



Fun with Prisms Part II (Summer)

Boys and Girls Club After School Science
NSF Center for Chemical Innovation
Chemistry at the Space Time Limit (CaSTL)
<https://www.castl.uci.edu/>

Standard(s) Addressed:

Children know an object is seen when light traveling from the object enters the eye.
Children observe the effects of a prism on the light reflected off printed text.

Lesson Objective:

Children will be able to know that light travels in a straight. They will notice the different effects of a prism on the light reflected from print from the top, side and behind.

Materials Used:

For each group:
3 equilateral plastic prisms
worksheet

Classroom Management:

Setting up: Before the lesson, assemble the prisms and photocopy the worksheet. Children will be grouped into 2 per group.

During Explore: While the children are observing the effects of the prism in the investigations, teacher will walk around, observe, ask questions, and supervise.

Clean Up: After Explore, collect the prisms.

Signal: Stand silently in front of the room, raising hand in the air to get the children's attention.

Funding and Credits:

This project was funded by the National Science Foundation Centers for Chemical Innovation award #1414466 and #0802913 to V. Ara Apkarian, Ph.D. at the University of California, Irvine, Department of Chemistry. This lesson was written by Therese B. Shanahan, Ed.D., University of California, Irvine, School of Education and Cal Teach.

ENGAGE: *Connect to Prior Knowledge and Experience, Create Emotionally Safe Learning Environment, Preview New Vocabulary* **Estimated time: 5 – 10 minutes**

Description of Engage: Teacher will engage the children in a discussion regarding light by asking them to remember the lesson from the previous week with the prisms.

Teacher’s Role	Teacher Questions	Children’s Role
<p>Teacher gets the children interested in the lesson by asking what they learned last week with the sunlight and the prisms.</p> <p>Teacher scripts their words.</p> <p>Teacher asks students for evidence to support their statements.</p> <p>Teacher shows the children the equilateral plastic prism that they will use in today’s investigation.</p>	<p>Remember last week’s investigation when you went outside in the sunlight with the prisms?</p> <p>What is one thing you learned about prisms?</p> <p>How do you know that the white light from the sun has all the colors of the rainbow?</p> <p>Today we are going to investigate what else happens to light when it passes through a prism.</p>	<p>“<i>The white light has all the colors of the rainbow and the prism helps us to see the colors.</i>”</p> <p>“<i>We saw the rainbow colors on the grass when the light went through the prism.</i>”</p>

EXPLORE: *Hands-On Learning, Contextualize Language, Use of Scaffolding (Graphic Organizers, Thinking Maps, Cooperative Learning), Use of Multiple Intelligences, Check for Understanding* **Estimated time: 10 – 15 minutes**

Description of Explore: Each group will have 2 children. Teacher asks what the children think will happen when they look at words through the prism. Each group will receive a prism from the teacher. The children will look at the printed words on the worksheet from the top of the prism. They will record their observations on their worksheet. They will then look at the words from the side and also from behind the prism and will record their observations in each case.

Teacher’s Role	Teacher Questions	Children’s Role
<p>Organize the children into their groups.</p>	<p>You are going to do some investigations by looking at words through the prism.</p>	

<p>Teacher models what to do in each investigation.</p> <p>Teacher asks the children to predict what they think will happen when they look at the words through the prism.</p>	<p>But before you do these investigations, you will do what scientists do: make a prediction.</p> <p>What do you think will happen?</p> <p>As teacher walks around the room, teacher asks each group:</p> <ol style="list-style-type: none"> 1. What happens to light from the printed words when it travels through the prism? 2. What happens to the light when you look at the words from the side of the prism? 3. What happens to the light when you look at the words from behind the prism (the opposite side of the prism)? <p>Use this sentence frame:</p> <p>I see _____ when the light travels through the prism.</p>	<p>Children tell what they think will happen. Answers may vary.</p> <p><i>“We will see the colors of the rainbow.”</i></p> <p><i>“We will see white light.”</i></p> <p>The children do the investigations once the teacher hears their predictions.</p> <p><i>“The words move down and get bigger.”</i></p> <p><i>“It changes direction.”</i></p> <p><i>“The words are upside down.”</i></p> <p><i>“I see words upside down and backward.”</i></p> <p><i>“The words are flipped.”</i></p> <p><i>“I see bigger words when the light travels through the prism.”</i></p> <p><i>“I see backward words when the light travels through the prism.”</i></p>
--	---	---

<p>sure they know the word that describes the light bouncing off a material (reflection), light changing direction and speed (refraction), and white light spreading into its different colors (diffraction).</p> <p>Teacher puts the 3 words on the whiteboard that describe the properties of light that the children have been investigating for the past several weeks.</p> <p>The teacher describes in words each of the properties and the children write the word on their worksheets and show the word to the teacher at the signal.</p> <p>Once the teacher checks for the correct word, then the children get ready for the next one.</p> <p>Once the teacher checks for the correct word, then the children get ready for the next one.</p>	<p>see if you have learned the words that scientists use to describe the different ways that light changes when it hits a material or it travels through a material.</p> <p>I have written the 3 words here and your job is to write on the back of your worksheet the correct word that describes the property of light.</p> <p>I will tell you when to show me your word.</p> <p>OK? Ready?</p> <p>This word describes the property of light that means white light spreading out into the colors of the rainbow.</p> <p>OK. Show me your word.</p> <p>This word describes the property of light that means light bouncing off a shiny object.</p> <p>OK. Show me your word.</p> <p>This word describes the property of light that means light changing direction and speed.</p> <p>OK. Show me your word.</p>	<p><i>“Diffraction”</i></p> <p><i>“Reflection”</i></p> <p><i>“Refraction”</i></p>
--	--	---

EXTEND/ELABORATE: *Group Projects, Plays, Murals, Songs, Connections to Real World, Connections to Other Curricular Areas* **Estimated time: 5 – 10 minutes**

Description of Extend/Elaborate: Teacher and the children sing the Light song.

Teacher's Role	Teacher Questions	Children's Role
Teacher shows the children the words to the song and they sing it together.	OK. Now we are going to sing a song to help us remember some of the words that scientists use when they talk about light.	Children and teacher sing the song.

Fun with Prisms Part II

Look at the words through the prism 3 different ways. Write what you see in the box.

From the top:

See these words.

What did the prism do to the letters?

From the side:

See these words.

What did the prism do to the letters?

From behind or the opposite side:

See these words.

What did the prism do to the letters?

Did You Know There Are Different Colors in Light?

(to the tune of "If You're Happy and You Know It. . .")

by Dr. Terry Shanahan, July 31, 2005

Did you know there are different colors in light? (Clap, clap)

Did you know there are different colors in light? (Clap, clap)

Red, orange, yellow, green,

Blue, indigo, and violet,

Did you know there are different colors in light? (Clap, clap)

Did you know light bounces like a ball? (It's reflection!)

Did you know light bounces like a ball? (It's reflection!)

Light rays bounce off an object

And travel to your eye.

Did you know light bounces like a ball? (It's reflection!)

Light changes its speed in a lens, (Yes, it will!)

Light changes its speed in a lens, (Yes, it will!)

The top becomes the bottom,

The direction changes too.

Light changes its speed in a lens, (Yes, it will!)

Light always travels in a straight line, (Yes, it will!)

Light always travels in a straight line, (Yes, it will!)

It may change its angle

But it's a line, just the same.

Light always travels in a straight line, (Yes, it will!)

Common Characteristics of Lesson Plans

Get Children into the Learning--Connect to Their Prior Knowledge

Exploration/Investigation/Hands-On Learning

Making Meaning--Teachers and Children Together

Evaluation/Assessment

Extension to the Real World or Other Curricular Areas

Other Aspects to Consider:

The lesson is Child-Centered--the child is listening, speaking, reading, writing and drawing. The child is thinking.

The children talk more than the teacher talks.