

East Renfrewshire Council: Education Department
Practitioner Moderation Template



Williamwood High School
Physics Department

Prior to the moderation exercise, please complete the following information and submit it to your facilitator with assessment evidence from one learner that you judge to have successfully attained the Es' and Os'.

Experiences and Outcomes:

SCN 3-11a By exploring the refraction of light when passed through different materials, lenses and prisms, I can explain how light can be used in a variety of applications. ✓

Learning Intentions:

- 1 • I am learning to use scientific apparatus safely with regards to myself and others.
- I am learning how to apply previous knowledge to an unfamiliar situation.
- I am applying skills developed in other subjects to science.
- I am learning how to describe and explain observations from an experiment.
- I can use scientific vocabulary and apply it correctly: medium, refraction, normal, angle of incidence, angle of refraction, ray of light (laser).
- I can name apparatus used in a scientific investigation; laser board, rectangular block, triangular prism, semi-circular block, lens, (concave and convex).
- I can summarise my knowledge and present it in a format of my choosing.

Success Criteria:

- 1 • I can carry out a practical investigation safely and effectively.
- I can record observations / results accurately
- I can use a protractor to accurately measure angles
- I can use the vocabulary: medium, refraction, incidence, normal, laser light.
- I understand the difference between reflection and refraction.
- I can explain a practical application of the refraction of light.
- I can solve practical problems by applying my knowledge of the refraction of light.

Briefly outline the context and range of quality learning experiences that have been provided making reference to the chosen design principles.

Lesson 1: Progression, Challenge and Enjoyment.

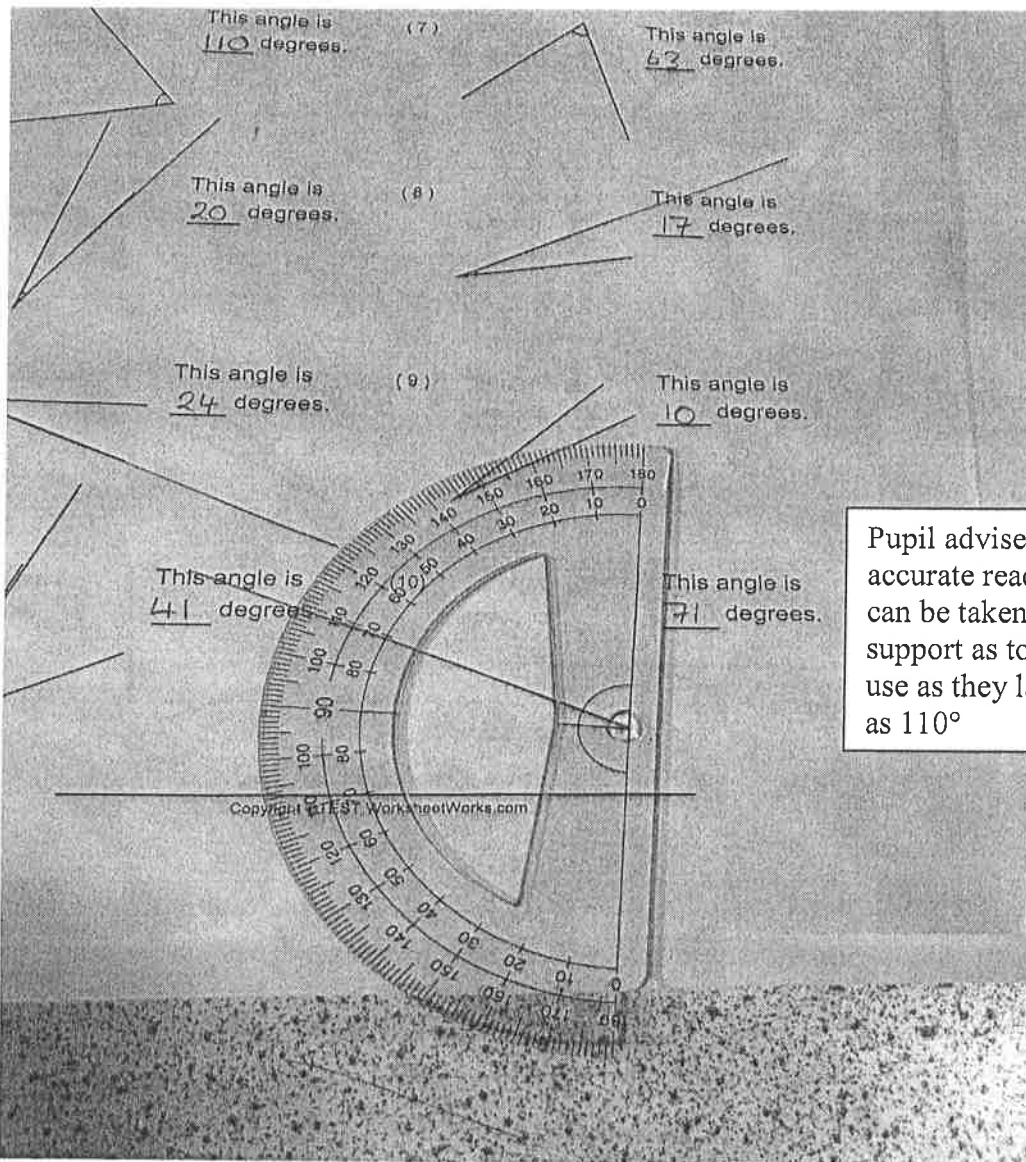
Practical work: Measuring angles work sheets following teacher demo.

Practical work: Marking on the "normal" line.

- I am learning how to apply previous knowledge to an unfamiliar situation.
- I am applying skills developed in other subjects to science.

Evidence Gathered

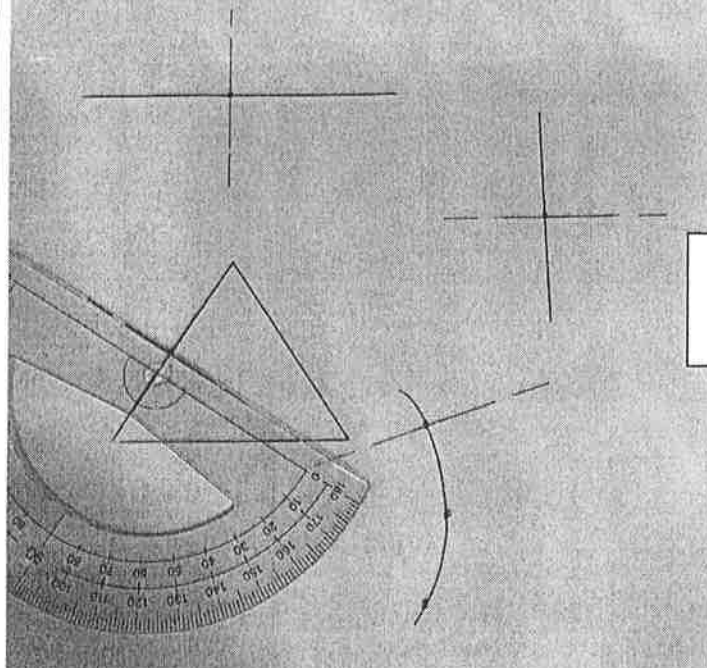
Pupil completes worksheet on measuring angles.



Refraction

Lesson 1 - Adding the "normal".

- The normal is an imaginary line at 90° to a boundary.
- Following a demo from your teacher, add the "normal" to the following lines.
- You **MUST** use a protractor.



Check that pupils can name correctly angle of incidence and angle of reflection from previous lessons. "Between the ray and the normal" – Show me boards.

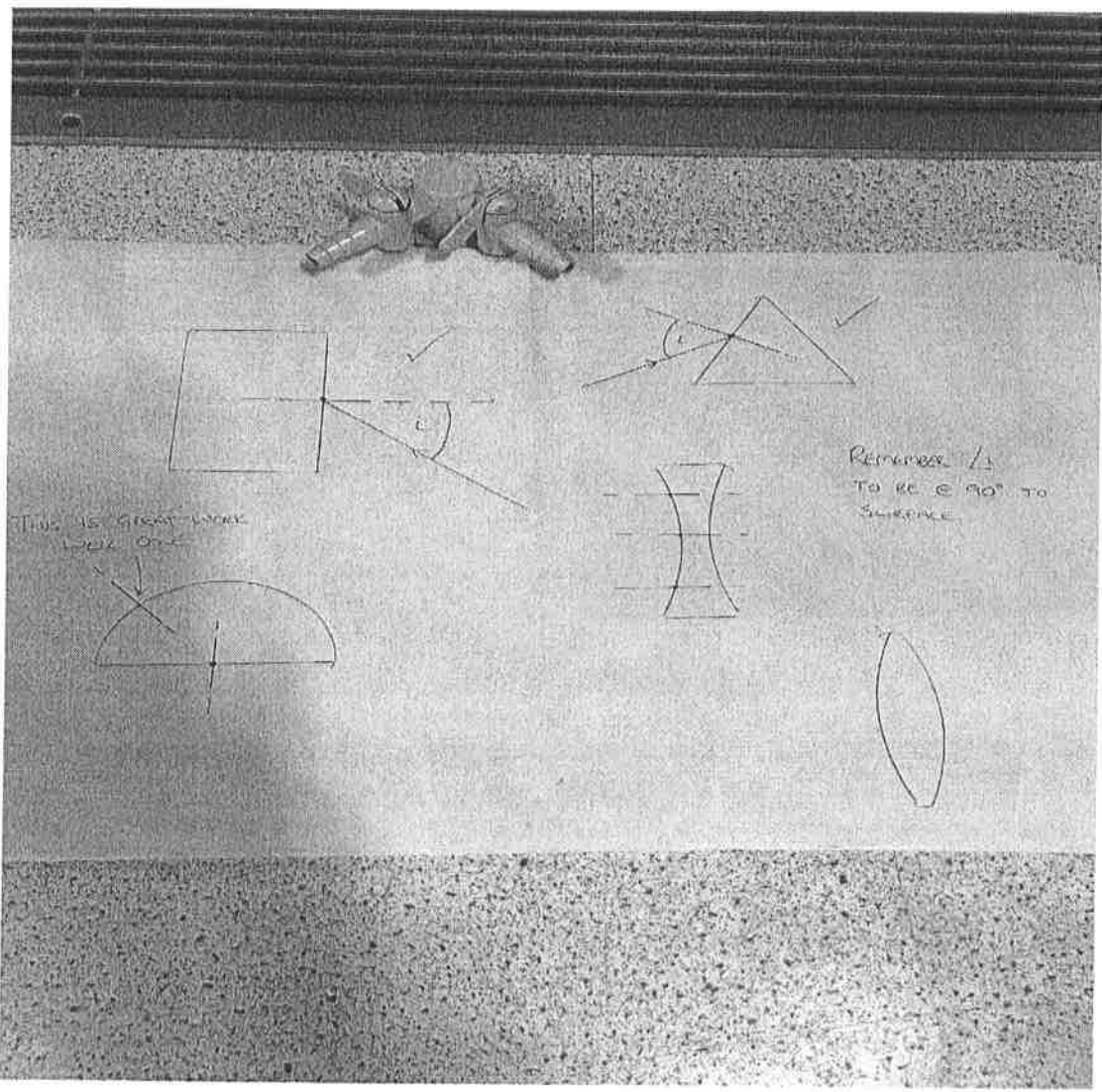
Lesson 2: Coherence, Relevance, Breadth and Depth

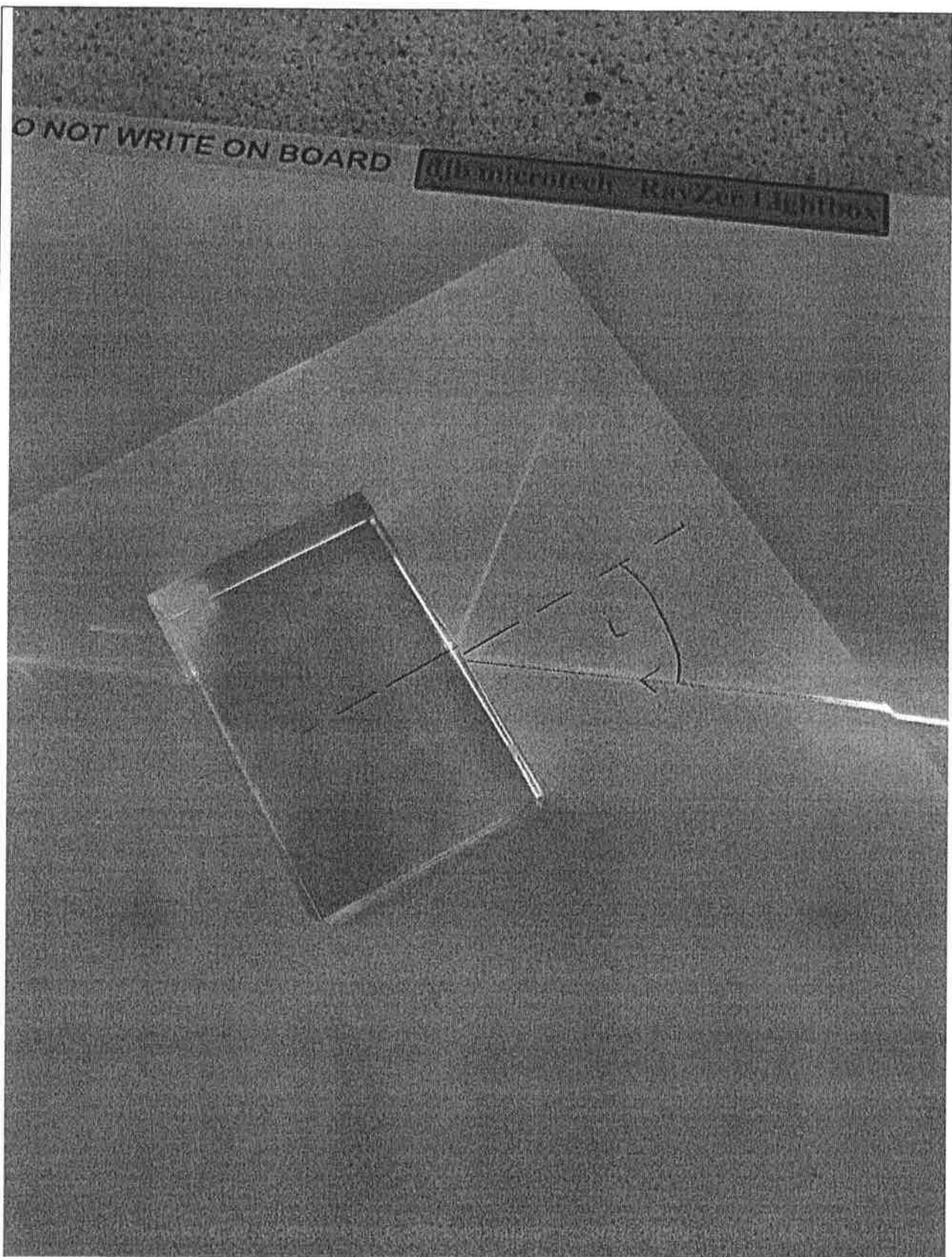
Practical Work: Draw round each of the following shapes rectangular block, triangular prism, semi-circular block (convex and concave)

Mark on the normal and draw on a line that the laser light will follow.

- I am learning to use scientific apparatus safely with regards to myself and others.
- I am learning how to apply previous knowledge to an unfamiliar situation.
- I can use scientific vocabulary and apply it correctly: medium, refraction, normal, angle of incidence, angle of refraction, ray of light (laser).
- I can name apparatus used in a scientific investigation; laser board, rectangular block, triangular prism, semi-circular block, lens, (concave and convex).

Evidence of pupil work.





Measure and label the angle of incidence

Lessons 3: Progression, Personalisation and Choice

Notes to be copied into jotter.

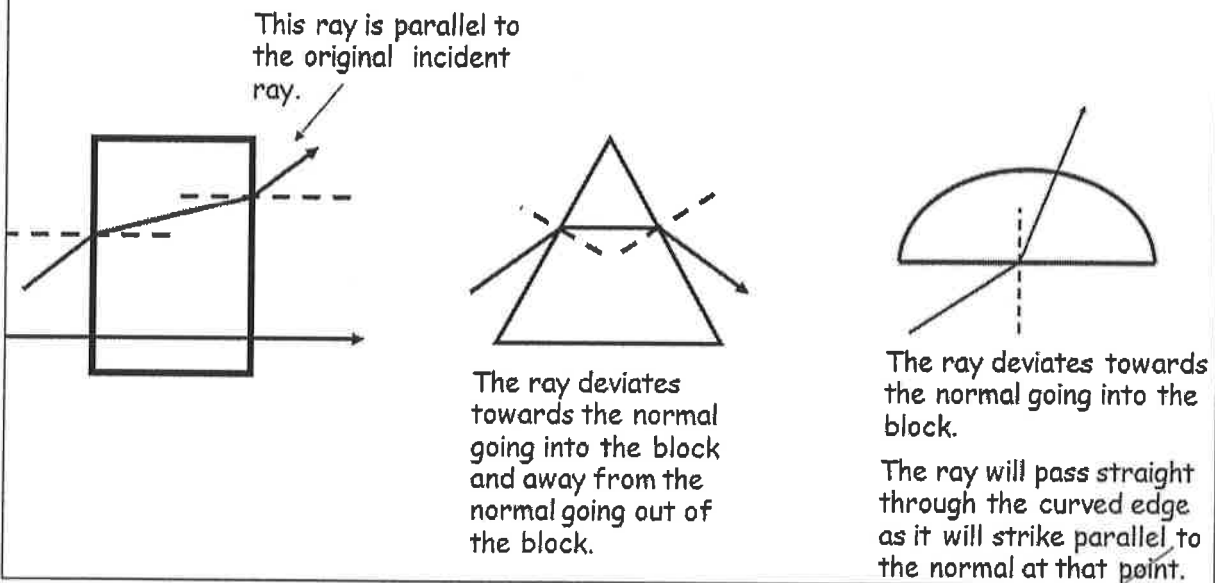
Summary of previous lessons to be produced in a format that the pupil chooses.

- I can summarise my knowledge and present it in a format of my choosing.

Summary:

REFRACTION

Refraction is the changing of the speed of light as it passes from one medium to another. This also results in a change of wavelength. It can also cause a change of direction if the angle of incidence is greater than 0° . However, the frequency is unchanged.

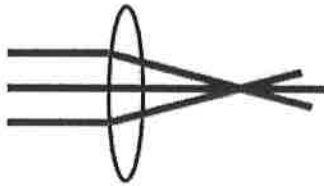


Success Criteria Achieved?

Summary:

LENSES

Convex Lens; Used to fix long sightedness.



Long sightedness is when you can clearly see far away objects but close-up objects appear blurry.

CONVE **X**

Concave Lens; Used to fix short sightedness.



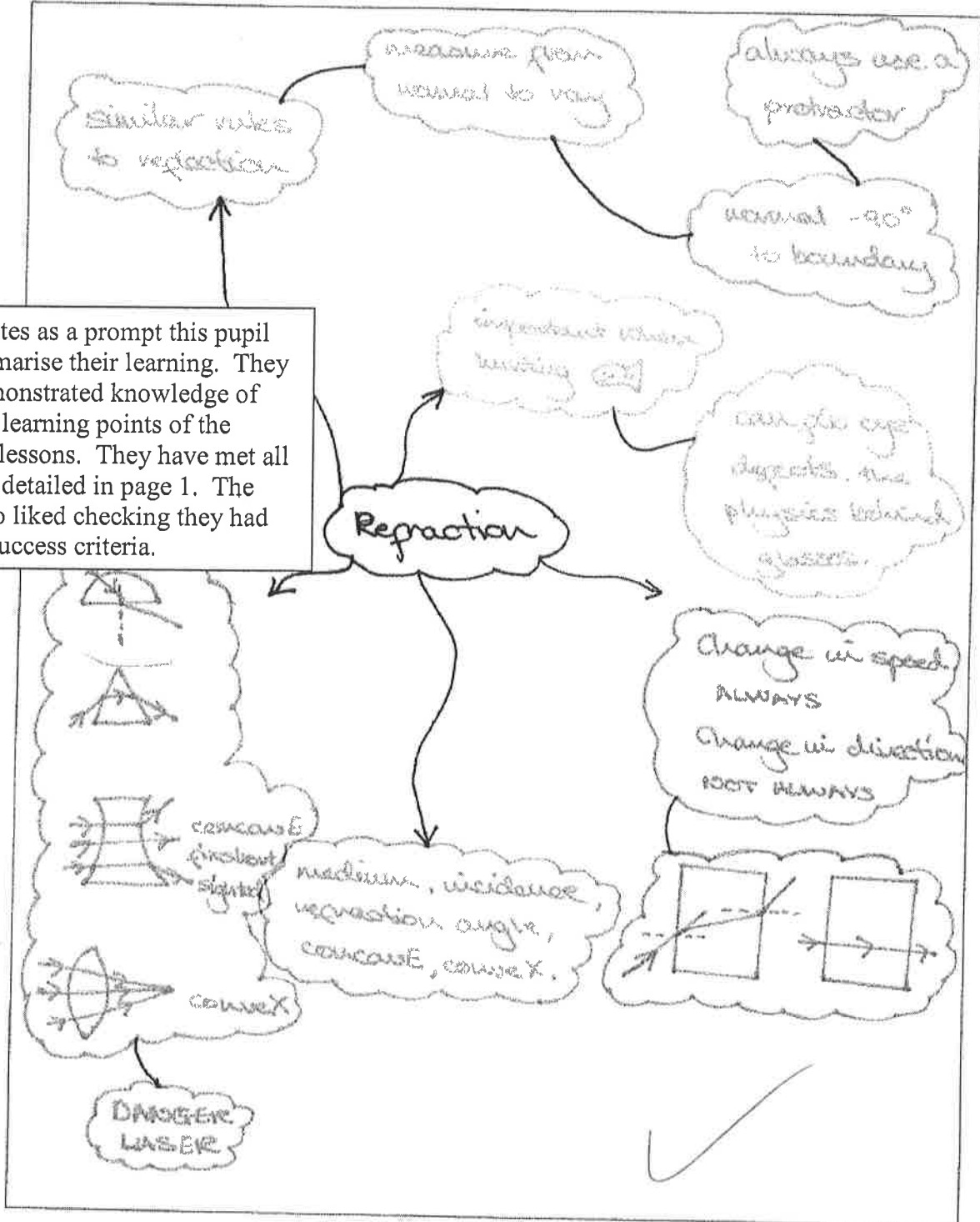
Short sightedness is when you can clearly see close-up objects but far away objects appear blurry.

CONCAV **E**

Success Criteria Achieved?

Topic 7 - Refraction - Summary

You should now utilise the space below to produce a summary of refraction. You may wish to produce concise bullet points, or draw a mind-map, or use any other useful revision technique.



Using notes as a prompt this pupil can summarise their learning. They have demonstrated knowledge of the main learning points of the series of lessons. They have met all of the LI detailed in page 1. The pupil also liked checking they had met the success criteria.

Record the range of assessment evidence that was gathered to meet the success criteria (Say, Write, Make, and Do) considering breadth, challenge and application.

Say

- Be able to use angle of incidence, angle of refraction, medium, laser light, ray diagram correctly.
- Be able to predict the change in direction of light.
- Use correct vocabulary when describing refraction of light.

Write

- Be able to draw a "normal" onto a ray diagram and mark on the angle of incidence, angle of refraction.
- Complete ray diagrams using knowledge of refraction.
- Complete HW.

Do

- Based on practical work and classroom teaching by able to solve refraction questions.
- Accurately mark on a normal and measure angle of incidence and refraction.
- Compare angle of incidence to angle of refraction.

Briefly outline the oral/written feedback given to the pupil on progress and next steps, referring to the learning intention and success criteria.

- Pupils struggled with using protractor and marking on a normal to a diagram with a curved line. Support was required.
- Initially poor numeracy skills (using protractor). Verbal support and showing was required.
- Pupil needed a lot of support to recall rules learned from refraction lesson. Measuring from the normal to the ray.
- Pupil could by end of lessons complete ray diagram for Perspex block but struggled with eye defects and applying skill to "looking at fish from above" type situations. However pupil could meet 6 out of 7 success criteria. Pupil was supported by clear diagrams provided in notes and past paper question issued.

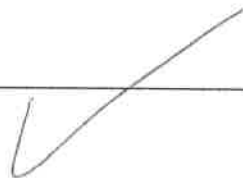
Pupil Voice:

What have you learned? How did you learn? What skills have you developed?

- I can use practical activities to learn. Be careful with laser light.
- I'm better at using a protractor now.
- I know to always measure FROM the normal TO the ray line.
- The normal is at 90° to the boundary.
- Don't say material – say medium.
- What I learned in reflection lesson is very useful for refraction.
- I still don't understand long / short sightedness.
- I like concav**E** and conve**X** – this will help me remember.
- Mind maps help me realise what I've learned.

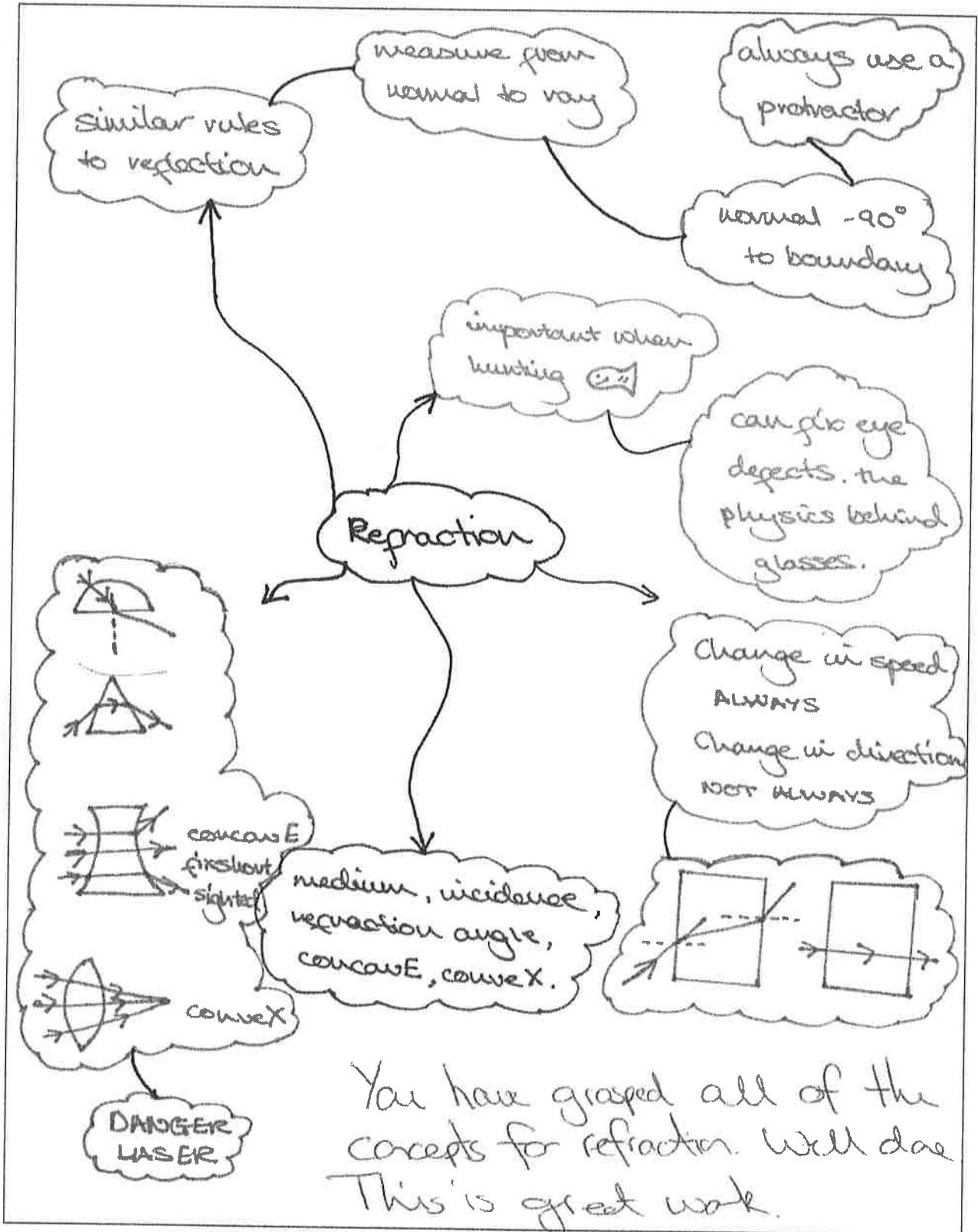
Did the learner successfully attain the outcomes? YES/NO

Yes.



Topic 7 - Refraction - Summary

You should now utilise the space below to produce a summary of refraction. You may wish to produce concise bullet points, or draw a mind-map, or use any other useful revision technique.



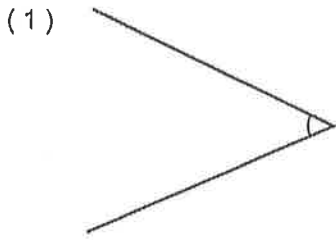
You have grasped all of the concepts for refraction. Well done
This is great work.

Measuring Angles

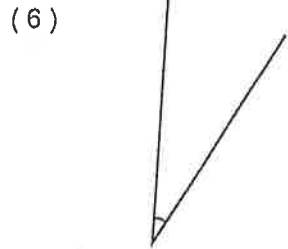
Name: _____ Date: _____



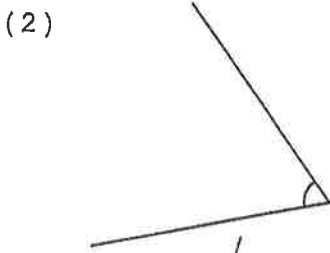
Use your protractor to extend the lines and measure each angle.



This angle is
49 degrees. ✓

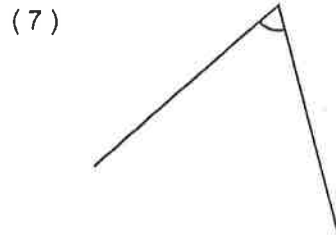


This angle is
29 degrees. ✓

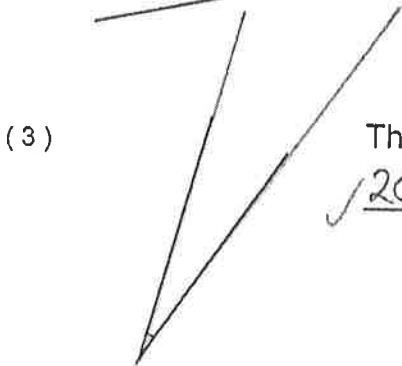


*look again at
scale.*

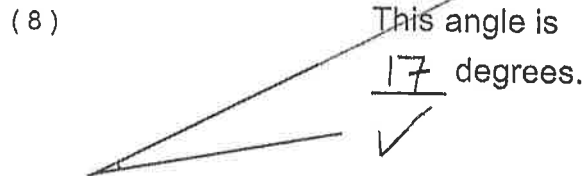
This angle is
110 degrees.



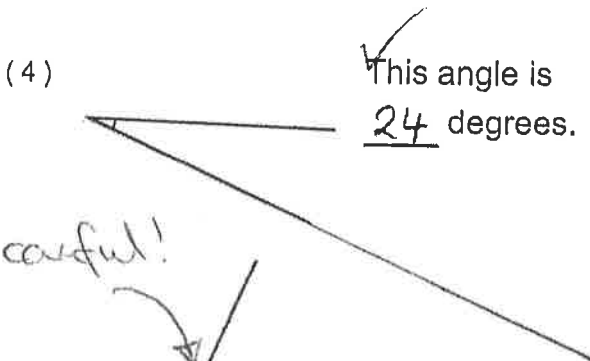
This angle is
63 degrees. ✓



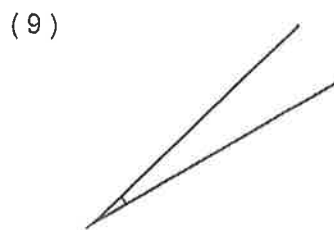
This angle is
20 degrees. ✓



This angle is
17 degrees. ✓

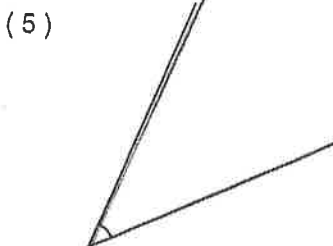


This angle is
24 degrees. ✓



This angle is
10 degrees. ✓

be careful!



This angle is
41 degrees. ✓



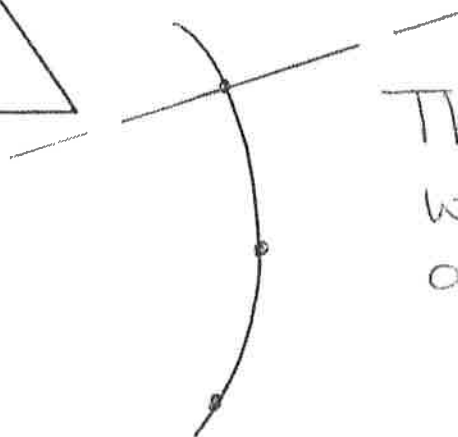
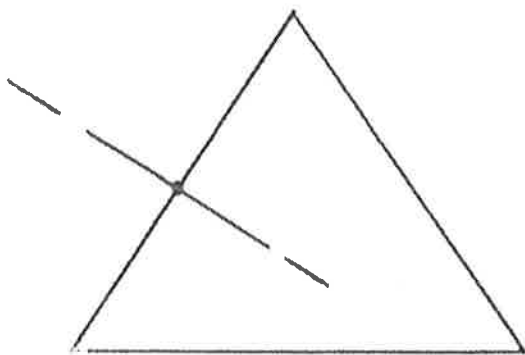
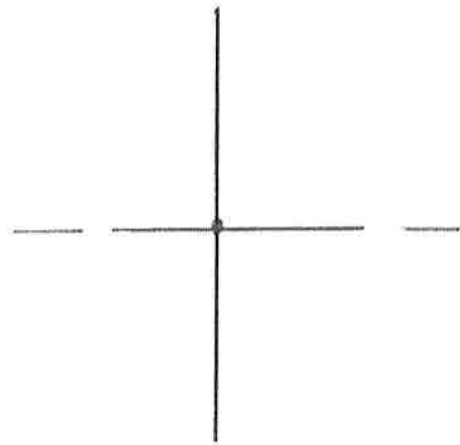
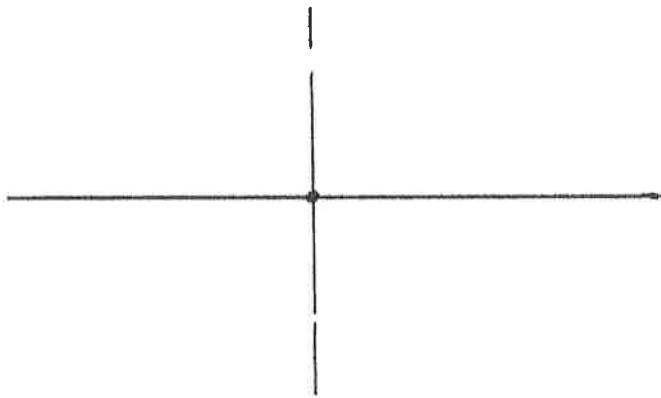
This angle is
71 degrees. ✓

*extending the line
to suit protractor helps.*

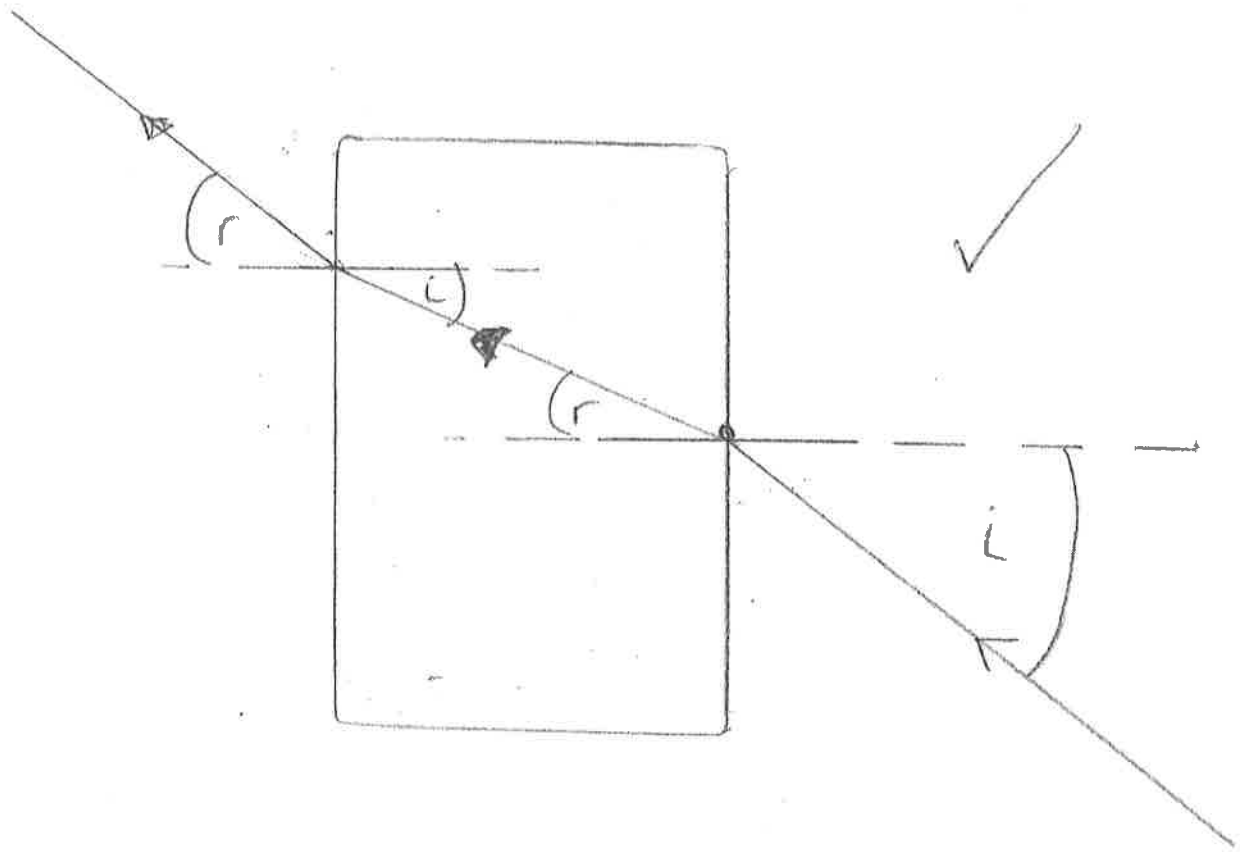
Refraction

Lesson 1 - Adding the "normal".

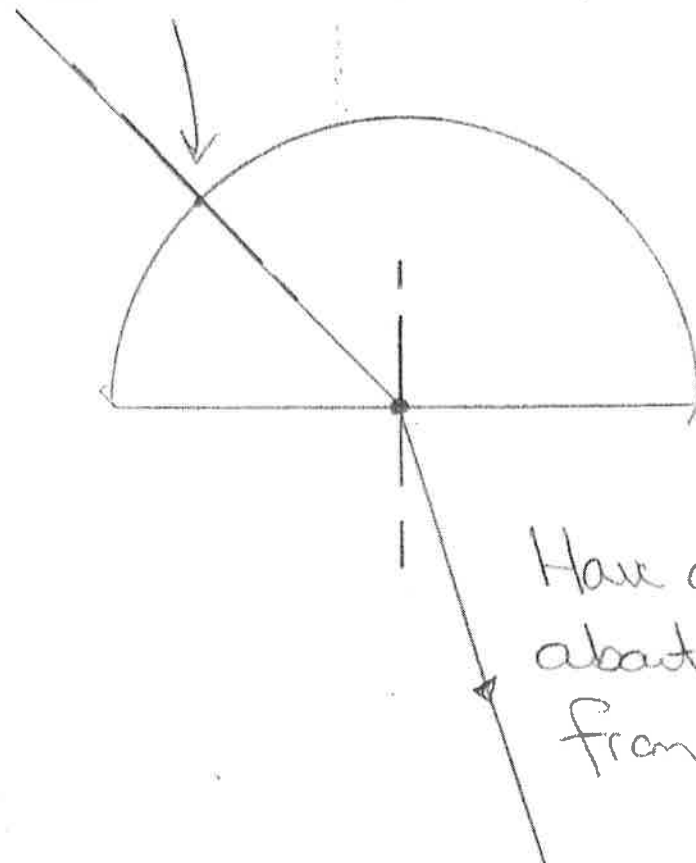
- The normal is an imaginary line at 90° to a boundary.
- Following a demo from your teacher, add the "normal" to the following lines.
- You **MUST** use a protractor.



This is good work. Now move on to other sheet.



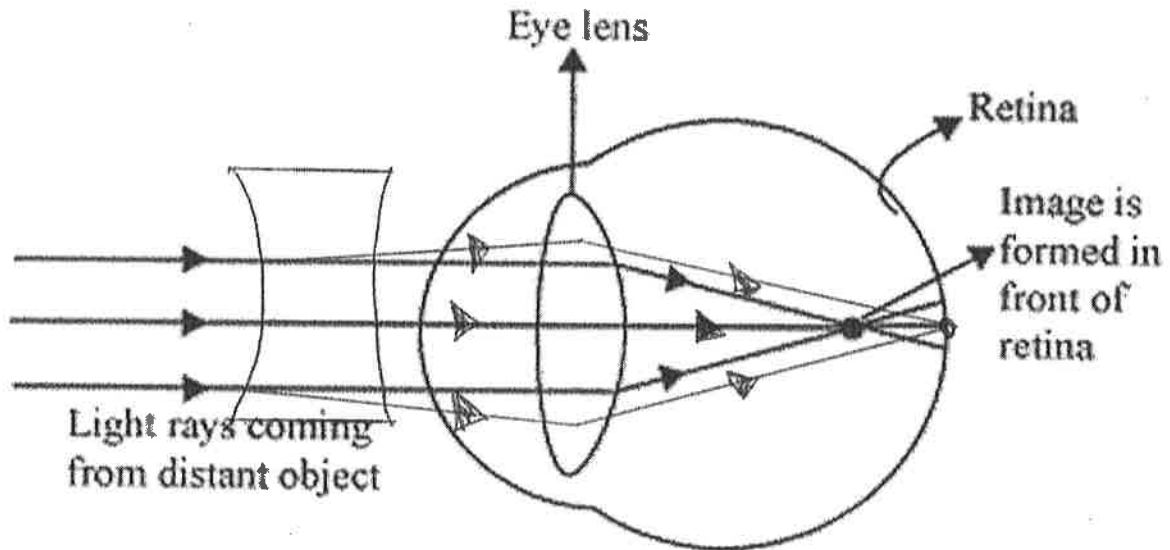
THIS IS GREAT WORK
WELL DONE



Have a think
about what happens when you go
from glass to air

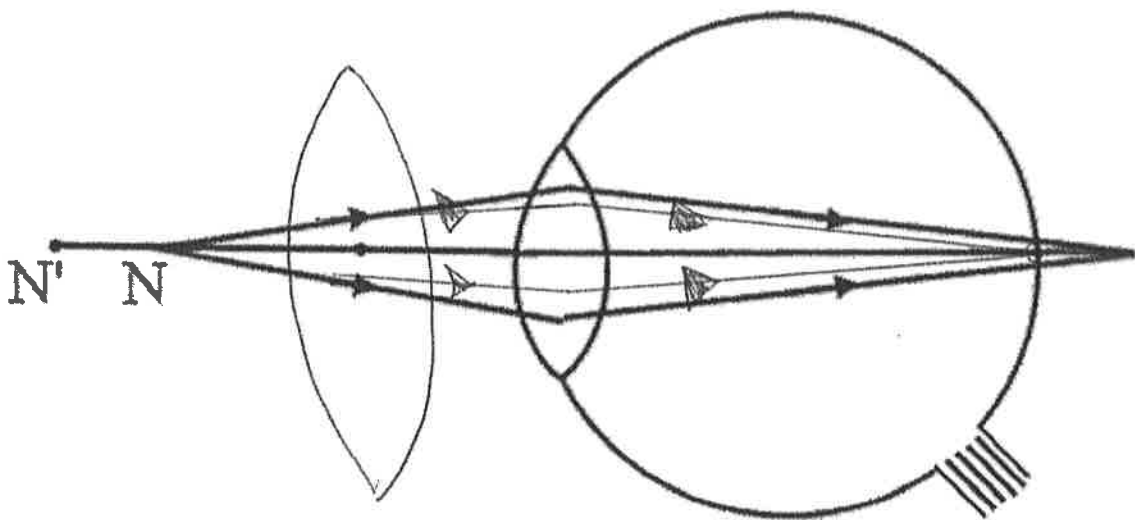
Add a concave or convex lens to the below diagrams to show how the sight defects can be corrected.

Short Sighted

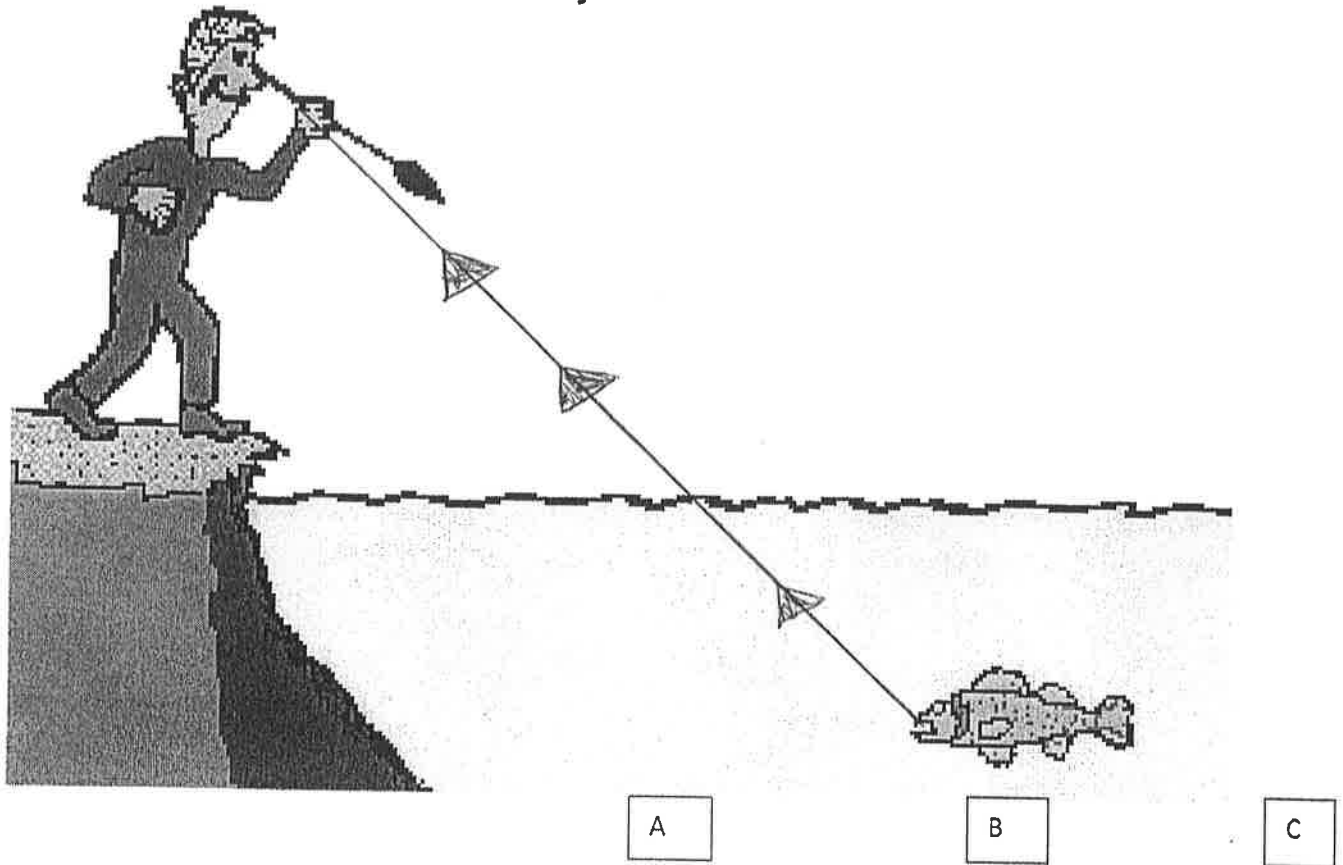


This is great work. You can apply your knowledge of concave and convex lenses to solve problems.

Long Sighted



Add a ray diagram showing the path a ray of light takes going from the fish to the hunter's eye.



What position does the hunter think the fish is at?

Remember there is a change in direction when light goes from one medium to another.

Start by adding in the normal line and think about what light did going from glass block to air.