Polarization Study **Name: _____**

Purpose: To study various aspects of polarization
Materials:

- 3 polaroids
- Calcite crystal (Icelandic spar)
- LCD calculator ('liquid crystal display' - you most likely have this kind)

Procedure:
You will need to record your observations for each step. On a separate sheet of paper, number the investigations you will do. Include a simple labelled sketch to remind you of what you do. Below the sketch, record in words what you observed.

Note: the direction of polarization is noted on the Polaroids by 'slashes' on either side of the lens.

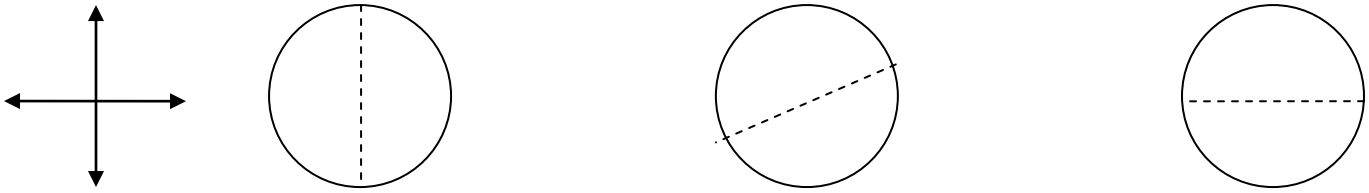
1. Take 1 Polaroid and hold it up to the light. Note the intensity of the light now.
2. Take 2 Polaroids and cross them. Hold them up to the light and rotate one of the Polaroids all the way around. Note the orientation of the polarizing planes.
3. Position 2 Polaroids in a manner such that **no** lights gets through. Note the direction of the polarizing plane of each lens. Keep the 1st two lens oriented in this way. Now put a third Polaroid in between them at an angle to the first two.
4. Place a calcite crystal on a page of written text. Rotate the crystal around.
5. Place a Polaroid over top of the crystal. Leave the crystal in place and rotate the Polaroid.
6. Place a Polaroid over top of a calculator with a LED readout displayed. Rotate the Polaroid.

Criteria **Inquiry**	Level 1 50 – 60%	Level 2 60 – 70%	Level 3 70 – 80%	Level 4 80 – 100%
Criteria: A1.5 - able to conduct inquiries independently and collect Accurate data	← Increased: assistanced and/or errors and/or diagrams missing			Successfully completed with no assistance. Documented appropriately with diagrams

Discussion: (Reading 10.5 and 10.6 in text will aid in your ability to answer correctly).

1. Why does the intensity of the transmitted light change as you rotate the Polaroids around? A word answer is okay. It is even better (more marks) if you can use light ray diagrams as well. You can work with the diagram below if you wish. Any extra writing can be done on a separate sheet numbered appropriately. **4 marks**

2. Why does light pass through 3 Polaroids positioned in the manner described in the procedure. You may find it helpful to use the diagram below. Any extra writing can be done on a separate sheet numbered appropriately. **4 marks**



3. Why does the calcite crystal produce 2 images? Why does one image rotate around the other? Which image is produced by the 'o' ray and how do you know?
3 marks

4. Why does a Polaroid cut only one image at a time from the calcite crystal? **2 marks**

5. Why did the LCD readout of your calculator disappear as you rotated the Polaroid?
2 marks

Inquiry **Total** **/ 15** = **/10**

Criteria:

A1.8 synthesize, **analyse, interpret**, and evaluate qualitative and quantitative **data**;

E2.3 conduct inquiries involving the diffraction, refraction, **polarization**, and interference of light wave