Lessons at a Glance

Science Content: Big Ideas

The Light Unit concentrates on the following Big Ideas. Along with the scientific Habits of Mind discussed on page 6-7, these concepts are reinforced throughout the unit. The lessons in which each big idea is introduced or is a major focus are indicated in parentheses.

- Light is all around us. (Lessons 1, 2)
- If you can see something, then light must be present. (Lessons 1, 2)
- Light travels in straight lines. It moves outward in all directions from a source until it hits something. (Lessons 3, 6, 10, 11)
- When light hits something, one or more of these three things can happen: the light can bounce off the object, go through it, or be absorbed by it. (Lessons 4, 6, 7, 8, 9, 10, 11)
- The eye detects light. (Lesson 5)
- You see when light comes into your eye. (Lessons 5, 10, 11)
- When light goes through a transparent object, it either goes straight through or changes directions. (Lesson 9)
- Scientists use models to represent things that are too big, small, fast, slow, far away, or dangerous to observe in the real world. (Skill Building Activity)

Lesson Overviews

The following overviews briefly summarize each lesson in the Light Unit. Suggestions for scheduling and flexible implementation are shown in italics.

Lesson 0: Doing Science

Children sharpen their awareness of scientific thinking as they conduct a self-directed exploration and then reflect on the processes they engaged in. In the context of these experiences, they are introduced to the work of scientists and to the Science Companion "I Wonder" circle, which provides a visual representation of many of the facets of scientific inquiry, exploration, and discovery.

You can find Lesson 0 in the *Teacher Reference Materials*.

Lesson 1: Light Is Everywhere

The children are introduced to the Light Unit in a science talk. Through this discussion, they examine how they sense light and how they think light moves from place to place. They also draw models, which they refer back to at the end of the unit, that show their ideas about the behavior of light.

Prior to this lesson, it would be helpful if the children already completed the Skill Building Activity "Using Models in Science" on page 170.

Lesson 2: Light and Dark

The children examine sources of light and attempt to create total darkness in their classroom. The difficulty of creating an absence of light provides a context for exploring in-depth how light travels in Lesson 3, "The Path of Light."

Lesson 3: The Path of Light

Children explore how light travels. They observe a light beam pass through a cloudy solution, and create a model that simulates its straight path. They also consider what happens to light when it hits an object in its path, a topic that is the focus of the remainder of the unit.

Lesson 4: Light Bounces

In this lesson the children investigate what happens when light bounces, or reflects, off things. They learn that when light hits an object, it can bounce directly back, creating a mirror-like reflection, or bounce in many directions and scatter. They also use a model to describe what happens when light bounces.

Consider teaching this lesson over two days.

Lesson 5: Light and the Eye

The children continue their exploration of bouncing light by considering how the eye reacts to differences in light. In doing so, they learn that we are able to see things because light bounces off of objects and into our eyes. They also observe that the more light there is, the easier it is to see.

Lesson 6: Modeling How Light Travels

In this lesson, the children continue their exploration of bouncing, or reflecting, light. They manipulate periscopes to observe a variety of objects. The children consider how the model of reflecting light that's been presented in Lesson 4 applies to their periscope observations and draw models of how light travels in a periscope.

Lesson 7: Light and Materials

Children continue to explore what happens to light when it hits something by investigating how much light can "go through" different materials. They experiment with a variety of opaque, transparent, and translucent materials to compare how much light passes through each material. The children will apply what they learn during future lessons as they continue to investigate how light interacts with opaque and transparent materials.

Lesson 8: Opaque Materials

The children continue their exploration of how light interacts with materials. Through experimentation, they learn that opaque materials reflect light, absorb light, or both. They compare opaque materials that reflect light to materials that absorb light. They also discover that sometimes an opaque material can be changed into a translucent material by altering its thickness.

Lesson 9: Transparent Materials

Children continue their exploration of light and materials. They experiment with transparent materials and gain a deeper understanding that light passes through these materials. The children also think about how transparent objects reflect light, enabling us to see them. In addition, they see examples of how light can change directions when it passes through transparent media, such as magnifying lenses, water, and oil.

Lesson 10: Another Look at Light

The children re-evaluate the models of light they drew in Lesson 1. They review their questions about light and reflect on their understanding of light. Using this information, they generate a list of criteria for making models of light, which they use to revise their own initial models.

Lesson 11: Light Extravaganza

In this final lesson of the Light Unit, the children role-play two different scenarios that model the behavior of light. While providing an opportunity for children to apply their understanding of light kinesthetically, this lesson also functions as an in-class, summative assessment of the unit.

Skill Building Activity: Using Models in Science

Children study various types of models and learn how they are used in science. They also make models of their own.