

Powers of the eye

What do you know about vision? (2 min alone - 2 min with your neighbor - 1 min in group of 4)

A) Separating power of the eye

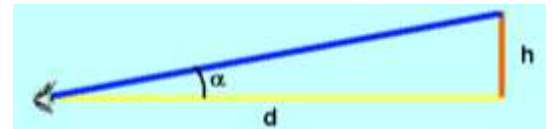
Problem : Can the eye see every little detail ?

Experiment 1:

- Draw two parallel lines separated of 1 mm from each other on a white sheet. Hang the sheet on the wall and then move backwards what happens at a certain distance?

Answer the problem.

The separating power of eye called α is the angle from which two points can't be separated by the eye.



- Calculate $\alpha = \frac{h}{d}$

d is the distance at which you can't separate the lines.

h is the distance between the two lines

Document 1 : Application : Pointillism

Pointillism – A History of Pointillism, the Famous Dot Painting Movement



With the name originally being coined by art critics as a way to ridicule the technique, Pointillism developed as part of the Post-Impressionist movement in the late 1880s. This art technique involved painting tiny yet distinct dots next to one another in order to form an image. Many artists began to adopt this technique of painting and after the 1890s, once Pointillism has reached its peak, it led the way to the development of the Fauvist art movement.

Pointillism was one of the most scientific approaches that developed in relation to the production of art. Michel Eugène Chevreul concluded that the visual impact of the tapestries relied on optics and the juxtaposition of complementary colors, with Pointillism drawing heavily on these results in the paintings that were produced.

Experiment 2: Screen

Observe the screen display of your smartphone using a magnifying glass : explain !

B) 3 dimensions vision

Problem : The image formed on the retina is only in two dimensions. However our eyes can see in 3D. Why?

Experiment 3 :



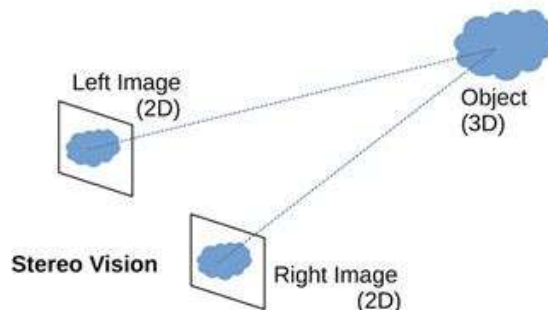
- Take a pencil in each hand. Turn their points to each other. Separate them from about 30 cm.
- Close one eye and try to make the points touched.
- Is it easy?

Oral activity:

Document 2 : 3D vision principle

<https://www.baeldung.com/cs/stereo-vision-3d>

Main ideas to develop : 3D vision – movie
in 3D – goggles filters – brain – retina



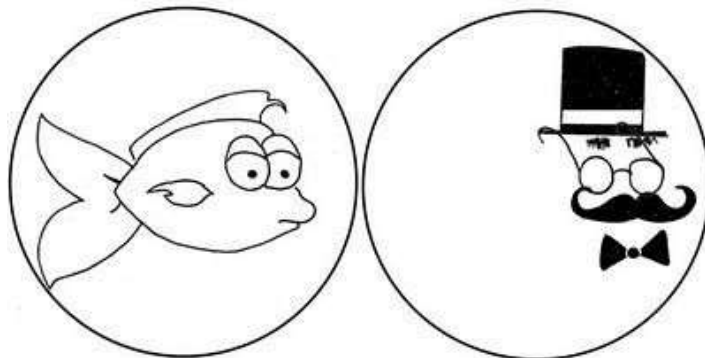
C) Persistence of vision

Document 3 :

The illusion of films is based on the optical phenomena known as persistence of vision and the phi phenomenon. The first of these causes the brain to retain images cast upon the retina of the eye for a fraction of a second beyond their disappearance from the field of sight, while the latter creates apparent movement between images when they succeed one another rapidly. Together these phenomena permit the succession of still frames on a film strip to represent continuous movement when projected at the proper speed (traditionally 16 frames per second for silent films and 24 frames per second for sound films).

<https://www.britannica.com/art/history-of-the-motion-picture>

Example of the thaumatrope:



Oral activity: Carry out the experiment and describe to a kid what is happening with your own words.