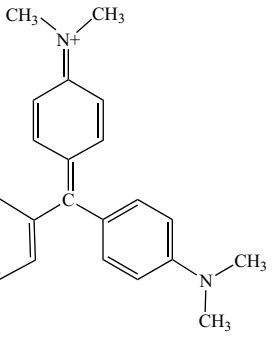
FLINN SCIENTIFIC

Name_____

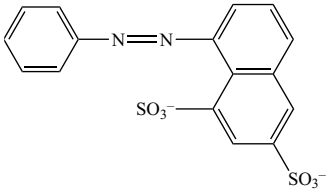
Pre-Lab Activity

The five structural formulas—A–E—on the right are the formulas for each of the five dyes used in this activity. The names of each dye and their approximate molecular weights (MW) are listed in the chart below. Look carefully at each structural formula and find the charge that each dye molecule possesses. Finish the chart by filling in the Charge column.

	Dye Names	MW	Charge
A	Malachite Green	(329)	
B	Orange G	(452)	
C	Safranin O	(315)	
D	Alizarin Red S	(360)	
E	m-Cresol Purple	(404)	



A



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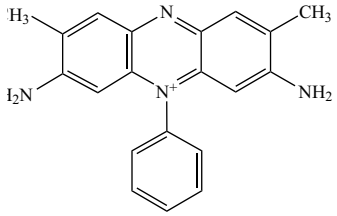
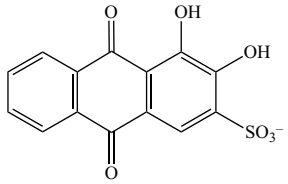
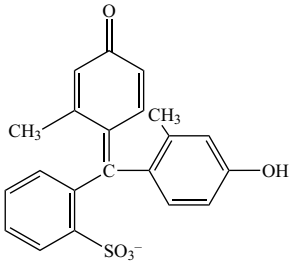


C



D



E

Based on the information in the chart and the structural formulas, answer these questions:

1. Predict the direction of migration for each of the known dye samples.

2. Which dye do you predict will move through the gel the fastest? The slowest?

3. Write a brief function for each of the parts used in gel electrophoresis:
   a. Agarose gel

   b. Electrophoresis buffer

   c. Wells in the gel

   d. Electric current

4. List one important safety precaution that must be followed when performing any type of gel electrophoresis.

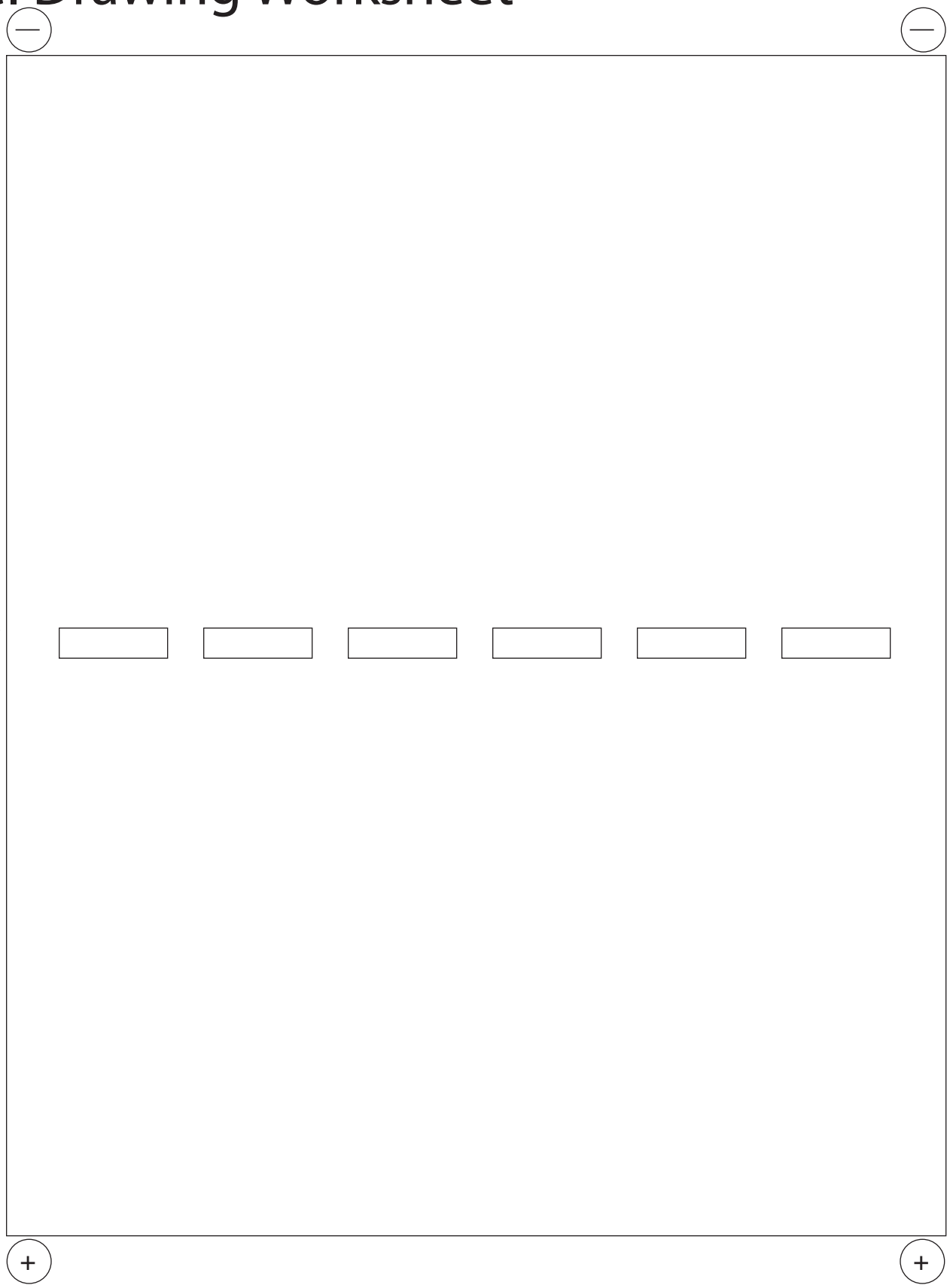
5. Use Figure 1 as an example and construct a data table, with five labeled columns and six rows on a separate sheet of paper.

Dye Name	Dye Well #	Migration Distance (mm)	Migration Direction (+/–)	Dye Molecules "Speed" Rankings

Figure 1.

Name_____

Gel Drawing Worksheet



Name_____

Post-Lab Questions *(Answers may be written on the same sheet of paper as the Data Table or in the spaces provided below.)*

1. Which dye(s) traveled the farthest? (Use data to support your answer.)

2. How did the results differ from your predictions regarding migration direction, which dye(s) would travel the fastest, and which dye(s) would travel the slowest? Be specific.

3. Why didn't all the dyes travel the same distance or the same direction from the wells? Explain your answer.

4. Why did the two positively-charged dyes travel almost the same distance? (Use a mathematical calculation to support your answer.)

5. Of the three negatively-charged dyes, why do you think the "heaviest" was the second fastest dye? (Hint: Look closely at the structural formula.)

6. List the dyes that were used in your "unknown" dye sample.

7. Write one reasonable explanation to support the answer written for Question #6.

8. Explain the basis for the "speed" rankings given to the known dye samples in the Data Table.

9. List three errors that could affect the outcome of any gel electrophoresis procedure.

10. Briefly summarize how gel electrophoresis is used to separate molecules.