Exploring Diffusion Lab
Student Activity

Name _____

Class _____

Open the TI-Nspire document *Diffusion Data Collection.tns.*

In this activity, you will explore the movement of molecules through diffusion and the effects of concentration gradient on diffusion rate.

Move to pages 1.2 through 1.6.

Q1. Riding a bike down a hill is analogous to active transport.

Q2. Why are you going to use a conductivity probe in this lab experiment?

Q3. Which of the following shows the greatest concentration gradient?

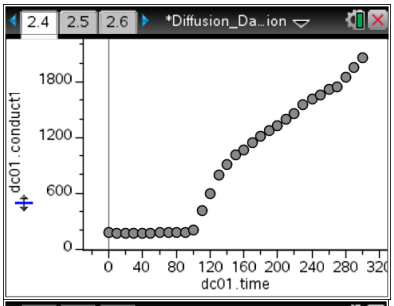
Q4. The water in a stream or river flows in a manner most similar to passive transport.

Q5. You can place a limp piece of celery in water, and it will become crisp again. Which BEST explains this?

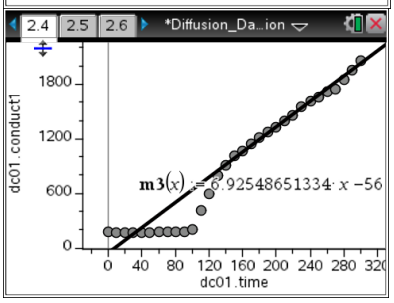
Move to pages 2.1 through 2.7.

1. To conduct the experiment and collect data, begin by pouring about 250 mL of distilled water into the beaker.
2. Tie off one end of the dialysis tube with dental floss. To tie off the dialysis tubing, twist one end of the tube, fold it over on itself, loop a knot of floss over the doubled-over tube, and tightly secure the floss.
3. Measure 15 mL of distilled water, and use a funnel to pour it into the dialysis tube.
4. Tie off the other end of the dialysis tube so you have a bag. Be careful that no liquid can leak out of the ends of the bag.
5. Plug in the conductivity probe, and set the toggle switch to the middle setting.
6. On page 2.4 set up a data collection for every 10 seconds for a total of 5 minutes.

7. Place the probe into the beaker of water, let the reading stabilize, click "start," and then place the dialysis bag into the beaker. The data should be displayed on Page 2.5.



8. When the data collection is over, use the **Movable Line** tool to draw a line of best fit through the linear portion of the data. The slope of the best-fit line is the diffusion rate.



9. Record the diffusion rate in the data table on Page 2.7 of the handheld.
10. Repeat the procedure three more times for each of the three remaining salt solutions, recording data on Page 2.7.
    - The water goes in the beaker, and the salt solutions go in the dialysis tubes.
    - Use a new dialysis tube and fresh beaker water each time.

Move to pages 3.1 through 3.6.

Q6. Which molarity gave the greatest rate of change?

Q7. Which molarity would you have EXPECTED to give the greatest rate of change? Which molarity would you have EXPECTED to have the least rate of change?

Q8. If you had used a 0.5 M salt solution in the tubing, how would the rate of diffusion have compared to the other rates you measured?

Q9. Other than the molarity of the salt solution, what is another experimental variable that could be applied to alter the rate of diffusion?

Q10. Predict how your results would have been different if you had put distilled water into the dialysis tube and the salt water into the beaker.