PTRA: Bringing Physics to Life Through Literature

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AMERICAN ASSOCIATION OF PHYSICS TEACHERS
PHYSICS TEACHING RESOURCE AGENTS

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PTRA: The Little Prince

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The Little Prince Antoine de Saint Exupery

https://1drv.ms/w/c/670cf41058257ff9/IQA7YzOvbt6QSKiFJAyh2XcyASleTFNu7X1mW-PbHVHKZac?e=GEdLfB

Images with lenses and mirrors.docx

Links for document and lesson plans may be used in middle to high school

The Little Prince Antoine de Saint Exupery

Standards

Math MS.LS1.D

DCI ; HS.PS4.A ; HS.PS4.B ; HS.ESS1.A ; HS.ESS2.A ; HS.ESS2.C ; HS.ESS2.D

ELA/Literacy -

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

The Little Prince Antoine de Saint Exupery Engage

https://www.bing.com/videos/riverview/relatedvideo?q=Little+Prince+Episode&&mid=89E94F8D3FC6F7AC018389E94F8D3FC6F7AC0183&churl=https%3a%2f%2fwww.youtube.com%2fchannel%2fUCWOA1ZGywLbqmigxE4Qlvuw&FORM=VRDGAR

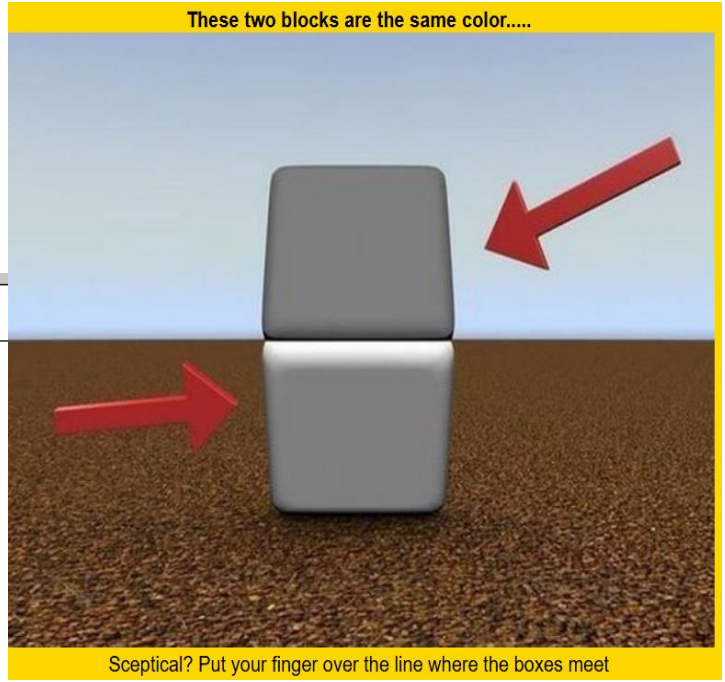
The Little Prince | Official Trailer [HD] | Netflix

The Little Prince Explore

Optical Illusions

Using the website http://www.illusions.org/ examine 10 of the 100 illusions and complete the data table

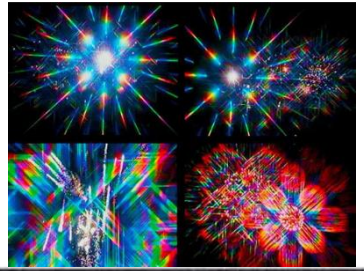
Name of Illusion	Describe Illusion



The Little Prince Explore

Distribute Diffraction grating glasses or diffraction slides and have students look at various light sources and explain what they see.

As the instructor shine a laser beam through the glasses or gratings and project the image on the wall. Have students compare what is now visible versus what they saw previously.



https://www.bing.com/videos/riverview/relatedvideo?q=diffraction+grating+glasses&&mid=80B36436246AE4DCDA3680B36436246AE4DCDA36&churl=https%3a%2f%2fwww.youtube.com%2fchannel%2fUCM64SC6ITArBd-xGICf2GYw&mmscn=stvo&FORM=VRDGAR

The Magic of Diffraction Gratings

The Little Prince Explain

Images with Lenses and Mirrors

1. How are images formed with various curved lenses or mirrors?
2. How is the size of an image related to the location of the image with respect to the lens or mirror?
3. How does the distance from an image to the lens or mirror compare with the distance from the object to the lens or mirror?
4. How do you distinguish a real image from a virtual image?
5. How is the orientation of the image related to the lens or mirror type and/or location of the image with respect to the lens? Note: orientation means whether the image is erect or inverted.

https://docs.google.com/document/d/0B1YX2OOkgNqNbW81Vy1PQy1UazQ/edit?usp=sharing&ouid=108981929184412260361&resourcekey=0-O0rnmOHF_yn5m_mMFpyeUg&rtpof=true&sd=true

The Little Prince Explain

Images with Lenses and Mirrors

Data Table

lens type, Object distance	Image distance cm	Image type Real or virtual	Image Size Larger, smaller or same size	Image Orientation Inverted or erect
Concave lens				
1 m				
15 cm				
5 cm				
Convex lens				
1 m				
15 cm				
5 cm				

The Little Prince Extension

Cool Ray and the Polaroids

What is polarized light?
How is light polarized?
How does the orientation of the polarizer and analyzer affect the intensity of light transmitted through the filters?

LO: Students will: Describe the process of polarization via reflection, refraction, and transmission through a filter.

Materials: 3 polarized filters or glasses, an Iceland spar (calcite crystal), a container for water, a mirror, a glass plate, a protractor, cell phone screen or computer screen, small flashlight, 3 – D glasses,

Procedures: For each suggested activity write a summary of your observations on a whiteboard or chart paper. These summations will be shared.

Cool Ray and the Polaroids

1. Using a single filter examine the lights in the room and reflections from various surfaces Describe the effect of the filter on the reflections. Does the orientation of the filter change the observation?
2. Examine the effects of an Iceland spar, calcite crystal. Place the crystal over a printed word and observe the word as you rotate the crystal. Hold one polarizing filter over the crystal. Observe what happens to the word as you rotate the filter 360°. How would you explain your observation?
3. Align a pair of polarizers so that the maximum amount of light is transmitted. Mark one edge of both polarizers. This will be the "0 angle" for the polarizers. With the two polarizers, (one will be identified as the polarizer and the other will be the analyzer) examine light sources or reflective surfaces through both filters, rotating the analyzer and holding the polarizer fixed. Record your observations including a description of variables changed.
4. Don a pair of 3 – D glasses (i.e. as in movie theaters) and look at another person wearing a pair of 3-D glasses. What do you see? Close on eye and then the other. Record your observations and propose an explanation for these results.

Conclusion: Share the results! Write a summation that correctly answers the problem statements posed on the lab.

The Little Prince Evaluate

15.7. The Disappearing Beaker[1]

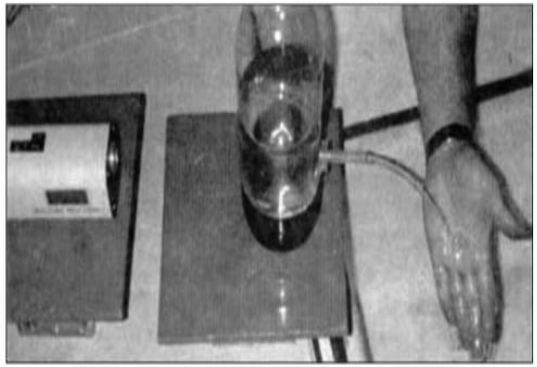
Refractive Index

Description

Put a small Pyrex® beaker inside a larger beaker. Pour mineral oil or Johnson's® Baby Oil into the inner beaker. As the oil overflows into the larger beaker, the small beaker will "disappear." The painted graduations on the side will appear to be standing in free space. This is even more effective if you can find a small beaker with no markings on the side.

15.10. Can You Pour Light From a Bottle?[1,4]

Total Internal Reflection



Description

A laser beam is directed so that it passes through a water-filled container and out the orifice at the other side of the container. The water stream acts as a light pipe just as optical fibers do. A hand placed in the stream will scatter both the water and the light.

Fig. 15.15. Laser beam passes through water-filled container.

QR Code PTRA NSTA

Evaluation code

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