



Classroom Teacher Preparation

Physics 13: Light Reflection, Transmission, and Absorption

Please use the following to prepare for the next SfS lesson.

Description:

This lesson introduces students to the idea that reflected or emitted light is the only thing we see; we perceive this as seeing objects. Students will explore how white light interacts with various objects. They will then observe that white light is made of all the colors of light, and will finish by exploring how filters can block all but one color of light, connecting this to the ideas of light absorption and transmission.

Lesson Objectives – SWBAT (“Students Will Be Able To...”):

3rd-5th

- Draw and explain diagrams of light interacting with objects
- Predict what colors of light are transmitted and absorbed by a colored filter

Disciplinary Core Idea (DCI)

PS4 Waves and Their Applications in Technologies for Information Transfer – PS4.B Electromagnetic radiation

- (3rd-5th) Objects can be seen when light reflected from their surface enters our eyes.

Science & Engineering Practice (SEP)

Developing and Using Models

- (3rd-5th) Develop a model using an abstract representation to describe a scientific principle

Constructing Explanations

- (3rd-5th) Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation

Crosscutting Concept (CCC)

Energy and Matter

- (3rd-5th) Patterns can be used as evidence to support an explanation

Preparation:

This lesson is an introduction to light; there are no pre-requisites to the lesson.

Room Set Up for Activities:

Students will work in groups of 2-3 at their desks, **ten groups** maximum. Some of the activities benefit from darkening the room, so it is helpful to lower shades and turn out the lights if possible.

We will need to set up four small table lamps in a central location. Depending on the size of your classroom, the students may need room to gather around the lamps in order to view them through spectrometers. The lamps also require the use of an outlet, but the kit does include a power strip and a 6-foot extension cord.



Safety:

Students should not touch the light bulbs as they can become hot. Students should never look directly at the sun through the spectrometers; however, they can simply point them outside towards the daylight.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Energy**. Modules include:

Physics 2: Electricity – A basic introduction to electricity and circuits for younger audiences without prior exposure. Students create a simple circuit and test the conductance of various materials.

Physics 10: Sound – This station-based module introduces students to sound. Students focus on how to change the pitch and volume of different simple instruments at each station.

Physics 16: Energy – This station-based module familiarizes students with many forms of energy. Students explore various conversions of energy through different activities.

For other module sequences and groups, look here: www.sciencefromscientists.org/sequences

Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: www.sciencefromscientists.org/standards/

Lessons are matched to both national NGSS and local state standards.

After Our Visit:

Extend this lesson with a cool Light and Color activity from NASA.

Access this Extension activity by visiting the Classroom Post found on our website at sciencefromscientists.org/cohorts. Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at sciencefromscientists.org/open-response-questions. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

Additional Resources:

WGBH Videos and Activities: The PBS educational site is a great, **free** resource for educators but you must create an account to use the materials. The first time you log in to the PBS Learning Media website you will be asked to create an account and provide an email and password. Once you have logged in, select “keep me logged in” to avoid having to repeat the process.

- What is Light? (2:03) <https://mass.pbslearningmedia.org/resource/mck14-pd-sci-phys-whatlight/what-is-light/#.Wclko9FrXPY>
- *SciShow Kids* - Why Is the Sky Blue? (2:50) <https://www.youtube.com/watch?v=bcVr13Fw7w8>