic sheets
- flashlights (1 per student)
- clear plastic (hard plastic)
- tissue or wax paper
- mirrors
- styrofoam pieces
- pastels
- watercolor paints/brushes
- large white art paper

Pacing

2-3 sessions

Assessment

SUMMATIVE

Students create a 3-dimensional artwork that illustrates the effects of light through various materials.

Elements of ART

- Value
- Color

CONTENT Standard

NGSS 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.

Additional Standards Addressed:

ARTS Standard

VA:Cr2.1.1a

Explore uses of materials and tools to create works of art or design.

Additional Standards Addressed: VA:Cr3.1.1a

21st Century Skills

- Creativity
- Communicating
- Productivity

Lesson Objective

By experimenting with the effects of light and objects along with various art materials, students will create an original three-dimensional work of art.

Lesson Overview

While learning light specific vocabulary, students will have the opportunities to explore what happens to color when it is combined with light and different objects. As they see how color changes and shifts, students will also explore various art materials, to find what will best allow them to represent beams of light in an original artwork.



Artful Thinking Routine

Think/Puzzle/Explore routine

Have students view Old Woman and Boy With Candles by Peter Paul Rubens and complete the following analysis.

- What do you think you know about this artwork or topic?
- What questions or puzzles do you have?
- What does the artwork or topic make you want to explore?

Artful Thinking by Project Zero is licensed under a Creative Commons AttributionNonCommercial 4.0 International License. Routine found here: <http://pzartfulthinking.org/>



Introduction

To build on the Artful Thinking routine, ask students to hold a flashlight, turn it on, and then put their hand over it, much like the Old Woman is doing to the candle in the artwork. What do they notice? Ask them to take that same flashlight and put their sweater or shirt over the top of it. Do they notice anything different? Engage them in a discussion around what happened.



Teacher to Teacher

Teacher Tip

If you don't have enough flashlights for each student, pair students up for this review activity and add in the challenge of students ensuring agreement, as well as alternating what kind of object they need to find.



Science Review

It is assumed that students have also been instructed in the vocabulary words *transparent*, *translucent*, *opaque* and *reflective*. Quickly review these words with students, to ensure understanding.

Using the student resource sheet provided, ask students to move around the room, testing different objects with their flashlight to see how they react with light.

Their goal is to find two objects that align with each vocabulary word.

Bring students back together and ask them to share their findings, as well as to prove their thinking and understanding of the words.

If there is misunderstanding or misconception between the vocabulary words, take the time to reteach, or let students help you reteach.

If there are varying opinions about the transparency of a particular object, explore it together as a whole group, coming up with a final decision together.



Check for Understanding

Questions to Ask Students:

How are you looking for different objects and deciding what to test?

How do you know _____ is translucent (or any other vocabulary word)?

Which object is the hardest to find? Why do you think so?



Color and Light

Take the student's flashlights, and tape a colored piece of plastic over them (or use a rubber band) so that the beam of light is now a color rather than pure white. This will make it easier for students to see what happens to light when it goes through different surfaces.

Ask students to take one object they earlier discovered from each vocabulary word (*transparent*, *translucent*, *opaque* and *reflective*) and try it again, this time noticing the colored light and what happens to it. They should record their findings, trying to use art vocabulary to describe color.



Color Play and Abstract Art

Allow time for students to experiment with different materials to show different values in color. Watercolor and pastel will likely be easiest for this, and will be a medium that students don't often get the chance to use.

Show them various techniques for moving gradually from dark to light - keeping the same color, but merely changing its intensity.

At this time, also show students varying examples of abstract art and how colors can intersect and blend together, in ways that even if they don't provide an actual picture, they can create a feeling.

Suggested artists to share:

- Willem de Kooning
- Mark Rothko
- Karel Appel
- Gerhard Richter



Main Activity

Explain to students that they will be using creating a piece of art to show what happens when colored light goes through different objects.

- It might get lighter
- It might stay the same
- It might be stopped
- It might bend and reflect.

They will need to show all 4 kinds of light effects from different materials in their piece. They may use each one more than once, and in doing so, will show their understanding of the scientific terms and what happens to light.

Give students their choice of medium, along with wax paper, tissue paper, small pieces of styrofoam, and clear plastic pieces. Students will use the three dimensional pieces and their chosen medium (and colors) to create an abstract design, based on what happens to light passing through various materials.

The student may choose different mediums for different reactions of light, depending what they feel is most appropriate.

Estimated Time: 30 minutes



Teacher to Teacher

Teacher Tip:

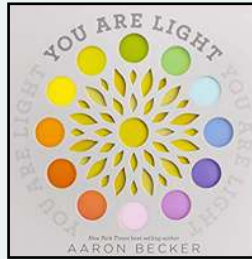
- You may need to provide an example. Using watercolor, start painting a dark colored line. Put a piece of tissue paper somewhere on the line, and after the "beam of color" passes through it, the color should become lighter and diffused.
- Depending on the class, you may not need to provide the "objects", but instead have students discover what they could use from other materials provided to them.

Your notes:

CLOSURE

Invite other classrooms in for a gallery walk. Allow the artists to explain their pieces, which should include an explanation of the light and color in the art. Ask each student to share an artist statement about their piece and what it means.

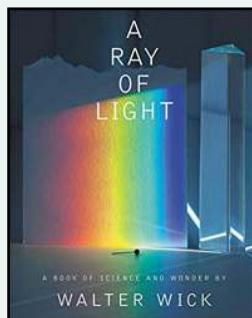
Your other favorites:



You Are Light

Aaron Becker

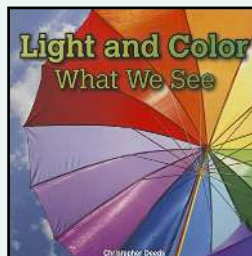
A heartwarming story with a positive self message, the illustrations also play with the concept of light, and students will see how colors change. Allows for discussion of transparent and opaque.



A Ray of Light

Walter Wick

Amazing photographs are paired with the wonder of light, to allow students to look at light up close and directly, and to try to understand it visually.



Light and Color - What We See

Christopher Deeds

An informational text that follows a young girl learning about light, color and perceptions. Filled with photographs and diagrams.



Magical Experiments with Light and Color

Paula Navarro

Simple but engaging experiments that can be done with everyday objects to allow students to experiment with light and how it travels, while using color as an aid.

Name: _____ Date: _____

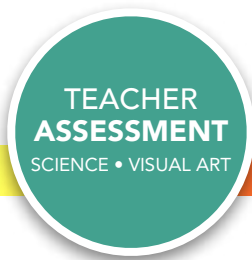
Explore materials around the room with your flashlight. Decide if the material is translucent, transparent, opaque, or reflective.

Object	Reaction to light			
	Translucent	Transparent	Opaque	Reflective

Name: _____ Date: _____

Test the colored beam of light through different materials. What do you notice happens to the color?

Colored Beam of Light	What happens to the color?
Transparent	
Translucent	
Opaque	
Reflective	



Color Beams

Total Score:
____ / 12

Student: _____

CRITERIA	Distinguished (4 Points)	Excelled (3 Points)	Adequate (2 Points)	Basic (1 Point)
The student is able to plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.	<input type="checkbox"/> The student is able to independently and purposefully plan and conduct investigations to determine the effect of objects in light's pathway.	<input type="checkbox"/> The student is able to plan and conduct investigations to determine the effect of objects in light's pathway.	<input type="checkbox"/> The student is able to plan OR conduct investigations to determine the effect of objects in light's pathway. Student may need support in doing this.	<input type="checkbox"/> The student is not able to plan and/or conduct investigations to determine the effect of objects in light's pathway. They may need great support or may not understand.
The student is able to explore uses of materials and tools to create works of art or design	<input type="checkbox"/> The student is able to explore, use and purposefully choose a variety of materials and tools in their artwork.	<input type="checkbox"/> The student is able to explore uses of materials and tools in their artwork and choose what they feel is most appropriate to use.	<input type="checkbox"/> The student is able to explore some uses of materials and tools in their artwork. They may need support and guidance in choosing what to use.	<input type="checkbox"/> The student is unable to explore uses of materials and tools in their artwork. They do not use materials in a way that supports the artwork.
The student is able to share an artist statement and explain their piece.	<input type="checkbox"/> The student is able to share an original and thoughtful artist statement which shows their purpose and understanding.	<input type="checkbox"/> The student is able to share an original artist statement which shows thinking.	<input type="checkbox"/> The student is able to share an artist statement with guided questions and support.	<input type="checkbox"/> The student is unable to share an artist statement about their artwork.

NOTES: