



Curiosity Guide #609

Waves

Accompanies Curious Crew, Season 6, Episode 9 (#609)

Double Slit

Investigation #7

Description

Can you bend light waves? What happens when the waves are blocked or combined?

Materials

- Black electrical tape
- 4 binder clips, 2 medium and 2 large
- Blank 4 by 6-inch notecard
- Laser pointer
- Hair lice comb
- Putty knife

Procedure

- 1) Cover the tines of the lice comb with electrical tape, leaving only two adjacent tine gaps uncovered.
- 2) Clip the comb's handle into a large binder clip so that when the clip is standing on its edge, the tines face down.
- 3) Clip the laser pointer near each of its ends with the 2 medium clips and stand the pointer so that the metal clips act like stable feet, resting on the table.
- 4) Clip the bottom corner of the notecard with the final large clip and stand the notecard on edge.
- 5) Turn on the laser.

6) Point the laser toward the card with the lice comb in between and adjust the items so that the beam of light goes through the two slits in the comb.

7) What do you notice?

8) Carefully slide the putty knife in from one side of the comb to cover one of the slits.

9) What do you notice now?

10) What happens if you block the other slit with the putty knife?

My Results

Explanation

When you look at the first beam of light produced, you should be able to see spots that are light and that alternate with dark spots. When you first block one of the slits, some of the dark spots disappear, but the dark spots reappear when you move the knife.

When the laser shines through just one slit, the light gets diffracted or bent, which causes the light to spread out along the card in that dark and light pattern. When the light goes through both slits, there is interference with the waves, which happens when two waves overlap.

If two wave crests overlap, they combine and make the wave bigger, which makes the light brighter. However, when the crest of one wave combines with the trough of another, the waves cancel each other out and leave a dark spot.

Thomas Young conducted a double-slit experiment in 1801 and realized that light energy can travel in waves. Scientists later discovered that light could behave both like a particle and a wave.

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