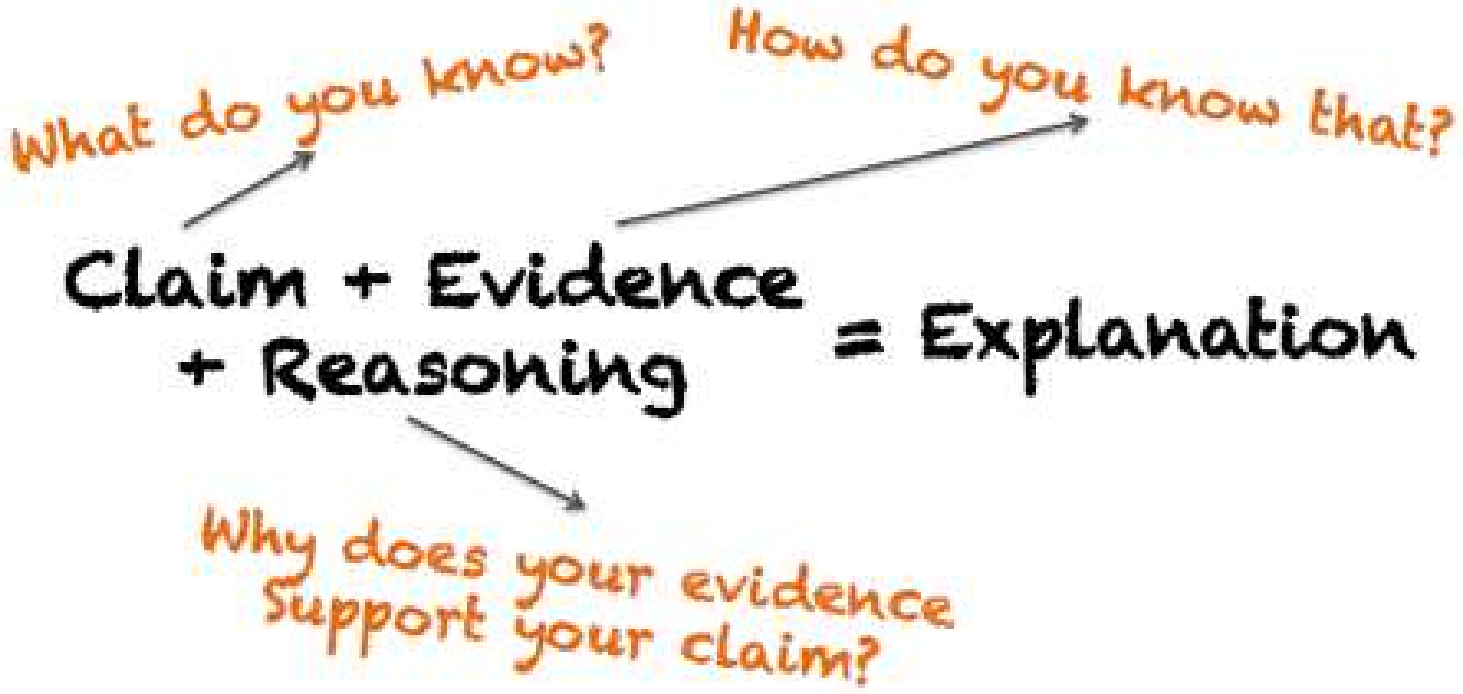
Physics Discovery Properties of Light Exploratory Stations

Goal for Students

By FRIDAY students will create a CLAIM, EVIDENCE and REASONING poster about the properties of light. Students must explain how and why light travels. Students must use evidence from at least six stations.

Students will use the stations to help guide them in creating their poster. Students must complete as many stations as possible for the first three days and then work on their poster.


What do you know?
How do you know that?
Claim + Evidence
+ Reasoning
= Explanation
Why does your evidence
support your claim?

Claim Evidence Reasoning Example #1

Claim: People are addicted to cell phones.

Evidence: I see a lot of students in the hall with their cell phones. Everyone uses their phones all the time.

Reasoning: I think that this is the way people are right now. I can tell from what I see.

Claim Evidence Reasoning Example #2

Claim: Students at Avondale High School show signs of cell phone addiction.

Evidence: 90% of students reported being on their cell phone in class. 85% of students reported using social media during class. 75% of students use the cell phones while walking in the hallways. 40% of students have not done well during a class due their phone. 50% of students get anxious or upset without their phone.

Reasoning: Based on this data, students show signs of cell phone addiction. According to research, feeling anxious without a cell phone leads to cell phone addiction. Students also report being on their phones during class, which is very distracting.

Example: Claim-Evidence-Reasoning

Explain why greenhouse walls can be constructed of glass or clear plastic but not wood or metal.

Neither wood nor metal will work as the walls of a greenhouse. Wood and metal do not allow visible light to pass through them. Light can pass through both clear glass and plastic, but lower-energy thermal radiation cannot. A greenhouse warms up when light energy is absorbed by materials inside that can radiate that thermal energy back into the greenhouse as they heat up. If the materials of the walls blocks light energy from getting inside the greenhouse, then it cannot become trapped thermal energy and the greenhouse will not warm up. Therefore, wood and metal would not work for the construction of greenhouses.


Claim
Evidence
Reasoning

How to write a claim...

1) Write down ALL of your ideas about the properties of light that you have learned from your stations
2) Circle and connect claims to each other… cross some out that don’t connect or are confusing to you
3) Create a 1-2 sentence claim about properties. It should be specific but general enough to back it up with evidence and reasoning.
4) Show your claim to Ms. Logan to get it approved.

Stations Instructions

Each stations has a goal and instructions.

No vocabulary will be used. Students and teacher can develop this on their own.

Students must write for each station…

- Goal
- Materials
- Procedure
- Diagram and chart of observations
- Conclusions in writing, charts, diagrams, etc about the station

10-15 minutes per station. Can work by themselves or in pairs.

What doing a station should look like… Station 3922

Goal: Determine how viewing an object looks different through various materials.

Directions: Observe each material. Look at an object through the material. Note the different in view.

Station 1

Goal: Categorize and compare the lenses as you view an object and text.

Instructions: Use the five lenses given to categorize and compare these lenses while viewing an object and text (below).

HELLO

Station 2

Goal: Categorize and compare the mirrors as you view yourself.

Instructions: Use the five mirrors given to categorize and compare these mirrors while viewing yourself.

Station 3

Goal: Compare how light travels through the 6 mystery liquids

Instructions: Observe the properties of the liquids. Shine light through the 6 mystery liquids and observe how light travels through them.

Station 4

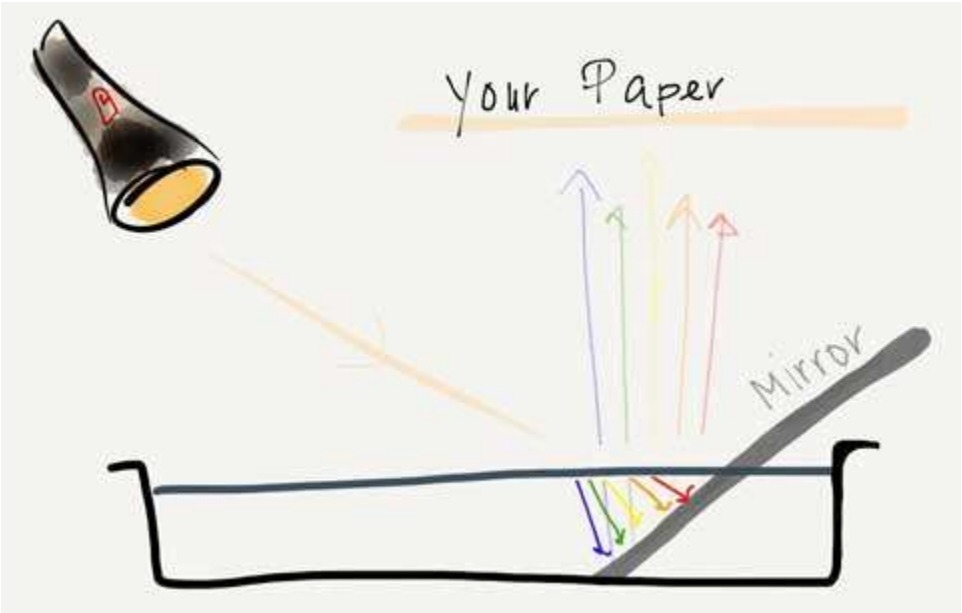
Goal: Observe how light interacts with the six objects that are given.

Instructions: Observe the properties of the six objects given. Shine the light onto the 6 objects and observe how light interacts with them.

Station 5

Goal: Determine how a rainbow can be formed.

Instructions: Set up as show on the right to create a rainbow. Move the light different angles to create an angle.



Station 6

Goal: Observe the popsicle stick in four different liquids to make conclusions.

Directions: Make observations about the type of liquids. Without touching the glasses observe the popsicle stick from ABOVE and STRAIGHT ON (you may need to bend down to observe).

Station 7

Goal: Observe how white light and a laser interacts with gummy bears of different colors

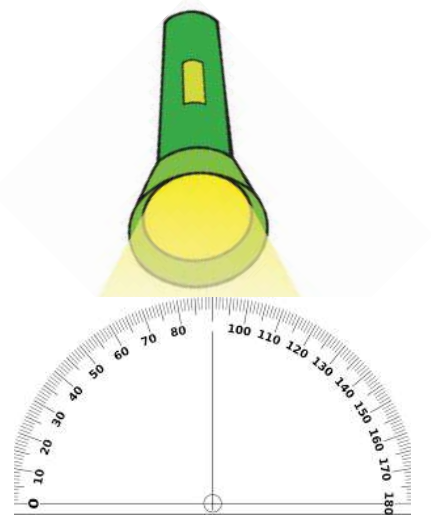
Instructions: Shine the white light through each gummy bear. Observe. Shine the red laser light through the gummy bear. Observe.

WARNING: LASERS CAN BE EXTREMELY HARMFUL. FOLLOW DIRECTIONS FOR USE OR IT WILL RESULT IN AN AUTOMATIC ZERO AND SUSPENSION. GET THE LASER FROM YOUR TEACHER AND RETURN WHEN YOU ARE DONE.

Station 8

Goal: Determine how light creates a shadow based on position.

Instructions: Set up the flashlight, protractor and object as show on the right. Change the angle of the light and observe the shadow on the object. Observe and record.



Station 9

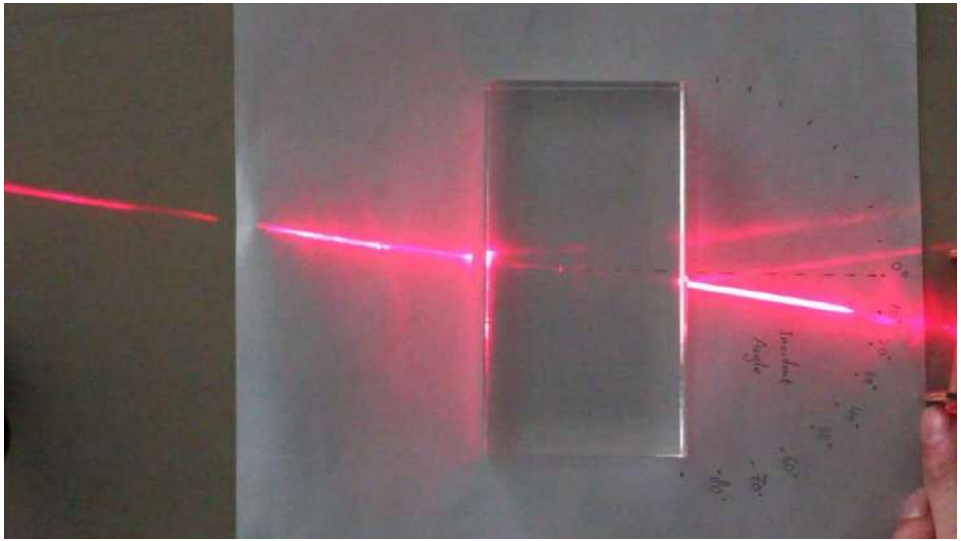
Goal: Observe the changes in the perceived color of light.

Instructions: Turn on a phone flashlight to the highest power setting and place it in front of a white screen (paper). Place each screen in front of the light and record the color shown. Now combine two screens together and observe the color shown. Make sure you try both combinations (red then green and green then red) to notice differences. Observe and Record.

Station 10

Goal: Determine how a prism changes the laser light

Instructions: Set up the prism and laser so it is going parallel to the table. Send the light through the prism and record your findings. Repeat for all prisms.



Station 11

Goal: Determine how looking into a water beaker changes.

Directions: Look into the empty beaker with a penny from the top and side. Pour some water in and observe again. Pour even more water in and observe.

Station 12

Goal: Observe how 3D glasses and sunglasses changes our perception.

Instruction: View the images without glasses. Observe. View the images with sunglasses. Observe. View the images with 3D glasses.

Station 13

Colorblind Test

In Class

Station 14

Optical Illusions

In Class