It’s Getting Bright In Here! Thematic Unit

Development Document, by Jenni Clyde

**Instructional Goal:** Students need to define, examine the origins, collect and record data and describe how light can be produced, reflected, refracted, and separated into visible light of various colors. Teacher will determine prior knowledge by giving students a pretest on light.

**Scope and Sequence**

Pre-Test

Lesson 1: Light Vocabulary Notes

Lesson 2: How is light produced?

Lesson 3: What role did Thomas Edison Play

Lesson 4: Reflection and Refraction Experiments

Lesson 5: Present recorded data

Lesson 6: Creation of a Power Point

Post-Test

Lesson 1: Light Vocabulary Notes

Anticipatory Set (1-2 minutes): Welcome students to class. “Today we are going to watch a Prezi Presentation, while you take notes. At the end of this unit you will get to create your own Prezi as well.”

Objective (1-2 minutes): Student will watch a Prezi Presentation and will be able to recognize and organize the given vocabulary about light on a teacher designed note page. “Today you will fill out a vocabulary note sheet while watching the Prezi presentation. Then you will play a memory game using the vocabulary words you took notes on.”

Prior Knowledge (3-5 minutes): Using a KWL chart fill out the K and W part of the chart with the class. “Class talk with your table partners and discuss with them what you know about light.” Ask students what they know about light and fill in the K part of the chart. Then do the same thing only asking them what they want to know about light. “Class talk with your table partners and discuss what you want to know about light.”

Content (15-20 minutes):

Handout vocabulary note worksheet to each student, and tell them to get out pencil. Now complete the vocabulary note sheet with the assistance of the Prezi presentation.

Show: Moves 1-5(in Prezi) while student’s copy down the information.

* Word: Electromagnetic Spectrum

Definition: visible light arranged in the order of its wavelength.

Teacher tell students the following:

* What it is like: a prism
* What it isn’t like: the color black
* Examples of visible light: rainbow, light bulb, sun.

Student Partner Talk

* Picture: Rainbow or anything else they might come up with in partner talk.

Show: Moves 6-7 (in Prezi) while student’s copy down the information.

* Word: Reflection
* Definition: when rays of light or heat are reflected, or bounce off other objects

Teacher tells students the following:

* What it is like: a mirror
* What it isn’t like: a wall

Student Partner Talk:

* Picture: Mirror, smooth water surface

Show: Move 8 (in Prezi) while student’s copy down the information.

* Word: Angle of Reflection
* Definition: The angle at which light bounces off a surface

Student Partner Talk:

* Picture: A flashlight hitting a mirror and bouncing back at them.

Show: Move 8 (in Prezi) while student’s copy down the information.

* Word: Angle of Incidence
* Definition: the angle at which light strikes a surface

Show: Moves 9-11: (in Prezi)

* Word: Refraction
* Definition: when light goes from one medium to another medium, (from air to water) and is bent

Teacher tells the students the following:

* What it is like: a pencil in a glass of water
* What it isn’t like: a pencil in a glass without water

Student Partner Talk:

* Picture: Draw a “broken” pencil in a glass of water

Show: Moves 12-13 (in Prezi)

* Word: Absorb
* Definition: taking in or swallowing up energy

Teacher tells the student:

* What is it like: The sun making a cloth warm
* What it isn’t like: The sun being blocked by a wall.

Student Partner Talk:

* Picture: Draw a piece of material socking up the visible light from the sun and reflecting the color that the object is seen as.

Show: Move 14-15 (in Prezi)

* Word: Concave
* Definition: a lens with an inward curve and makes objects look smaller and farther away.

Teacher tells the student:

* What it is like: Glasses or contact lenses that are for far-sighted people.
* What it isn’t like: A microscope.

Student Partner Talk:

* Picture: draw a concave lens facing inward.

Show: Move 16 (in Prezi)

* Word: Convex
* Definition: a lens with an outward curve and makes objects look bigger and closer.

Teacher tells the student:

* What it is like: Glasses or contact lenses that are for far sighted people.
* What it isn’t like: A mirror

Student partner talk:

* Picture: draw a magnifying glass.

Application Level 1 (50:50): Student will write down definition provided by the teacher for each vocabulary word.

Application Level 2 (70:30): Student will partner talk about the definition and draw a picture that goes with the vocabulary word.

Application Level 3 (90:10): Student will create a vocabulary book for each vocabulary word to quiz themselves with.

Closure (15-20): Play a game of memory with partner using vocabulary cards with words and definitions.

Tell students to get into groups of six as practiced in the past turning desks from front to side.

Hand out one memory game bag to each group. Have students select the first person to play. Continue clockwise in the circle.

Explain the rules as follows:

1.The person at the table you hand the cards to will mix up the cards. Then they will turn the cards over so the blank side is showing and organize the turned over cards into a grid like fashion so that there is an equal number of rows and columns.

2. Each person will turn over two cards when it is their turn. As a table you will check to see if both cards are a match. A match constitutes a word with a definition and they go with each.

3. If it is a match that person will get to go again until they not longer are able to match a word and a definition.

4. After the first person is done the nest person will play as explained in steps 1-2.

5. The game will be played until all the cards have been matched.

Evaluation: Ask the students if they enjoyed the game? Do you feel that you know the light unit vocabulary words?

\*Note to teacher. Once the 60-minute class period is over please collect the cards and dismiss the class.

Lesson 2: How is light Produced

Anticipatory Set (1-2 minutes): Today you will be conducting an experiment to compare different types of light and show how light is produced.

Prior Knowledge (3-5 minutes): Teacher will ask class. “Talk with your partners and tell each other what you remember about light from yesterday’s Prezi about light and how it is produced.” After partner talk instructor will ask class, “What do you know about light?”

Objective (1-2 minutes): Today we will be able to describe how light is produced.

Content (1-2 minutes):

Teacher will read the following to the class.

Light travels so fast that it seems we see things the instant they happen. Light travels at 300,000 km per second, or 186,000 miles per second. Light travels in straight lines. When light hits an object, it can be absorbed, reflected, or pass through (transmitted). If light passes through a transparent object at an angle, it can also be refracted, or bent, because the speed of light slows as it passes from one transparent object to another.

Application Level 1 (50:50) (5-10 minutes): Teacher will demonstrate to the class how to use each flashlight, incandescent bulb, fluorescent bulb and laser pen. Teacher will also state to the class that they are not to shine the lights or lasers into anyone’s eyes or their own. Teacher will handout the Comparing Light worksheet to the class. The teacher will then, with the class watching, do flashlight #1 together and fill out the worksheet with the class copying the answers for the first flashlight. The teacher will then make each light source as station for the class to rotate through for stations. The class is already familiar with how to conduct station experiments.

Application Level 2 (70:30) (25 minutes): Students will rotate through the five stations as teacher goes around and monitors the students performing the experiment and filling out their comparing light worksheet. Teacher will also switch the stations every 13 minutes.

Application Level 3 (90:10) (10 minutes): After the class has rotated through all five stations the class will go back to their groups. The teacher will then pass out the situation cards. Teacher will then tell the class, “You will now use the situation cards I have handed out to your tables to answer the bottom section of your comparing light worksheet. You will then turn this in to be used in lesson on collecting data”

Closure: Teacher will collect their light sources worksheet and let them know they will discuss the data during lesson 5. Dismiss the class after the 60 minutes is up.

Lesson 3: What Role Did Thomas Edison Play

\* During Social Studies Teacher will connect the production of light with the invention of electricity and the light bulb by Thomas Edison for Lesson 3: What role did Thomas Edison Play.

Lesson 4: Reflection and Refraction Experiments

Anticipatory Set (1-2 minutes): “Today we are going to conduct an experiment on reflection and refraction

Objective (1-2 minutes): “After the experiment you will be able to describe how light can be reflected and refracted.”

Prior Knowledge (3-5 minutes): “Talk with you table partner and tell each other what you remember about reflection and refraction?”

Content (3-5 minutes):

Teacher will read the following to the class.

All objects reflect some light, because we can see them, but objects that are smooth and hard are better at reflecting light than others. Mirrors are excellent reflectors because the surface is smooth, and light is able to bounce back. When light hits a surface, it is always reflected at the same angle it strikes the surface. The law of reflection states that the angle of incidence equals the angle of reflection. This is best demonstrated by throwing a ball at a smooth surface. The angle at which it hits will equal the angle at which it bounces back (45° going in equals 45° going out).

With a transparent object (air, water, clear glass) almost all light passes through. Translucent materials (wax paper, bathroom windows) allow some light to pass through while some light is reflected. Opaque materials (wood, metal) block all light and either reflect or absorb the light. As light passes from one transparent material to another at an angle (from air to water, or air to glass), the light will slow down and appear bent. This is called refraction. A good example of this is placing a pencil in a clear glass of water. The part of the pencil above the water appears to be broken off from the part below the water. Light shining through a glass or Pyrex® baking pan filled with water demonstrates refraction.

Application Level 1 (50:50) (5-10 min): Teacher will choral read the reflective surfaces worksheet with the class. Then ask the class what questions they might have. The teacher will then answer any questions. Teacher will also discuss again with the class the rules for using the different light sources. Teacher will then read the directions for the reflection experiment. 1. Place the coin in the bowl. 2. Move your face down until you cannot see the coin in the bowl. 3. Have one group member pour water slowly into the bowl until the other group members can see the coin. 4. Pour the water back into the cup. 5. Repeat! 6. Draw a model of what happened BEFORE and AFTER the water was poured into the bowl. 7.Write ALL YOU KNOW about refraction!

Application Level 2 (70:30) (20-30 minutes): Students will then in their table groups follow the direction on the reflective surfaces worksheet and refraction worksheet. The teacher will be walking around to answer any experiment questions and monitor the experiments.

Application Level 3 (90:10): Leaving this level out due to time needed to complete the experiments.

Closure: Teacher will collect the students comparing light sources worksheet and reflective surfaces worksheet and let them know they will discuss the data during lesson 5. Dismiss the class after the 60 minutes is up.

Lesson 5: Present recorded data

Anticipatory Set: “I know you would all like to discuss all of your discoveries for all of the experiments you have been conducting. To day you will get the opportunity to do just that!”

Objective: By the end of class today you will be able to draw conclusions about light from the discoveries you made during your experiments.

Prior Knowledge: Teacher will pass back the Comparing Light Reflective Surfaces and Refraction worksheets. Teacher will then ask students to read over what they had filled out on those worksheets.

Content:

Using the document camera fill out the class-recording sheet for comparing light sources ask class the question “What did you notice about the color of Flashlight #1?” After getting answers from each table group write down the class answer in the correlating box. Ask class the question “What did you notice about the intensity of Flashlight #1?” After getting answers from each table group write down a class answer in the correlating box. Ask class the question “What did you notice about the direction the light traveled of Flashlight #1?” After getting answers from each table group write down a class answer in the correlating box. Ask class the question “What did you notice about the change in temperature of Flashlight #1?” After getting answers from each table group write down a class answer in the correlating box. Ask the same series of questions now for flashlight #2, flashlight #3, the incandescent bulb, the florescent bulb and the laser pen and then record a class answer in the correlating box.

Now put the class-recording sheet for reflective surfaces under the document camera and fill out the sheet. Tell the class that you are going to tally their responses for the two foil types. Ask each student, “Did you get a good or bad reflection for the unused foil when using a flashlight?” Record their response in the correlating box by using a tally mark. Then ask each student, “Did you get a good or bad reflection for the crumbled foil when using a flashlight?” Record their response in the correlating box by using a tally mark.

Now ask each student “What type of reflection did you get with sandpaper when using a laser, large, small or no reflection? Record their response in the correlating box by using a tally mark. Now ask each student “What type of reflection did you get with whitepaper when using a laser, large, small or no reflection? Record their response in the correlating box by using a tally mark. Now ask each student “What type of reflection did you get with black paper when using a laser, large, small or no reflection? Record their response in the correlating box by using a tally mark. Now ask each student “What type of reflection did you get with stiff paper when using a laser, large, small or no reflection? Record their response in the correlating box by using a tally mark. Now ask each student “What type of reflection did you get with metal when using a laser, large, small or no reflection? Record their response in the correlating box by using a tally mark. Now ask each student “What type of reflection did you get with glass when using a laser, large, small or no reflection? Record their response in the correlating box by using a tally mark.

Then ask the class to partner talk with their table partner about what they can conclude from these experiments. Then after getting answers from each table group write down a class answer on the lines.

Now put the class-recording sheet for refraction under the document camera to fill out the sheet. Ask the class to partner talk with their table partner about what they observed about the penny before that water was poured into the bowl? Ask 5 partner groups their answers to the question then record a class answer on the lines. Then ask the class to partner talk about what they observed happened to the penny after the water was poured into the bowl? Ask 5 partner groups their answers to the question then record a class answer on the lines. Now ask the class to partner talk with their table partner about what they know about refraction? Ask 5 partner groups their answers to the question then record a class answer on the lines.

Application Level 1 (50:50): This level was skipped because it was done in lessons 2 and 4.

Application Level 2 (70:30): This level was skipped because it was done in lesson 2 and 4.

Application Level 3 (90:10): Students will present their data to the class, make observations and conclusions as to what happened in their experiments.

Closure: Teacher will sum up their finding for each experiment and add any teach able moments about how light is produced, reflection and refraction.

Lesson 6: Creation of a Power Point (Four 60 minute class periods)

Anticipatory Set: Over the next few days we will be taking the information you have learned from our light unit and put it into a power point.

Objective: This Power Point will need to include 8 slides, include content related to our light unit, transitions, and pictures. It will also need to have correct placement of text and contrast in colors.

Prior Knowledge: You may use your notes and experiments to help you with this Power Point.

Content:

Use the power point to walk the class through the steps

Application Level 1 (50:50): Teacher will walk the students through the steps as a class.

Application Level 2 (70:30): Teacher will create a slide, showing the process on the lab projector, while the students are also creating a slide.

Application Level 3 (90:10): Teacher will then monitor as the students finish working on their presentation.

Closure: Students will present their Power Point to the class.