INVESTIGATION 1

PURPOSE

To investigate the use of diffraction patterns as an indirect method of determining the arrangement of atoms in materials.

PROCEDURE

a. Orient the slide provided by the instructor so that the ICE logo is on the right-hand side. Using a stereoscope or microscope, look carefully at the arrays on the slide and make a sketch in the space provided in Table 1 of the Data Sheet.

b. Connect the battery snap to the red LED and place it at least a meter away from you. View the LED through the different regions of the slide and sketch the diffraction patterns that you see in the appropriate spaces in Table 2.

FOLLOW-UP QUESTIONS

1. Consider your sketches of arrays *a* and *c*. How are they similar? How are they different?

2. Discuss how the difference between arrays *a* and *c* affect the diffraction patterns that are produced.

3. Consider your sketches of arrays *b* and *d*. How are they similar? How are they different? How do they both differ from the arrays *a* and *c*?

4. Discuss how the differences between arrays *a* and *c*, and between *b* and *d*, affect the shape of the diffraction patterns that are produced.

5. Discuss how the difference between arrays *b* and *d* affects the diffraction patterns that are produced.

6. Consider the remainder of your sketches in the order *e*, *g*, *h*, and *f*. What change in the arrays for this sequence do you note?

7. Discuss how the sequential changes in the arrays *e*, *g*, *h*, and *f* affect the diffraction patterns that are produced.

8. If we were to call the arrays “lattices”, what is the meaning of the phrase “reciprocal lattice effect” with respect to the diffraction patterns produced by them?

Name _____
Date_____Period_____

INVESTIGATION 1
DATA SHEET

Table 1

a	**b**
c	**d**
e	**f**
g	**h**

Table 2

a	**b**
c	**d**
e	**f**
g	**h**