



SCIENCE OVERVIEW

The Nature of Shadows

Shadows are evidence that light travels in straight lines from its source. If the path of light is blocked by an object, then the light cannot reach the surface behind the object, so it remains (relatively) un-illuminated, in contrast to the more brightly lit area around it. Thus a shadow may be defined as the lack of illumination rather than an object in its own right.

Nevertheless, common phrases and stories, as well as repeated experience, lead us to think of shadows as things. For example, we talk of 'casting a shadow', or of 'our shadow following us', while shadows take on a separate identity in cartoons and stories such as Peter Pan. Even for those who have a scientific understanding of shadow production, the appearance of shadows makes them seem like objects. For children who have not formed an understanding of light travel, this appearance can overwhelm any attempt to teach the scientific explanation.

Shadows are important in our daily lives. It is, after all, what separates night from day: night comes in an area when the Earth rotates around its axis so that the area in question is not facing the Sun but is in the shaded side of the Earth.

The Relationship Between Light, Heat and Shadows

Sunlight heats the objects it illuminates. Because there is less light in the shadows and in the shaded parts of objects, the heat generated by the light in these areas is also less. That is why it is cooler at night

than it is during the day, and why the temperatures in the shade are lower than in sunlight during the day.

Young students require many different experiences in various contexts to successfully form a conceptual knowledge of light. Take into account the children's own ideas, not only at the beginning of each experience but also at intervals during an activity. It is important to plan investigations with the children, using their ideas as a starting point. For instance if children believe that shadows can only be produced by the Sun, have them test this idea. For example, by shining a flashlight and/or a candle on a toy figure, a child can see that a shadow is indeed produced by other kinds of light as well as by the Sun.

Generally children are more aware of their own shadows than the shadows of objects. Some children confuse shadows with reflections and draw a colored shadow detached from the object casting the shadow. Many youngsters know that shadows can be produced by sunlight, but very few can explain what happens to light when a shadow is formed.

