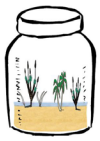
Name: _____ **Class:** ___ **Date:** _____

Monitoring an Ecosystem in Jar



Learner Outcomes:

- Analyze an ecosystem to identify biotic and abiotic components, and describe interactions among these components
- Monitor a local environment, and assess the impacts of environmental factors on the growth, health and reproduction of organisms in that environment.

Background Information: Energy from the sun drives almost all ecosystems on the earth. In a closed system such as Earth, water cycles and recycles by evaporating, condensing and then falling down as rain or snow. The oxygen and food created by plants is consumed and by animals. Animals in turn produce carbon dioxide needed for plants to grow, creating an endless cycling of energy and nutrients. Sometimes, there can be an imbalance in either the biotic or abiotic factors in an ecosystem that cause the ecosystem and the populations within it, to change over time.

Purpose: Students will create a small "jar" ecosystem and monitor changes in the ecosystem over time to determine what factors influence populations in an ecosystem.

Hypothesis:

Manipulated Variable: _____
Responding Variable: _____
Controlled Variables: _____
_____

Hypothesis: _____
_____
_____

Materials:

Misc materials brought by student

Glass jar	Ruler	Grow light
Soil or sand	Aquatic plant	Thermometer
Water	Birdseed	Marker

This investigation / activity has been adapted from:
Bullard J, Krupa G, Krupa M, et al. *Science Focus 7*. Toronto, ON: McGraw-Hill Ryerson.

Procedure:

- Students will choose which variable they will manipulate in this experiment. (i.e. adding water (how much?) amount of light, closed or open jar, sand or soil, etc.)

1. Place 5 cm of soil or sand and 7.5 cm of water in a large jar.
2. Place the jar near a window or grow light and let the water settle overnight.
3. The following day, place an aquatic plant in the water. Draw an illustration of the ecosystem and label its biotic and abiotic components.
4. Record the number of organisms you see inside the jar, as well as the a-biotic conditions.
5. Add three or four birdseeds to the jar every couple of days for a week. Record your observations each day.
6. Continue to add birdseeds and record observations for at least three days after all of the water evaporated.
7. Draw an illustration of the ecosystem after the water has evaporated. Label it's a-biotic and biotic components.

Evidence / Observations:

Qualitative Evidence: Drawing of jar ecosystem with biotic and a-biotic components labeled both before and after evaporation.

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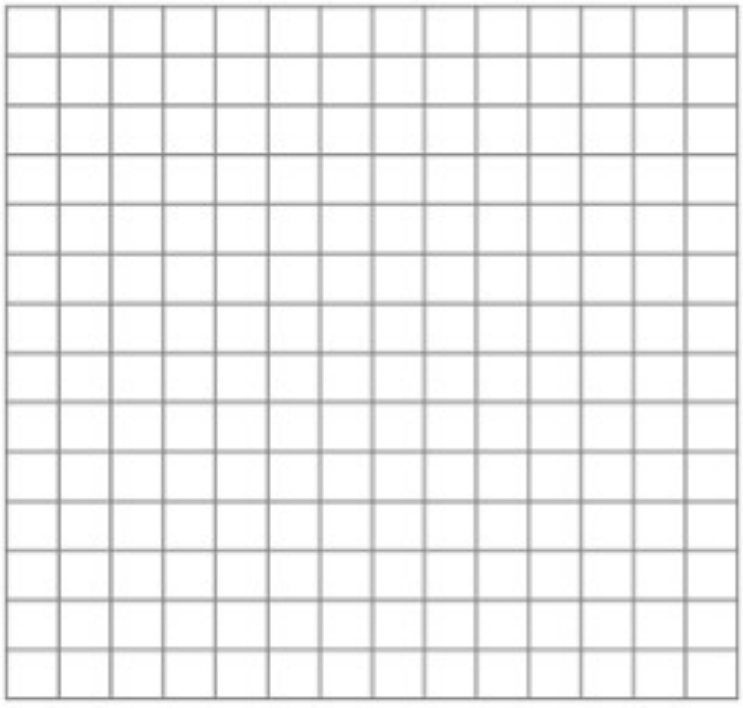
Bullard J, Krupa G, Krupa M, et al. *Science Focus 7*. Toronto, ON: McGraw-Hill Ryerson.

Quantitative Evidence: Create a data table to record the measured biotic and a-biotic factors over time.

	Organisms (Biotic Factors)		Abiotic Factors			Notes:
Date:						

Analysis: Graph **two** significant changes in the ecosystem over time. (Use two separate graphs)



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Analysis Questions:

1. What type of ecosystem does your first illustration represent? What other types of biotic (name 3) and abiotic (name 2) components would you find in a real-life ecosystem of the same type?

2. What type of ecosystem does your second illustration represent? What other types of biotic (name 3) and abiotic (name 2) components would you find in the real ecosystem?

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3. What type of ecosystem would be present after the model had **completely** dried out? What kinds of organisms would live in such an ecosystem?

4. Do the changes that took place in this model ecosystem mirror what happens in a real ecosystem? Why or why not?

5. What factors caused the changes in this ecosystem? What other factors might cause changes in natural ecosystems over time?

Conclusion: What conclusions can we draw regarding changes in an ecosystem?

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Extension:

Research one natural ecosystem or habitat that has been severely affected (positively or negatively) by human activity. Explain how the ecosystem has changed and how humans have caused this change. Identify at least one way that humans can reduce their impact on the ecosystem.

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