FLINN SCIENTIFIC

Name_____

Seeing Polymers in a New Light Worksheet

1. Describe how the amount of light that is transmitted through two polarizing filters changes when the second filter is rotated. (a) What is the alignment of the "slits" on the two filters when the maximum amount of light passes through? (b) What is the alignment of the slits when all of the light is blocked?

2. In the first box below, use colored pencils to sketch and color the birefringence pattern observed for the plastic CD case (Box A).

Box A **Box B** **Box C**

3. In the second box, mark off and label the areas of the plastic case in which the polymer molecules are in an amorphous versus a partially crystalline state, respectively.

4. Plastic CD cases are manufactured by a process called injection molding—the melted polymer is forced through a narrow nozzle into a mold. The polymer flows into the mold, where it cools and solidifies. The mold then opens and the plastic object is ejected. In the third box, draw and label the regions where (a) the polymer flows into the mold and (b) the polymer molecules have been "frozen" into a partially crystalline arrangement.

5. Explain why some areas of the CD case are dark when viewed between "crossed" polarizing filters.

6. How and why does the birefringence pattern of the plastic "dumbbell" change after it has been stretched? Explain how "stress" of this type may orient the polymer molecules.