Name: _____ Date: _____

Student Exploration: Effect of Environment on New Life Form

Vocabulary: controlled experiment, hypothesis, variable

Prior Knowledge Question (Do this BEFORE using the Gizmo.)
Johnny likes to watch the birds that visit his birdfeeder. His favorite bird is the cardinal. How could Johnny determine which kind of birdseed cardinals prefer? Explain your answer in detail.

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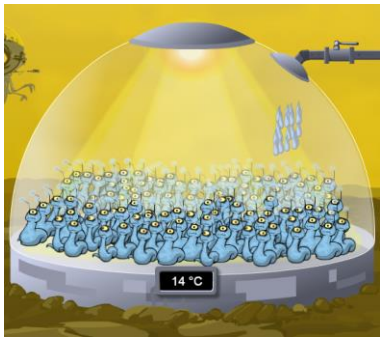
Gizmo Warm-up
Imagine a new alien life form has just been discovered on a nearby planet. Your job is to study this new life form. The *Effect of Environment on New Life Form* Gizmo shows 100 individuals that have been transported from the planet to your laboratory.



1. The new life form can have three shapes: thin, medium, and thick. How many of each shape are there now?

   Thin: _____ Medium: _____ Thick: _____

2. Click **Play** ( ). Do the numbers of each type of alien change over time? _____

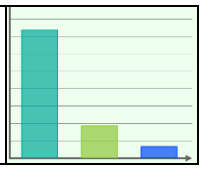
3. Click **Reset** ( ). A **variable** is something that can be changed in an experiment. Look on the SIMULATION pane. What are the three variables you can change in your laboratory?

   _____

4. Which of these variables do you think will have the greatest effect on the aliens? Explain.

   _____

   _____

Activity: **Controlling variables**	Get the Gizmo ready: • Click **Reset**. • Select the BAR CHART tab. • Turn on **Show numerical values**.	

Question: What variables control the shape of the alien life forms?

1. Record: Record the starting numbers of thin, medium, and thick aliens:

   Thin: _____ Medium: _____ Thick: _____

2. Observe: Change the **Light** to 0 hours/day, the **Water** to 1 drops/hr, and the **Temp.** to 0 °C. Click **Play**, and observe the aliens until the numbers are stable. Click **Pause**.

   A. How many of each type of alien are there now?

      Thin: _____ Medium: _____ Thick: _____

   B. Click **Reset**. Change the **Light** to 24 hours/day, the **Water** to 20 drops/hr, and the **Temp.** to 30 °C. Click **Play**. How many of each type of alien are there now?

      Thin: _____ Medium: _____ Thick: _____

3. Analyze: From the observations you made above, can you state exactly why the aliens changed their shape? Why or why not?

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4. Form a hypothesis: A **hypothesis** is a proposed explanation for an observation. Hypotheses must be testable. Write a hypothesis about what causes the aliens to change their shape.

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(Activity continued on next page)

Activity (continued from previous page)

5. Design an experiment: A **controlled experiment** is an experiment in which only one variable is changed at a time.

   Describe a controlled experiment you could use to test your hypothesis. _____

   _____

   _____

6. Run the Gizmo: Run a controlled experiment to test your hypothesis. Describe the results of your experiment below.

   _____

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7. Run the Gizmo: Run controlled experiments to determine the effect of each variable.

   A. How does changing the amount of light affect the aliens? _____

      _____

   B. How does changing the amount of water affect the aliens? _____

      _____

   C. How does changing the temperature affect the aliens? _____

      _____

8. Draw conclusions: Which variable or variables affected the aliens? _____

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9. Think and discuss: Why is it important to only change one variable at a time? If possible, discuss your answer with your classmates and teacher.

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