FLINN SCIENTIFIC

Name_____

Pre-Lab Questions

1. Other than the products listed in the introduction, what are three additional applications of liquid crystals in everyday life?

2. Liquid crystals can be divided into three phases: thermotropic, lyotropic and metallotropic. Briefly describe the primary characteristic of each phase.

3. Most liquid crystal mixtures require a director molecule. What is the purpose of this molecule? Which of the liquid crystal components is the director in this lab?

4. A liquid crystal mixture is heated to its maximum detection temperature. Describe how this increase in temperature would affect the pitch, wavelength and color of the liquid crystals. Would the crystal helix be more tightly packed or more loosely packed?

Liquid Crystal Data Sheet

Assigned solution numbers: _____ _____

A. Preparation of Liquid Crystals

Solution #	Appearance of solution in vial	Appearance of liquid crystal sandwich
4		
8		

B. Light Reflection and Transmission

Solution #	Can be heated in hand?	Appearance of crystals in front of a white light	Appearance of crystals on a dark surface

C. Liquid Crystals as Temperature Indicators

Solution #	Observed color change	Temperature of color change (° C)	Estimated Temperature Range of liquid crystal (° C)

D. Transition Temperature

Observations of Aquarium Strip

Post–Lab Questions

1. Based on your data, and the data collected from the rest of the class, what can you conclude about the ratios of liquid crystal components and their temperature ranges? How does molecule size (figure 3) support your conclusion?

2. Did the liquid crystals look the same when placed on the white versus dark surface? If they did not, why would the result be different?

3. When the liquid crystals were heated they exhibited a series of color changes for a few degrees then a single color persisted. Why did they liquid crystals not continue to change? Did both of your liquid crystal mixtures produce the same color scheme?

4. Other than temperature, pressure and concentration, what other property can be used to affect the orientation of liquid crystals? (Hint: think about how ions interact in solution).