Research on Student Learning

The majority of elementary students and some middle-school students who have not received any systematic instruction about light tend to identify light with its source (e.g., light is in the bulb) or its effects (e.g., patch of light). They do not have a notion of light as something that travels from one place to another. As a result, these students have difficulties explaining the direction and formation of shadows, and the reflection of light by objects. For example, some students simply note the similarity of shape between the object and the shadow or say that the object hides the light. Middle-school students often accept that mirrors reflect light but, at least in some situations, reject the idea that ordinary objects reflect light. [1] Many elementary- and middle-school students do not believe that their eyes receive light when they look at an object. Students' conceptions of vision vary from the notion that light fills space ("the room is full of light") and the eye "sees" without anything linking it to the object to the idea that light illuminates surfaces that we can see by the action of our eyes on them. [2] The conception that the eye sees without anything linking it to the object persists after traditional instruction in optics. [3] Some 5th graders can understand seeing as "detecting" reflected light after specially designed instruction. [4]

References

[1] Guesne, E. (1985). Light. In Driver, R. (Ed.), *Children's ideas in science* (pp. 10-32).

Ramadas, J., Driver, R. (1989). Aspects of secondary students' ideas about light. *Aspects of secondary students' ideas about light.*.

[2] Guesne, E. (1985). Light. In Driver, R. (Ed.), *Children's ideas in science* (pp. 10-32).

[3] Guesne, E. (1985). Light. In Driver, R. (Ed.), *Children's ideas in science* (pp. 10-32).

[4] Anderson, C., Smith, E. (1983). Children's conceptions of light and color: Understanding the concept of unseen rays. *Children's conceptions of light and color: Understanding the concept of unseen rays.*.