Lesson Title	Light! Behave.
Length of Lesson	One (50 minute) class period
Created By	Calista Guthrie
Subject	Physical Science
Grade Level	8th grade
State Standards	8th: 1d (Inquiry); 2e (Physical Science)
DOK Level	DOK2, DOK3
DOK Application	Infer, Collect and Display, Identify Patterns, Interpret, Relate, Cause/ Effect, Investigate, Draw Conclusions, Formulate, Hypothesize
National Standards	5-8: A (Inquiry); B (Physical Science
Graduate Research Element	Have you ever noticed oil in a puddle in a parking lot? It makes a pretty rainbow. This is because the oil scatters light. Crude oil does not appear as light as the oil you see in a parking lot, but it can scatter or obscure some light from organisms living in contaminated waters.

Student Learning Goal:

MS 8th Grade:

1(d) Analyze evidence that is used to form explanations and draw conclusions. 2(e) Contrast various components of the electromagnetic spectrum and predict their impacts on living things.

National Science Education Standards of Content 5-8:

A: Inquiry: Develop descriptions, explanation, predictions, and models using evidence. Think critically and logically to make the relationships between evidence and explanations. Communicate scientific procedures and explanations. Understandings about scientific inquiry.

B: Physical Science: Transfer of energy.

Materials Needed (supplies, hand-outs, resources):

PowerPoint (INSPIRE_Guthrie_Spectrum)

Material Set 1: Prism, flashlight, darkened area, crayons/ colored pencils, Instructions*

Material Set 2: Pencil/ straw, glass container/jar, water, oil, Instructions*

Material Set 3: Hand lens, sunny window or door, Instructions*

Closure Demonstration: Water, glass container/jar, stirring rod/ straw, flashlight, powdered creamer, white cardboard, Instructions**

* INSPIRE_Guthrie_StationInstructions.doc

**INSPIRE_Guthrie_SpectrumClosureInstructions.doc

Lesson Performance Task/Assessment:

Class will begin by showing a picture of a radio, rainbow, x-ray, light bulb, and microwave. Students must guess what all of these images have in common. This will be followed by the capture activity for this lesson which is a video showing the different parts of the spectrum in scale. Students will have a brief introduction to the spectrum and then the activity will be described. Students will have 15 minutes to use the different objects on their tables and take notes about how light behaves with each set of materials. (If crunched for time or the class is very large have each group only use one set of materials and report to the class during discussion). This is an opportune time to emphasize to students the importance of making detailed descriptions, drawings and questions during labs so that they can use their data later. All observations are great but there are key observations students should get from each set of materials.

Set 1: A pattern of colors
Set 2: Pencils appear broken
Set 3: Images are inverted onto the paper

Class discussion will follow for students to discuss their observations for each set of materials. For closure the teacher will do a demonstration of why the sky is blue. This is something quick and is something students will really remember because most of them have probably wondered this before. I certainly remember discussing this in high school physics.

Lesson Relevance to Performance Task and Students:

Everything students see is due to the visible part of the light spectrum. This activity allows students to explore how light interacts with objects it comes into contact with. This is something tangible that students can recognize on a daily basis. It is a lesson that will peak their interest and causes them to ask more questions about light interactions.

Anticipatory Set/Capture Interest:

The initial capture of this lesson will be the video that puts the spectrum into scale (See Teacher Notes). The video will reveal what a small part of the spectrum is visible to the human eye. Also, this will give students a visual for wavelength differences along the spectrum.

Guided Practice:

Students will be guided through the sets of materials with instructions. During discussion the teacher will steer the conversation to the primary observations. Students will be asked questions that challenge them to revisit the data they collected.

Independent Practice:

While in groups, students will each record descriptions, drawings, and questions for the three material sets. Students will be challenged by the observations of other group members and inferences made by the rest of the group.

Remediation and/or Enrichment:

Remediation – In a dark area, have students look at a light bulb through a diffraction grating and describe and draw what they see. Students may rotate the grating. Students should see the colors in the spectrum. Next, use a toy car running into something to demonstrate the disruption of light when it runs into something. The light changes direction (scattering) and speed.

Enrichment- Have students use the internet to research how/why humans see color.

Check(s) for Understanding:
During discussion the teacher will look for and emphasize the primary observation important for each station. Example questions to discuss include:

Material Set 1: What colors did you observe? Was there a pattern? Why?
Material Set 2: What changed about the pencil? Why?
Material Set 3: How was the picture on the paper different than what you saw outside the window? Why?
Demonstration: How does this demonstrate why the sky is blue?

Closure:
A demonstration and discussion on why the sky is blue.

Possible Alternate Subject Integrations:

Teacher Notes
Lesson modified from *Bridging II TAKS: Module 1: 8th Grade.* For additional notes consult these materials.

The Electromagnetic Spectrum
http://www.youtube.com/watch?v=kfS5Qn0wn2o