

Name: _____ Date: _____

Student Exploration: Pattern Finder

Vocabulary: experiment, hypothesis, observe, prediction, theory

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

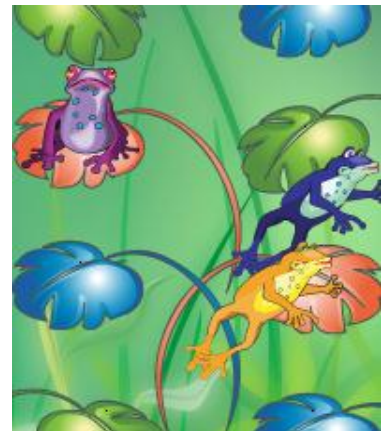
1. What is the order of the seasons? _____
2. A traffic light is green. What color will it be next? _____
3. If today is Wednesday, what day will it be 9 days from now? _____
4. What do seasons, traffic lights, and days of the week all have in common? _____


Gizmo Warm-up

The *Pattern Finder* Gizmo™ lets you find and test patterns by observing frogs hop around a set of lily pads.

1. Grab the **blue frog** and drop it on any lily pad you want. **Observe** the frog. Describe a pattern you find.

2. Click **Catch all**. Grab the **blue frog** and put it on a few different pads. Does it follow the same pattern? _____
3. Predict what color lily pad it will go to if placed on the pad in the top-left corner. _____
4. Put the **blue frog** on the pad in the top-left corner. What color does it jump to? _____
5. You just ran an **experiment** to test a pattern. Was your **prediction** correct? _____



Activity A: Observing patterns	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Click Catch all. 	
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Question: How do we find patterns?

1. Collect data: Place the **brown frog** on any blue lily pad. Record the colors of the lily pads it visits in order. Write **R** for red, **B** for blue, and **G** for green. Record the first 15 hops.

2. Analyze: Put the **brown frog** on other pads and watch. What pattern does it seem to follow?

3. Observe: Click **Catch all** and repeat the above steps with the **pink frog**.

A. What pattern does the **pink frog** follow? _____

B. Does its pattern depend on where it starts? Explain. _____


4. Find the pattern: What pattern does the **yellow frog** follow? _____

5. Extend: Describe the **red frog's** pattern. _____

6. Challenge: Compare the **purple** and **red frogs**. (Hint: Pay attention to more than just color.)

A. How are their patterns similar? _____

B. How are they different? _____

Activity B: Testing patterns	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Select Advanced. • Click Catch all. 	
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Question: How can we gain confidence in the patterns we see?

1. Form hypothesis: Put the **yellow frog** on any pad. Observe it carefully. Try it on other pads. When you think you understand the frog's behavior, write your belief, or **hypothesis**, below.

2. Predict: The true test of a hypothesis is if it predicts the results of experiments you have not yet tried. You should not trust a pattern until it correctly predicts the results of a test.

Use your hypothesis to fill in the two sentences below.

A. From the blue pad at lower left, the **yellow frog** will next jump to a _____ pad.

B. From the red pad at lower right, the **yellow frog** will next jump to a _____ pad.

3. Test: Run experiments to test your predictions. Were you correct both times? _____


- If one of your predictions was wrong, your hypothesis has been disproven.
- If your predictions were correct, your tests support your hypothesis.
- If enough experiments support a hypothesis, it can become a **theory**.

4. Form hypothesis: Now observe the **pink frog** carefully. What pattern does it repeat?

5. Predict: What are the next 10 colors the **pink frog** will visit if you start it at the bottom left?

6. Test: Test your hypothesis. What happened? _____

7. Challenge: Can you ever absolutely prove that a hypothesis is correct? Explain. _____

Activity C: Using patterns	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Select Advanced. • Click Catch all. 	
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Question: How can we use patterns to answer questions?

1. Find a pattern: Place the **blue frog** on any pad and observe it. What pattern does it follow?

2. Analyze: No matter where it starts, what color will it visit *least* in its first 20 jumps? Why?

3. Observe: Click **Catch all**. Observe the **red frog**. What rules does it appear to follow?

4. Analyze: Think about what will happen if you drop the **red frog** on a green pad.

A. What color will it never hit? _____ Explain. _____

B. Starting on green, what color will the **red frog** spend most of its time on? _____

C. Explain. _____

5. Observe: Click **Catch all**. Observe the **purple frog**. What rules does it appear to follow?

6. Challenge: Suppose you drop the **purple frog** on a green lily pad. Will it be easier to predict the color it will be on after 1 jump or after 4 jumps? Explain.
