

Instruments:

- drinking glass
- 2 drinking straws

Chemicals:

- water
- salad oil

Experiment:

- Fill the glass half full of water and place the straws on the surface in the shape of an X.
- Carefully add about 3 cm of oil on top of the water.

Observations: Looking at the glass from the front reveals that the straws look disjointed or cut. If extra oil is spread throughout the glass, the straws even look as if they are broken twice.

Results: Naturally, it is the light rays which are being broken and not the straws. Medium 1 is optically denser than medium 2, if the speed at which light passes through medium 1 is slower than that for medium 2. The optical densities of the three media air, water and salad oil are different. Salad oil is optically denser than water, which is optically denser than air. When light travels from a less dense substance into a more dense material (or vice versa), refraction occurs at the phase border of the two media. The refraction occurring at the water-air and oil-air borders is of different magnitudes, because water and oil have separate optical densities.

Template can be found online (in German): http://physicbox.uni-graz.at/bibliothek/freihandversuche_optik.pdf