



SENSING ENERGY

DESIGNING TO STAY COOL

LESSON OVERVIEW

LESSON SUMMARY

Students will explore the unseen energy produced by the sun.

OBJECTIVES

Students will understand that

- light has components that are both visible and invisible to our eyes.
- exposure to light can be measured and controlled
- exposure to light can change the properties of an object

GRADE LEVEL
2-4

DURATION
2-45 minute periods

ESSENTIAL QUESTION

How can a spacecraft be protected from the Sun's visible and invisible radiation?]



CONCEPTS

- The Sun produces energy- both visible and invisible to our eyes.
- The light we see is visible energy from the Sun reflected off surfaces.
- Some of the Sun's energy is received on Earth as ultra-violet energy that can produce skin burns and cancer.
- There are ways of blocking UV radiation.

MESSENGER MISSION CONNECTION

The atmosphere on Earth provides a measure of protection to the planet, and everything on it, from the harmful effects of exposure to sunlight. Once the MESSENGER Craft leaves the atmosphere, it will be more exposed to the dangerous invisible forms of the Sun's energy. As the craft gets closer to Mercury, this exposure will intensify. The potential for damage to the craft and its instruments is very high. MESSENGER team scientists are constantly refining their design of the craft so that exposure to the Sun's energy will be minimized.





STANDARDS & BENCHMARKS

NATIONAL SCIENCE EDUCATION STANDARDS

Standard D2 Objects in the Sky

- The Sun provides the light and heat necessary to maintain the temperature of the Earth.

Standard A2 Understandings About Scientific Inquiry

- Scientists use different kinds of investigations depending on the questions they are trying to answer. Types of investigations include describing objects, events, and organisms; classifying them; and doing a fair test (experimenting).

Standard B8 Light, Heat, Electricity, and Magnetism

- Light travels in a straight line until it strikes an object. Light can be reflected by a mirror, refracted by a lens, or absorbed by the object.

FROM THE NSES NARRATIVE

“Young children begin their study of matter by examining and qualitatively describing objects and their behavior. The important but abstract ideas of science, such as atomic structure of matter and the conservation of energy, all begin with observing and keeping track of the way the world behaves. When carefully observed, described, and measured, the properties of objects, changes in properties over time, and the changes that occur when materials interact provide the necessary precursors to the later introduction of more abstract ideas in the upper grade level.”

“By experimenting with light, heat, electricity, magnetism, and sound, students begin to understand that phenomena can be observed, measured, and controlled in various ways. The children cannot understand a complex concept such as energy. Nonetheless, they have intuitive notions of energy—for example, energy is needed to get things done; humans get energy from food. Teachers can build on the intuitive notions of students without requiring them to memorize technical definitions”.

