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To see or not to see – Part 1



Apparatus:

One 8 x 13 cm card or other stiff paper
A metre ruler

Reference: Gateway Science Suite Biology
Module B1d

Twenty First Century Science Suite Biology
Module B6.1 - Brain and Mind

In this pair of experiments we examine some aspects of vision that are surprising!

Blind Spot

The eye's retina receives and reacts to incoming light and sends signals to the brain, allowing you to see. There is, however, a part of the retina that doesn't give you visual information. This is your eye's blind spot.

Procedure

Mark a dot and a cross on a card as shown:



Hold the card at eye level about an arm's length away. Make sure that the cross is on the right.

Close your right eye and look directly at the cross with your left eye. Notice that you can also see the dot. Focus on the cross but be aware of the dot as you slowly bring the card toward your face. The dot will disappear, and then reappear, as you bring the card toward your face. Make a note of the distance of the card at which this phenomenon occurs.



Extensions and questions

- 1 Close your left eye and look directly at the dot with your right eye. This time the cross will disappear and reappear as you bring the card slowly toward your face.
- 2 Try the activity again, this time rotating the card so that the dot and cross are not directly across from each other. Are the results the same?
- 3 As a variation on this blind spot activity, draw a straight line across the card, from one edge to the other, through the centre of the cross and the dot. Notice that when the dot disappears, the line appears to be continuous without a gap where the dot used to be.

What's going on?

The optic nerve carries messages from your eye to your brain. This bundle of nerve fibres passes through one spot on the light sensitive lining, or retina, of your eye. In this spot, your eye's retina has no light receptors. When you hold the card so that the light from the dot falls on this spot, you cannot see the dot.

With the "line experiment" your brain automatically "fills in" the blind spot with a simple extrapolation of the image surrounding the blind spot. This is why you do not notice the blind spot in your day-to-day observations of the world.

