

Activity-56: Microscopy.

Aim:

What is Magnification & Resolution?

Requirements:

A Hand lens, A Razor Blade, A piece of Paper, A mm ruler, A bright light source, two volunteers, two colour sketch pens.

Procedure:

Task-1:

Take two coloured sketch pens and mark 2 points 1mm apart on a white plain paper. Now ask your friend to hold the paper vertically pointing towards you. A bright light source should be focussed on the paper.

Stand in front of the paper and observe the two points. Slowly walk backwards away from the paper. After some distance you will not be able to see the two different points. They will appear as one point.

Task-2:

Take a ruler and draw two very thin lines 1mm apart from each on a plain white paper. Use a sharp pencil for this. Illuminate the paper with a bright light source.

Now take a razor blade and start making cutting between these two lines. Make cutting as close from each other as possible. Use a very sharp razor blade.

How many cutting can you make in a gap of 1mm. if you repeat the experiment a number of times will you reach a limit to the number of cuttings you can make in a gap of 1mm.

Concepts covered:

In Task-1, you reached the resolution of human eye. Beyond a certain distance the human eye cannot distinguish between 2 distinct points. This is called Resolution. It is actually measured in terms of the distance between two points which is considered as the object. An object very near to the eye can be resolvable to the least of 0.1mm (100 microns).

In Task-2, you cannot cut the paper beyond a limit, this is not because the paper vanished but because you cannot differentiate between objects or lines or points that are very close to each other. To be able to do, we need to magnify them (enlarge them).

Task-3: Repeat task-2 with the aid of a hand lens. What is the limit?