Refraction of Light Lab

Purpose - to use Snell's Law to determine the indices of refraction of various substances and find the relationship between velocity and index of refraction.

Procedure - for all stations:

1.) Complete the table below **using all of the stations**.

Table 1 -

Station	Material	Angle of Incidence (θ_i)	Angle of Refraction (θ_r)	Index of refraction (n_r)	Velocity of light in medium (v_s)
A	Lucite				
B	Glass				
C	Water				

2.) **Be sure to use an incident angle of greater than $35°$ for all media.**

3.) Set a ray box for your group to produce a single ray of focused light as shown by your teacher.

4.) Draw the medium and light rays (including angles) for each medium.

Station (A) Lucite

1.) Place the block of Lucite on your blank page and trace the block. Draw the incident ray.

2.) Mark the point where the ray exits the Lucite on the far edge of the block.

3.) Remove the Lucite, join the point where the incident ray entered the Lucite to the point where it exited with a line, this is the refracted ray.

4.) Draw the normal line where the incident ray struck the Lucite, draw it on both sides of the Lucite.

5.) Carefully measure and record θ_i and θ_r.

Station (B) Glass

1.) Place the block of glass on your blank page and trace the block. Draw the incident ray.. Repeat the same procedure as Station A using the glass block.

Station (C) Water

1.) Place the water dish on your blank page and trace the dish. Repeat the same procedure as Station A using the water dish.

Station (D) Critical angle of water

1.) Set the ray box so light enters along the curved surface of the water dish and the protractor is set along the flat face of the dish with the zero point matching the place where the light exits the water dish.

2.) Increase your angle of incidence until no light passes out of the water dish, be sure to keep the zero point on the protractor matching the place where the light exits the water dish.

3.) Record the angle of incidence which causes internal reflection to occur.

Station (E) Index of Refraction of Lucite from Graphing

1.) Using a Lucite block complete the table below.

Table 2 -

θ_i	θ_r	sin θ_i	sin θ_r
10			
20			
30			
40			
50			

2.) Prepare a graph of **sin** θ_i vs **sin** θ_r.

3.) On your graph show a slope calculation to determine the index of refraction of Lucite.

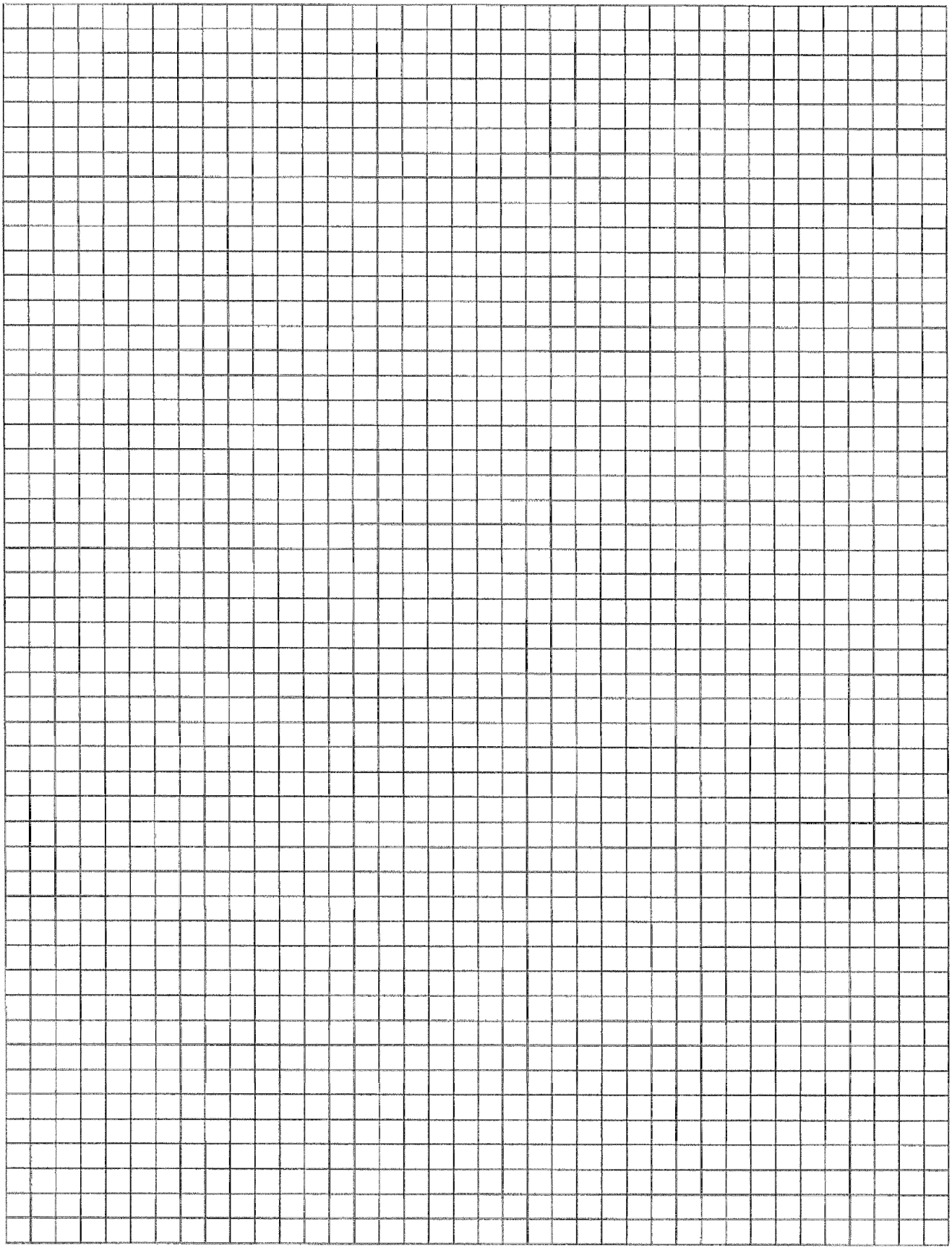
Discussion -

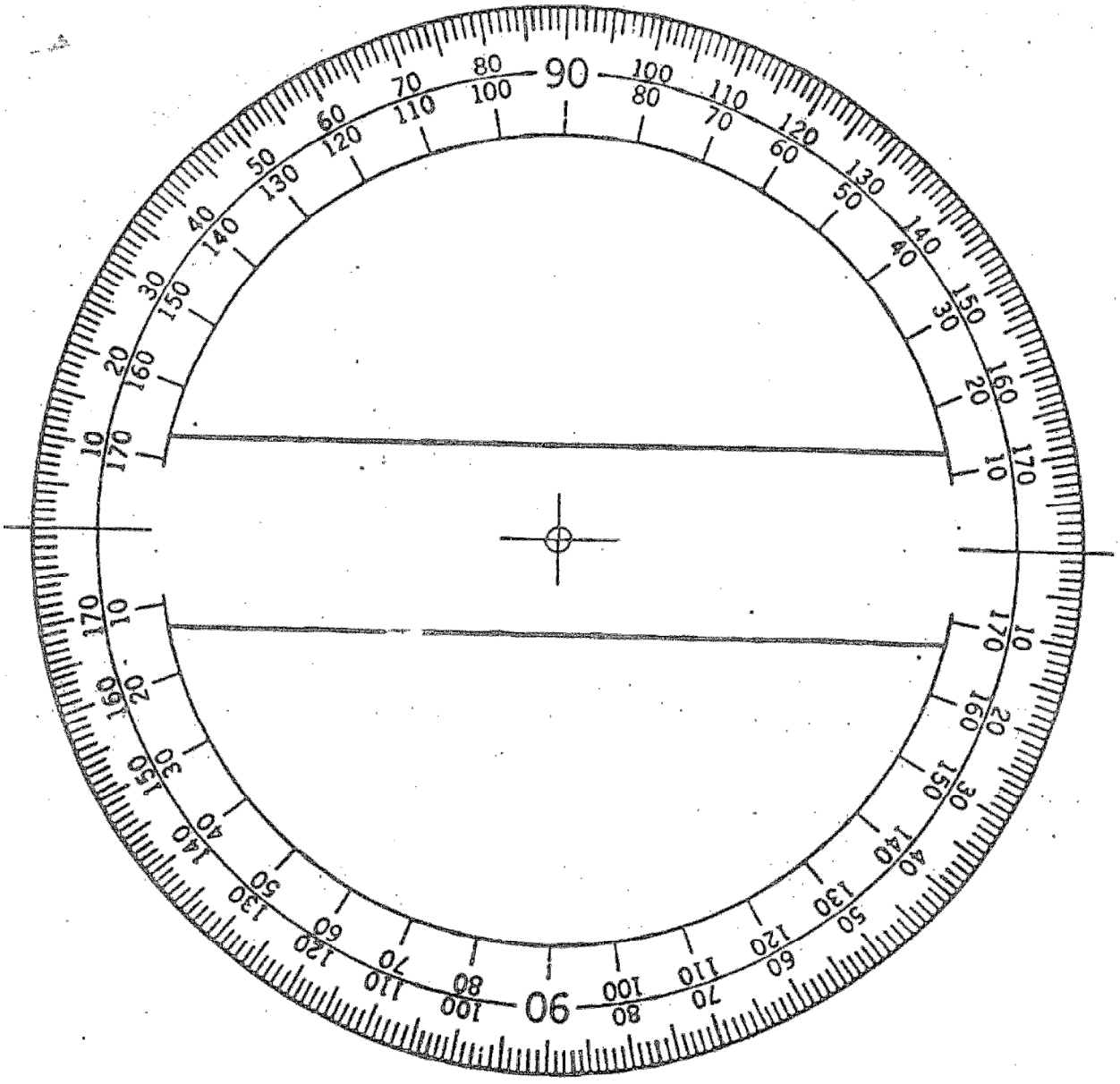
1.) Why do we not have to factor in the refraction of light in the containers for the liquids?

2.) Define critical angle.

3.) Why in your graph of part E does n_i not affect the slope greatly?

Conclusion - Don't forget a meaningful conclusion to this lab.




90
90