

Thread NSTA Light and Color Questions

Question 1

----- Original Message -----

From: [Richardson, Denise M](#)

Sent: Tuesday, August 26, 2008 10:15 PM

Subject: Giddy from the land down under

Giddy colleagues

I am wondering if some one may be able to help me out. **I am needing some activities/labs/interactives for year 9 Physics:Light & Colour.** Would appreciate some advise.

-
1. Use prisms to disperse light (a crack of light from a window shade). You can also bend it through water and reflect on the wall off a submerged mirror. Refraction.
 2. Have students orient two polarized lenses at right angles to block all of the light (they can use each other's polarized sunglasses).
 3. Have students view diffraction patterns holding their thumb and forefinger very close together while looking toward the sky (not toward the sun).
 4. Shine a laser through a feather and note the diffraction pattern on the wall.
 5. Have students make lenses out of gelatin, and shine lasers along a piece of paper through the gelatin. Measure the angles and calculate the index of refraction. You can do this with glass also.
 6. Go to prettygoodphysics.com and download oodles of great labs.

I'm sure others have great ideas to share.

Blessings,

Joe

Question 2

Light box question

From: physics-request@list.nsta.org [mailto:physics-request@list.nsta.org] **On Behalf Of** Fitzgerald, Tami (West Muskingum Local Schools)

Sent: Saturday, March 06, 2010 10:29 AM

To: physics@list.nsta.org

Subject: Light box labs

I was looking for labs using light boxes, especially for color. I have eight light boxes from a couple of companies, but all come with color filters and colored cardboards, and some lenses and mirrors. This would be for high school physics.

Thanks,
Tami Fitzgerald
West Muskingum High School
Zanesville, Ohio

Greetings,

Go to my website listed below.

Select Honors Physics

Select Chapter 13 Properties of Light

Explore some Power Point activities using the light ray box.

Go back to original page and select Regular Physics. Select Chapter 27 Light or Chapter 28 Color or

Chapter 29 Reflection and Refraction or Chapter 30 Lenses for more stuff.

Or Go back to original page, select Middle School Physics and select Behavior of Light or Color and Vision

Feel free to use any, all, modify as you desire.

Enjoy
Dick

Helping teachers who facilitate, motivating students who learn.

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Adjunct Physics Teacher - Baldwin Wallace College

Physics is learning how to communicate with ones environment so that it will talk back.

Question 3

Thread NSTA light experiment Question

From: DJ Science <djscience@tasd.net>

To: physics@list.nsta.org

Sent: Thu, March 31, 2011 6:38:31 AM

Subject: light experiment

A student asked me this question yesterday:

If there was a light bulb inside of a closed sphere that was lined with mirrors on the inside and you turned on the light and then off, how would the light react? would it continue to be reflected off the mirrors after the light was turned off?

Debbie Johnson

<http://johnson.emcs.net>

Debbie,

Of course the light would continue to bounce off the mirrors--but only for a very short time. If this is more than a thought experiment the mirrors would absorb some fraction of the light on each reflection. At the speed light travels there will be multiple reflections per second--maybe on the order of 50 Ghz. So in a very small fraction of a second the light will be converted to heat.

Dave

David Simmons

St. John's Jesuit High School

The average reflectivity of a standard household mirror is, if I recall correctly, about 70%. The photons should bounce around until all are absorbed by the mirrors. Since the photons are traveling at c m/s, this would happen within fractions of a second (I'm not going to do the calculation, but I would estimate a few nanoseconds). Couple that with the absorptivity of the light bulb itself, and you're talking essentially instant darkness. Still, the light *is* bouncing around in there--it would not be present long enough to be detected.

Even the best front-faced astronomical mirrors are only 98% reflective or thereabouts, so there's really no way around it.

Shawn [shawnyasu@aol.com]

It is like proving the light goes out when you close the refrigerator door

Even with 'perfectly' reflective surfaces, you could never know because any device that would measure (or see) the light would absorb it

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On Apr 1, 2011, at 5:43 AM, Edwin Eckel <edeckel@sbcglobal.net> wrote:

You ought to be able to test this. measure light intensity, the bounce it off a mirror and measure again. Do it a third time for two mirrors. Calculate how many bounces it takes to drop reflected intensities below the average minimum perception level for humans. It would probably be helpful to do this in a vacuum.

Or check the NASA data values for intensity of transmitted and reflected light sent back andforth to the mirror Apollo 16 (?) left on the moon to monitor the lunar-earth separation.

This might make a unique and interesting science fair project.

Ed Eckel

Stratford, CT

This situation is one of the old questions that were posed as a thinking idea (like the light from headlights if the car is going the speed of light or if a tree falls in the woods & no one is there to hear it...) or a "see if you can mess with the teacher" question.

I think the student got the suggestion for the light inside a mirrored sphere from a parent or a grandparent...

Stan

Question 4

Thread NSTA Light Lenses Question

On Aug 4, 2005, at 4:59 PM, TracknTerv@aol.com wrote:

> I'm looking for some good light activities/labs for my 8th

> graders that would cover wave behavior or the images formed by lenses

> and mirrors. If you have any you would be willing to share, I would

> greatly appreciate it.

>

> Thanks.

>

> Carolyn

SOME FAST AND EASY ONES ARE:

1. With the arm down on your overhead and the light turned on, room lights out, spray water into the light. You will see a distinct pattern. Then ask what type of lens does it have?

2. Give pairs of students both a convex and a concave lens. Have them try to project the lights from above onto a paper on their desk. One can project the other can't.

Mary Scimom19@aol.com

I have a couple things posted to the web here:

<http://shopinberkeley.com/science/physics/optics/>

The "Plastic block lab" is written to determine the speed of light in plastic, but could easily be adapted for middle school students just to see how the light bends in plastic (doing the activity without the math afterwards). All you need is small (10 cm x 4 cm x 4 cm or so) plastic blocks. The need to be transparent on the long sides, if not on the

"ends". You could probably pick them up at a local plastic store (TAP?).

I don't think that concave mirror "ray tracing" is a middle school topic either, but probably something they could handle if it fits in. It helps to emphasize the points that light travels in straight lines, and that diffuse reflection off most objects means light is leaving any point in all directions. I've got a couple ray tracing animated gifs on the site.

Lee Amosslee

I'd start with what forms on a screen when light is projected through a hole in a mask. There is lots of good experiments, as well as the opportunity to do some geometry, proportional reasoning, and algebra. Start with a point source and a round hole, then change the size and shape of the hole, and then the size and shape of the source, ie no longer a point source. Do well they come to understand that the image from an extended source is just a collection of images for the point sources that make up the extended source.

Then having developed the idea of ray, you can move to plane mirrors, and the puzzle of how large must a vertical mirror be so you can see your entire body, and does the answer depend on how far you are from the mirror.

cheers,

joe

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