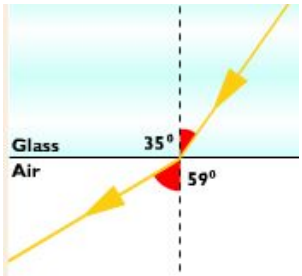
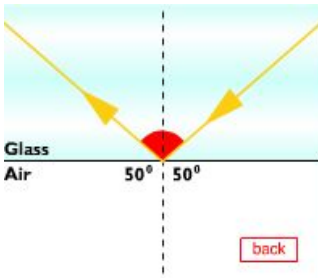
The Effect of the Angle of Incidence on the Angle of Refraction Write up

Background Information

Refraction is the bending of a wave when it enters a new material such as when light enters a glass block. Reflection is the returning of the light once it reaches a certain material that does not transmit or absorb it. The angle of incidence (angle that the light going towards the material) is equal to the angle of reflection. Total internal reflection is when the angle of incidence reaches a certain point so that the light is no longer refracted but is reflected. This angle is called the critical angle. You can see this demonstrated in the pictures. The dotted line is the normal.





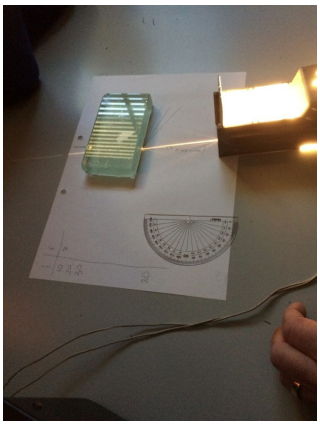
http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/wave_model/lightandsoundrev4.shtml	Very good for all round science. Moving diagram is really helpful!
http://hyperphysics.phy-astr.gsu.edu/hbase/geoopt/refr.html	This has all of the facts about refraction that you need to know but nothing else.

Equipment

- Perspex/glass block for the contrast in materials to shine the light through
- Protractor for measuring the angles
- Ruler for drawing straight lines
- Pencil for drawing those lines
- Paper to draw results on
- Power pack for getting energy to the light bulb
- Light bulb for shining the light
- Screen with slit in it to direct the light

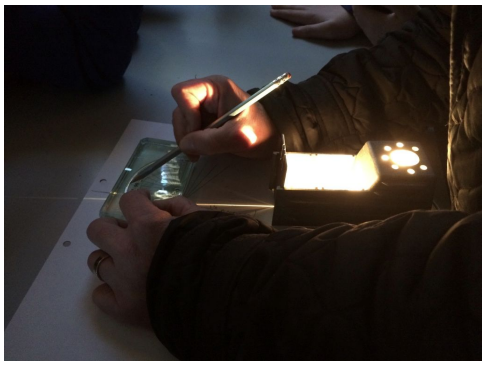
Method

1. First gather your equipment (see above) and plug in the power pack. Attach it to the light bulb and slot in the screen so that the single slit in facing down.
2. Using your pencil, draw round your perspex/glass block on the paper because it is important where the block is positioned doesn't move during the experiment. Take the block off and add in a normal (a line perpendicular to the edge of the glass

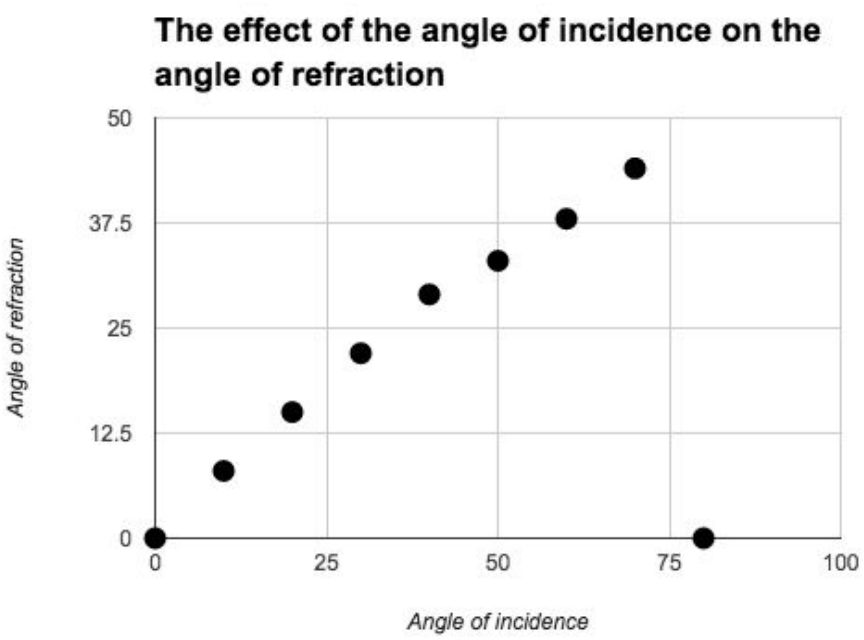


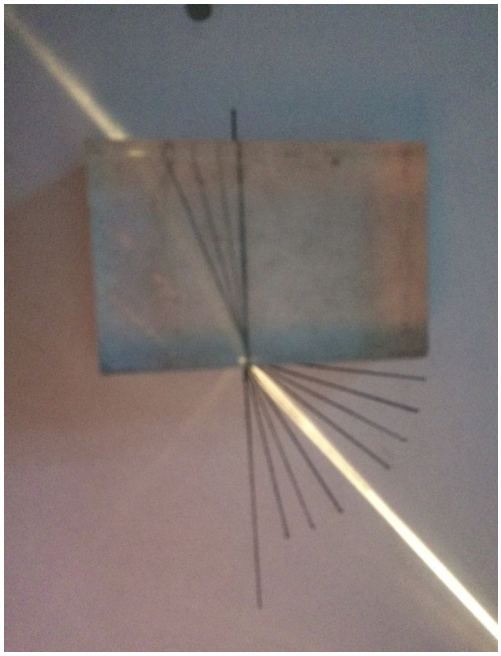
block. Put the centre of your protractor onto the point where the normal and edge of glass block meet. Draw dots every 10 degrees then take the protractor away and connect the dots to the point where the normal and edge of glass block meet (where you put the centre of your protractor).

3. Put the block back into place. Turn off all lights and close the blinds/curtains so that the only light in the room is the light from the bulb.
4. Arrange the light so that its beam is running straight along the normal, where does the light go when it meets the block? Record your results.
5. Repeat step four until you have reached 90 degrees. Remember that you are measuring *away* from the normal so the second measurement would be 10 degrees. During this experiment, you will come across a point when most of the light will be reflected, not refracted.



Results





Conclusion

This experiment shows that the higher the angle of incidence, the higher the angle of refraction. It also showed us that there is a point where most of the light is not refracted but is instead reflected.

Evaluation

In this experiment, you could easily make a mistake when measuring and if you get it a few degrees out both to start and end, you could have a completely different answer when you

finish. Also, the light is faint and difficult to see so that it is hard to see the angle that it is shining at as well as it being easy for the block to move out of its place. Finally, you might be thrown when the lights starts to reflect and write down incorrect results.