Kaleidoscopes

Objective:

Students will observe the effect of reflection by making kaleidoscopes, which create colorful patterns by reflecting multiple images.

Key Concept:

When a beam of light hits a mirror, each ray of the beam is reflected. Light can be reflected again and again by mirrors. Kaleidoscopes demonstrate multiple reflections as mirror images are bounced to other mirrors.

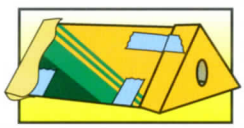
Supplies Needed:

- Crayola® crayons
- Crayola® scissors
- small mirrors (3 per kaleidoscope-available in craft stores or drug stores)
- recycled boxes (such as Crayola® crayon box)
- clear tape
- wax paper and clear plastic wrap
- paper punch hole cutter

Procedure and Results:

1. Cut a recycled cardboard box and fold into three sections - each panel the size of mirrors. Tape the mirrors to the inside of the box and fold box into a triangular shape. Tape the sides of the box closed.

2. Tape wax paper to one end of the triangular box. Sprinkle a few crayon shavings onto that paper. (Crayon shavings can be made either in a sharpener or by placing crayons in a bag and stepping on them until broken into tiny pieces.) Stretch a piece of clear plastic wrap over those crayon pieces and tape to box.



3. Cut another section of the recycled box to create a viewing top. Fold the top to fit snugly over the triangular box. Paper punch a hole in the middle of the triangle-shaped cap, for the viewing hole. Tape cap to the kaleidoscope. Turn kaleidoscope while looking in view hole. Gravity will move the crayon shavings around the base as the mirrors reflect multiple images.

4. Discuss how the kaleidoscopes work. Light rays from the bottom are reflected back and forth between the mirrors. Each image is multiplied by the mirrors before the light rays reach your eyes. To demonstrate this in the simplest form, take one large crayon chip and set it between two mirrors that stand upright, at right angles. How many crayon chips do you see?