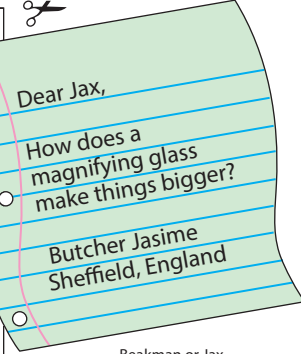
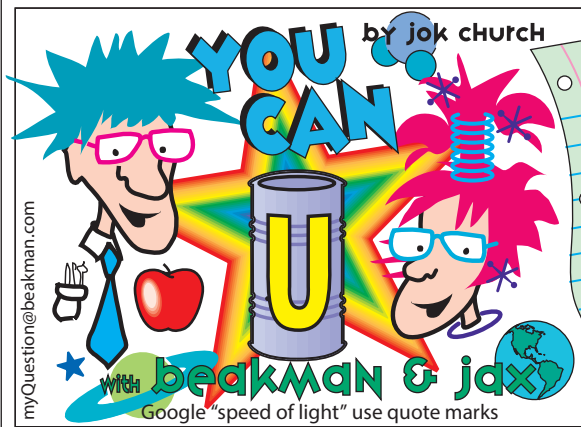




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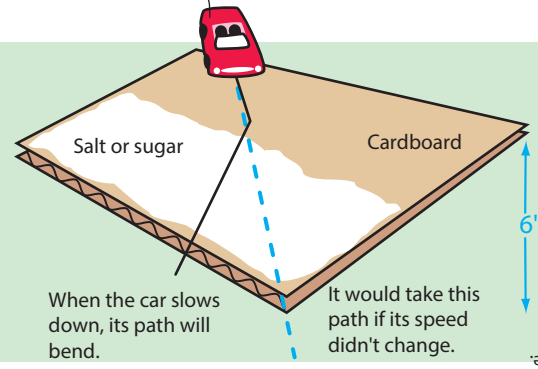
Beakman or Jax
P.O. Box 30177
Kansas City, MO 64112
Questions, name & address

Dear Butcher,
Magnifying glasses do not make things bigger. Instead, your mind works to understand beams of light coming into your eyes at unusual angles. And that needs processing, data processing in your mind.
So, you and light make things bigger.
Oops, I nearly forgot. We also need to change the speed of light. Really.

Jax Place
Jax Place

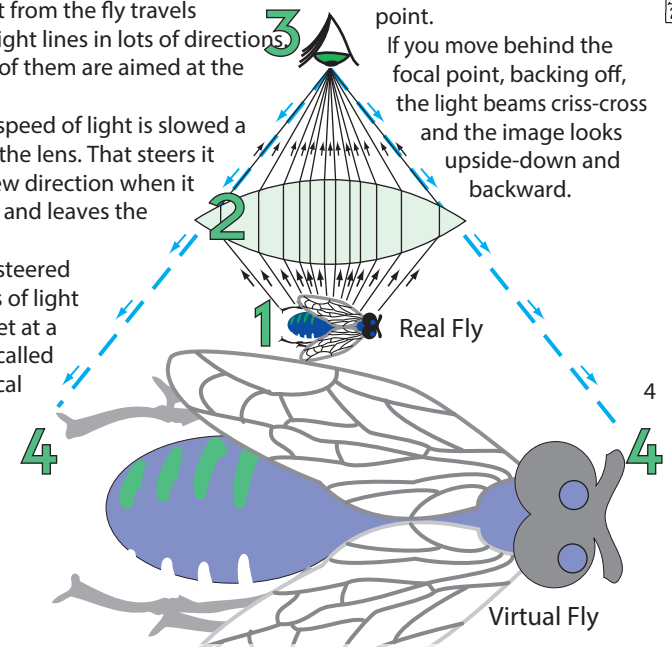
Experiment #1

WHAT YOU NEED: Toy car or truck - flat piece of cardboard (about 24" by 24") - glue - salt or sugar
WHAT TO DO: Spread glue over one half of the cardboard and pour on the salt or sugar. Let it dry and lightly brush away the extra. Tilt the cardboard up about 6 inches and roll your car or truck at an angle down the ramp. What happened to the car's path? Is it a straight line? Try it with another piece of cardboard that is clean.



WHAT IS GOING ON:
You built a model of a beam of light (the car or truck) changing speed and bending its path. Light is not a car or truck. But light does behave something like your model. As soon as the speed of light is changed by the lens, it changes its direction slightly.

1 Light from the fly travels in straight lines in lots of directions. Some of them are aimed at the lens.
2 The speed of light is slowed a bit by the lens. That steers it in a new direction when it enters and leaves the lens.
3 The steered beams of light all meet at a place called the focal point.
4 If you move behind the focal point, backing off, the light beams criss-cross and the image looks upside-down and backward.



Your eyes and mind follow the light beams back down as if the lines were straight and unbent.
Your mind and the glass made it look like the fly is huge.



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P.S. from Beakman: The word virtual is based on the ancient Latin word for truth. The way we use that word today is to mean not truth, or fake.