



Classroom Teacher Preparation

Physics 16: Energy

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

Description:

This module familiarizes students with various forms of energy using demonstrations and multiple workstations. It also introduces the First Law of Thermodynamics (i.e., “Energy can neither be created nor destroyed.”) through direct observations during activities.

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

3rd-5th

- Construct explanations for how energy is conserved

Disciplinary Core Idea (DCI):

PS3 Energy - PS3.A Definition of Energy & PS3.B: Conservation of Energy and Energy Transfer

- (3rd-5th) Moving objects contain energy. The faster the object moves, the more energy it has. Energy can be moved from place to place by moving objects, or through sound, light, or electrical currents. Energy can be converted from one form to another form.

Science & Engineering Practice (SEP):

Constructing Explanations

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

Crosscutting Concept (CCC):

Energy and Matter

- (3rd-5th) Energy can be transferred in various ways and between objects.

Preparation:

This lesson can be an introduction to the topic of energy. If classroom teachers are looking for a way to begin discussing this topic ahead of time with their students then we suggest the videos listed below in *Additional Resources*.

Room Set Up for Activities:

This activity is structured as multiple stations that students will progress through.

At least one classroom teacher is needed to help monitor stations during this lesson.

Safety:

Students will be working with chemicals and should be reminded to follow station directions carefully and under the supervision of a teacher.



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 13: Light – This station-based module introduces students to the properties of light. At the end of this module, students should be able to identify transparent, translucent, and opaque objects, discuss absorption, transmission, reflection and refraction of light, and have a better understanding of light waves and the electromagnetic spectrum.

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 by exploring energy transfer in bouncing balls.

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

- “Energy: The Dr. Binocs Show” video for younger students (4:13): <https://www.youtube.com/watch?v=Q0LBegPWzrg>
- “Different Forms of Energy” video for advanced students (4:14): https://www.youtube.com/watch?v=86PzkRbw4_U
- “What is Energy Really” video by the Science Asylum for advanced students (4:14): <https://www.youtube.com/watch?v=jCrOtF7T4HE>
- BBC Forms of Energy article: http://www.bbc.co.uk/schools/gcsebitesize/science/aqa_pre_2011/energy/heatrev4.shtml
- Energy Kids Page: http://www.ei.lehigh.edu/learners/energy/readings/energy_basics.pdf