Light

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Information Card 1

The Invention of the Microscope

A microscope is an instrument that produces a clear magnified image of an object viewed through it. It can also produce the fine details of the object in which the viewer is interested. The basic form of microscope is the optical microscope. (Simple microscope). It consists of a single convex (magnifying) lens or a combination of lenses which produce the same effect. The compound microscope consists of two separate lens systems. Each system is a single microscope. An object is placed close to one lens system and this forms an image called the primary image. This image is then magnified by the second set of lenses, called the eyepiece. The image seen by the eye is produced by the eyepiece at the normal distance of clearest vision.

The ancient Greeks used a technique of using water-filled glass spheres to magnify objects. In the 10th and 11th centuries, an Arab scientist named Alhazen studied the magnification produced by segments of glass spheres. The first compound microscope was developed by a Dutch eyeglass maker named Zacharias Janssen in 1590. Janssen was in the business of grinding lenses for eyeglasses. Some of his lenses made things look bigger. He wanted to put two lenses together that would make things look a lot bigger. The first microscope he built made things look about twenty or thirty times bigger. This is big enough to see tiny plants and insects that are too small to see with just your eyes.

The first person to make use of the microscope was another Dutch scientist - Anthony van Leeuwenhoek. He began to make microscopes as a hobby. The microscopes he invented could magnify objects up to two hundred times bigger. He collected things to look at - water, plants, blood and dirt. When he scraped stuff off his teeth, he became the first person to see bacteria.

People kept finding new ways to get bigger and clearer images from the microscope. In 1684, the Dutch doctor, Christiaan Huygens invented a type of twin-lens eyepiece that is still used today. An English scientist, Robert Hooke, made improvements to the microscope, while major improvements to the microscope lenses were made by a German doctor - Ernst Abbe. The electron microscope was developed by two German scientists, Max Knoll and Ernst Ruska in 1932. Their work was based on the discovery of electron lenses by another German scientist, Hans Busch.

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Divide chart paper into three columns labelled Transparent, translucent and opaque.

Ask students to list materials they can see through. If they can see through it, it means that light can pass through the material. Identify these materials as “transparent”.

Ask students to list materials they can only partly see through (cannot see through clearly). Identify these materials as “translucent”.

Ask students to list materials they cannot see through. Identify these materials as “opaque”.

Have students look at the lists to write their own definitions of the new terms.

Perform the following experiment in class with the students:

Transparent, Translucent and Opaque Materials

Purpose: To observe the effect of light on transparent, translucent and opaque materials.

Materials: clear glass or transparent plastic wrap
wax paper
cardboard
flashlight

Prediction: What will you see when you shine the flashlight on each of these materials?

Procedure: Darken the room and aim the flashlight at each material. After each one observe how much light appears on the other side of the clear glass or plastic wrap.

Observations: Write down what the students observed during the experiment.

Conclusions: Name some uses for transparent, translucent and opaque materials.

Reproduce the worksheet on page 35 for the students to complete either in class or for homework.

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Light Investigation

Name _____

Complete the following chart to investigate sources of light in your home. Choose objects that you think may or may not emit their own light. Make a prediction, carry out the investigation and draw a conclusion for each object you listed.

Object	Predictions		Observations		Conclusions	
	light source	not a light source	can see	cannot see	light source	not a light source