Key Concepts:
• Connect claims and evidence
• Recognizing patterns
• Connect structure and function
• Identify adaptations for behavior and structure
• Use metaphors to help describe

Skills:
• Apply observations and prior knowledge to different objects
• Compare and contrast
• Communicate in speech and writing
• Use metaphors

Materials:
• Pillow case or opaque bag to hold the needed objects
• Orange safety vest or other bright safety gear
• Camouflage hat or other item
• “Caution” tape or symbol
• Roll-up party favor
• Silly string
• Box of juicy juice
• Suction cup ball or other item with suction cups
• Toy frog
• Toy fish or picture of a tile roof
• Bug eye viewer

This activity has been adapted from “Wetland Metaphors” - Project Wild-Aquatic

Objective
Students identify ways a given object might represent a physical or behavioral characteristic of a monarch butterfly. This activity may be used as a tool to introduce the anatomy, characteristics, and behaviors of a monarch, or to assess what students have learned.

Background
Monarchs have evolved to have physical and behavioral adaptations that help them survive to reproduce.

Procedure
Have students sit in a circle on the floor. Place the objects on the list in a bag such that they are hidden. Have a student in the circle remove one item from the bag and show it to the class. Ask the student to the right of the one who chose to try to describe how the item is a metaphor for some aspect of the monarch’s physical features or behaviors. Ask the student to the left of the one who chose to explain how this adaptation benefits the monarch. You may wish to start with one of the easier objects as an example.

Adjust the number of objects from the list on the following page and detail of student explanations to the developmental level of your students.

In closing, you might have students write down the characteristic and adaptive advantage each item represents in monarchs. Ask students to think of other characteristics or adaptations monarchs have (at any stage in their life cycle) that could be represented by an object.

Alternative Procedure
• Select five of the objects listed on the next page.
• Give an example of how one object is like the ________ of a butterfly.
• Have students select one of the remaining objects to write a paragraph about.
• The paragraph should make a claim in a topic sentence. Support sentences should provide evidence to support that claim. Pictures and diagrams can add to the written description.
<table>
<thead>
<tr>
<th>Object</th>
<th>Metaphoric Function</th>
</tr>
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<tbody>
<tr>
<td>Roll up party favor</td>
<td>Proboscis - the adult monarch feeding tube, for sucking nectar. It coils up under the head when not in use.</td>
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<tr>
<td>Camouflage vest, hat or jacket</td>
<td>Compare how the monarch’s wings look like fall leaves when they are closed and the green of the pupa are both examples of camouflage.</td>
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<tr>
<td>Orange safety vest</td>
<td>Aposematic coloration—the orange color of the wings and bright stripes on the caterpillar are warnings to predators of distasteful prey.</td>
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<tr>
<td>Danger tape or poison symbol</td>
<td>Eating a monarch will make vertebrates sick – the cardiac glycosides are heart poisons that affect vertebrates. Milkweed plants make these chemicals.</td>
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<tr>
<td>Velcro</td>
<td>Tarsus- (plural- tarsi) - the hooks on insect legs that are used to grip vegetation and flowers. The true legs, found on the larva, also have the ability to hang on. The cremaster of the pupa hooks into the silk pad like velcro.</td>
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<tr>
<td>Suction cup ball</td>
<td>Compare to the larva’s prolegs, which have the ability to grasp onto even smooth surfaces.</td>
</tr>
<tr>
<td>Silly String</td>
<td>Compares to the silk created by the larva’s spinnerets. The silk is excreted from this organ as a liquid that forms a solid string as soon as it hits the air.</td>
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<tr>
<td>Box of Juicy Juice</td>
<td>Similar to the nectar adult monarchs feed on. They can smell the sweet odor of nectar with their antennae, and taste dissolved sugar with the organs on the back of butterfly tarsi. The students often mention that the straw is like the proboscis.</td>
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<tr>
<td>Toy frog</td>
<td>Like the monarch, the frog goes through metamorphosis.</td>
</tr>
<tr>
<td>Toy fish or picture of a tile roof</td>
<td>The fish, like the monarch, is covered with scales.</td>
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<tr>
<td>Bug eye viewers</td>
<td>The adult compound eye, composed of hundreds of tiny hexagonal units, and larva ocelli eyes, with a clear space in the center of many hexagonal units, can be modeled. (You can find viewers at science museums or nature stores, or a dollar store, Target, and other places party favors or toys are sold.)</td>
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