

WHAT DO YOU SEE?

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Purpose: Demonstration of the process of visual transduction. To show the sequence of the major structures involved in the process of visual transduction, the formation of images on the retina, the stream of information through optic nerve and finally the information interpretation at the visual cortex.

Materials: 1) Transparencies having drawn simple pictures like triangle, square and a pentagon. These pictures will be containing three different colors i.e. red, blue and green at each corner. 2) Projector head, this will act as the eye and the lens. 3) Screen (40 by 40 inches) with 5 by 5 grids on it and each box on the grid has a number on it. There is also one neuron (acts as rods and cones) in each box. 4) A frame to hang the screen. 5) 3 plastic pipes, one with green color, the second one with blue color and the third one having red color. 6) 25 balls having numbers from 1 to 25 on them. 7) Several white papers having 5 by 5 grids on them, same as shown on the screen. 8) Pens or markers of green, red and blue color. 9) Two kids, one will act as ganglion cells and the other one as visual cortex. 10) A box compartmentalized into 3 parts having red green and blue balls, each in different compartments. 11) A frame to hold the pipes.

Procedure: The projector head is turned on and the transparency having image drawn on it is placed on the projector. The projector is turned on and the image is formed on the screen having grids on it. A kid is standing in front of the screen and act as ganglion cell. This kid will look at the image formed on the screen and pay attention to the big dots (these dots will be occupying some number on the screen), on the screen and notice the number mentioned in that box where the dot is. Then he will pick up the balls containing same number as the dots and put it into the channel containing the same color as the dots accordingly.

The kid standing on the other end of the channel will act as visual cortex. He will pick up the balls from the box and see the number on it and then he will draw dots on the white paper with grids with a pen having the same color as the channel and join the dots to form the image. Then the kid will compare the shape and color of the image he draws with the image on the transparency. This will explain the visual transduction in a simple way.

Issues: 1) Actually ganglion cell is behind the retina, but as the child would not be able to look at the image while standing behind, so he (acting as ganglion cell) stands in front of the screen. 2) Also the picture formed on the retina is inverted but the 5th grade kid could get confused while interpreting the inverted images on the screen, so the image which we will be forming on the screen (acting as retina), will be upright as the object. 3) Rods and cones are the cells in the retina which code for different colors of the image formed, and they send this information to the bipolar cells and then ganglion cells. But this model lacks the bipolar cells. 4) The optic nerve is formed by axons of many ganglion cells. But to make a simple model, we only use three pipes to act as optic nerve.