I'm So Bright I Wear My Shades Indoors!

Summary

Using UV beads, students will observe and draw energy.

Group Size

Individual

Materials

For each student:

Two UV beads
Pipe cleaner
Paper/pencil/clipboard

- Energy Song (pdf)

Additional Resources

Books

- *The Wonder of Light*
  , by Jan Adkins (Ranger Rick Series, Newbridge Educational Publishing); ISBN 1567844758
- *The Usborne Internet-Linked Library of Science Light, Sound & Electricty*
  , Kirsteen Rogers et al. (Scholastic); ISBN 0-439-44147-1

Videos

- *Electromagnetic Energy*
  , (Schlessinger Media, 1-800-843-3620, http://www.libraryvideo.com); N6661
- *Eureka!*
  , section on Electromagnetic Spectrum (offered by Utah Education Network several years ago, created by TV Ontario, may still be available from district office)

Background for Teachers

Energy is defined as the ability to do work. *Heat, light*, and *sound* are all forms of energy. Some of the things they have in common are that they all travel in waves and can all be reflected (angle of incidence equals the angle of reflection).

Light is everywhere. It is really the only thing we can see, because when you look around you, you are looking either at a light source or something that is reflecting light. Every living thing depends on light energy in some form or another.

Light can be thought of as traveling in rays, which move in straight lines until they hit something. Light also travels in a series of waves. It is only part of a group of waves called *electromagnetic waves*. Radio waves, microwaves, and other types of radiation are constantly surrounding us, along with infrared rays, ultraviolet radiation, X-rays and
gamma rays. Scientists have grouped these together and labeled them the *electromagnetic spectrum*
.

The sun is our greatest source of light and energy. Other natural light sources include stars, fire, lightning, fireflies, and some bioluminescent animals. Invented light sources include: light bulbs, lamps, lasers, fireworks, flares and glow sticks, etc. Moonlight is not considered a light source because it actually reflects sunlight.

Intended Learning Outcomes

4. Communicate Effectively Using Science Language and Reasoning

Instructional Procedures

Invitation to Learn

Introduce the concept of energy to students by writing what they know about energy on a chart. Ask for specific examples of energy, and encourage students to specify how they will know when energy is present.

Instructional Procedures

- Tell students you are going outside on an energy hunt, but first they must put on some energy detectors.
- Hand out two UV beads and a pipe cleaner per student. Instruct them to place beads on the pipe cleaner and attach it to their wrist.
- Students will take a pencil and paper (clipboard if available), and go outside for a few minutes to observe and draw the energy they see. Encourage them watch for as many forms of energy as they can see. They should notice that their UV beads have changed color.
- After a few minutes of students drawing and observing, have them come back in and discuss their observations.
- Classify their findings and chart them as a class, such as natural and invented light sources or sources of light and reflectors of light (anything that is not a light source is a reflector of light).
- Sing the first two verses of *Energy Song*.

Strategies for Diverse Learners

Have students work with a group or buddy learner who can help with work. Choose several key words or terms for students to learn, instead of expecting mastery of everything.

Extensions

- Study of the electromagnetic spectrum is reserved for upper grades, however, a short introduction will help students better understand how visible light fits into everything. One way to teach it is to divide students into groups and have each group choose a part of the electromagnetic spectrum to research, then draw a poster of. Their findings should include ways we use this energy in everyday life. Posters can then be displayed on a bulletin board.
- Make a compare/contrast chart comparing natural and invented light sources. Students draw or write at least ten examples of each. Provide books with unusual light sources such as bioluminescent animals or chemicals that produce light.

Family Connections

Assign students a home project about light and color. This is something they should do at home, and share with the class at the end of the unit. In the instructions that are sent home, include Web site resources and project ideas.

Example:

This month we will be studying energy in the form of light. For their at-home project, students may choose to do a poster, bring a model, or demonstrate something for the class about light or color. The written report of their project and what they learned must be at least two paragraphs and can be typed or hand-written.

This project is worth 50 points.

5 points - Turned in on time.

25 points - Drawing, model, or demonstration.

20 points - Written description of research, in paragraph form.

Ideas for the Project:

- Model of the eye and how we see.
- Demonstration of colors of light, including homemade prisms.
- Model, poster, or demonstration of reflection or refraction of light (this might include a homemade

kaleidoscope).
Making a solar oven or solar cooker of some sort.
Report or demonstration of how light is bent through lenses.
List of 20 ways mirrors are used in everyday life.

Assessment Plan

Make a light book out of 12” x 18” art paper with examples of light sources, and one page of misconceptions of non-light sources, such as moonlight.
Have students draw or list ten examples each of natural and invented light sources.

Authors

Utah LessonPlans