

Be a Wildlife Biologist

How do biologists design solutions to problems that wild animals face?



MATERIALS:

- Rulers, one per student
- Variety of possible building materials, such as:
 - Construction paper, including red/pink shades
 - Cardboard
 - Plastic cups
 - Tape and/or glue
 - Yarn or string
 - Scissors
 - Recycled plastic containers, bottles, etc. (well cleaned)
- Student lab notebooks
- Pencils
- Skill stickers
- Wildlife Biologist career card
- Research Lab sign
- (Optional) “Be a Wildlife Biologist” introductory video



Prepare

1. Hang the “Research Lab” sign in a visible location.
2. Set up a materials station in your space where students can easily access the building materials.



Engage

Note: You could also use the “Be a Wildlife Biologist” video to introduce the activity.

1. Introduce the Wildlife Biologist career by showing the group the career card and asking questions to encourage students to think about what a wildlife biologist might do:
 - ▶ *What do you notice about this picture? What do you think this person is doing?*
 - ▶ *Have you heard words like “wildlife” or “biologist” before? What do you think a wildlife biologist might do or study?*
2. Explain that wildlife biologists study how wild animals behave, how they interact with their habitats (the places where they live), and how they interact with humans.
3. Introduce the storyline of the activity like this:
 - You are a team of biologists working for a nature preserve, making sure the natural areas are protected for wildlife. Your nature preserve is a stopping place for many kinds of birds during the seasons when they migrate.
 - One of the most popular birds that visits your preserve is a kind of long-billed hummingbird that eats from just a few types of flowers. Unfortunately, summers have been getting hotter in your area, and you’ve noticed that the flowers are blooming earlier—they wilt and die before the hummingbirds arrive.
 - Your visitors are disappointed that there aren’t many hummingbirds to see anymore when they visit. You’re also worried that the birds might not have enough food to make it through their migration, if they don’t stop to feed in your area.

Engage (Continued)

- Ask the group for ideas about how you could solve this problem:
 - ▶ *What could we do to help the hummingbirds stop and feed in our nature preserve again?*
 - ▶ *If we can't get the flowers to grow, how could we figure out what might work instead?*
- Explain that the leaders of your nature preserve want to put up feeding stations that the hummingbirds can use in place of the flowers. Your team's job is to figure out how the bird feeds and what it needs, and then design a model for what the feeding station could look like.

Explore

- Explain that to make a feeding station that the hummingbirds will use, you'll need to start by finding out how they normally eat.
- Invite students to look at the hummingbird photos and facts on p. 17 of their lab notebook. Encourage them to draw or write some notes about how the birds eat. Things to look for:
 - ▶ *What part of the flower contains the nectar?*
 - ▶ *How does the bird drink it?*
 - ▶ *Where is the bird when eating? (On the ground, in the air, perched on a branch?)*
- Next ask students to make some observations about the flowers this bird prefers:
 - ▶ *What do these flowers have in common?*
 - ▶ *What size and shape are they?*
 - ▶ *What colors are they?*
 - ▶ *Where and how do they grow? (Close to the ground, high up in trees, between rocks?)*
- Encourage students to decide which features of the flower are most important for the bird to recognize and feed from it. These are features they'll want to include in your feeder design. Cultivate rich dialogue by inviting students to discuss with a partner or small group.
- Discuss other factors their feeder designs will need to consider, like:
 - ▶ *How will it stand up or be attached to something so that the birds will find it?*
 - ▶ *How will you make sure other animals don't eat the food instead?*
 - ▶ *How will you add more food when it runs out?*



For younger students:

- **Read the bird facts and discuss the photos together as a group, instead of individually. Help the group draw conclusions about what the flowers have in common, and what features might be important for their feeders to include.**
- **Simplify the design process by focusing on the feeder shape and the bird's needs, leaving out the discussion of additional factors like other animals or how to refill it.**
- **You may want to find and share pictures of different styles of bird feeder to provide inspiration.**
- **Keep the brainstorming and sketching times brief or leave them out. Younger students may find it easier to explore their ideas by building and experimenting with the materials.**

Explore (Continued)

- Invite students to brainstorm some different ideas for what their feeding station could look like and sketch their ideas in their notebooks. Encourage them to look at the building materials at the materials station to help with their ideas.
- Ask students to decide on one design they think will work the best and use the materials from the materials station to create a model of their design.
- As students work, use the Core Four strategies to support their research:
- Ask questions** to guide students through their design thinking:
 - ▶ *How could you build a shape that looks like the flower? What parts of the flower shape do you think are most important?*
 - ▶ *Where will you put the nectar for the bird to drink?*
- Encourage scientific thinking** by inviting students to make observations and predictions about their designs:
 - ▶ *What do you notice about how your feeder is hanging?*
 - ▶ *What could you change to help the feeder hang like the flower?*
- Cultivate rich dialogue** by encouraging students to share their ideas with each other:
 - You two have similar designs. Tell each other what you're working on!
 - This person also had a problem like that with her design. Let's ask her how she solved it.
- Make connections** to students' everyday experience:
 - ▶ *Have you seen any other kinds of bird feeders? What parts did they have?*
 - ▶ *Your feeder needs to hold liquid in it. What things do you use at home that hold liquids? What shapes are they?*

Reflect

- Gather the group, with their models, to discuss the results of their research.
- Invite the group to look around the room at everyone's models.
 - ▶ *What do you notice that is similar about many of our designs?*
 - ▶ *What recommendations should we give our nature preserve about what our feeding stations need to have to work well for the hummingbirds?*
- Encourage the group to reflect on how they were like biologists during the activity. You may want to show the wildlife biologist career card again, or refer to the science skills stickers in their notebooks:
 - ▶ *What are some of the things we did today as wildlife biologists?*
 - ▶ *How did we think like scientists? What science skills did we use?*
 - ▶ *What did you do today that made you feel like a scientist?*
- Allow time for students to draw or write their reflections in their lab notebooks. Invite them to choose two science skills stickers that reflect skills they used and add them to their notebooks.

Alternatively, you could invite students to share their models with a partner or a small group. Encourage them to talk about:

- **How they decided on the different parts of their design**
- **What they tried that didn't work, or problems they had to solve**
- **What they would change or add if they had more time or different materials**

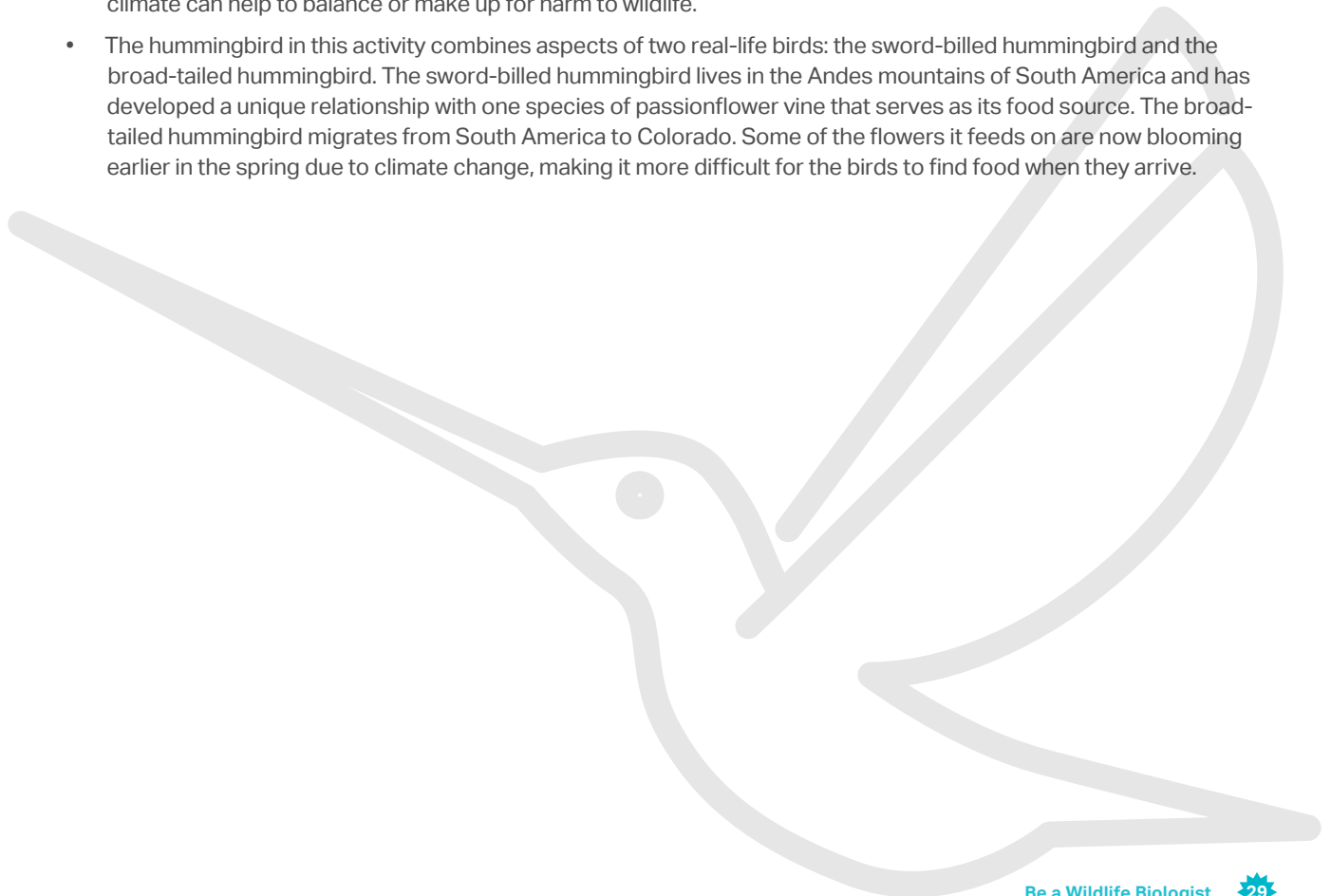


Extend

- Invite students to continue developing their original designs into fully functional models that can hold nectar, withstand outdoor weather, etc. Create a plan for how you could replicate the birds' feeding behavior to test the feeder designs.
- Research real hummingbirds or other birds that live in your area. Design a functional feeder for them, based on their needs and eating habits.
- Participate in a citizen science project to help scientists study climate change effects on hummingbirds. Visit these websites to learn more:
 - <http://www.hummingbirdsathome.org/>
 - <https://scistarter.org/audubons-hummingbirds-at-home>

Background

- Wildlife biologists study wild animals in their natural environments: how they grow, where they live, what they eat, how they interact with other living things, and how changes in their environment affect them.
- Humans are constantly changing environments by building roads and buildings, adding new varieties of plants and removing other ones, and using energy sources that add new chemicals to the land, water, and air. These changes affect other living things in these environments.
- The earth's atmosphere is getting warmer because of some of these human changes, and the changing climate affects which plants and animals can survive in different environments. For example, in an area where summers are getting hotter, plants may start growing earlier in the season or no longer be able to grow. Animals that rely on the plant for food then change their behavior, leave the area, or look for other things to eat. That may affect even more plants and animals, and so on.
- Humans can also change the environment to design solutions to problems that wild animals face. Projects like designing feeding stations to replace a missing food source or finding new plants that grow better in a warmer climate can help to balance or make up for harm to wildlife.
- The hummingbird in this activity combines aspects of two real-life birds: the sword-billed hummingbird and the broad-tailed hummingbird. The sword-billed hummingbird lives in the Andes mountains of South America and has developed a unique relationship with one species of passionflower vine that serves as its food source. The broad-tailed hummingbird migrates from South America to Colorado. Some of the flowers it feeds on are now blooming earlier in the spring due to climate change, making it more difficult for the birds to find food when they arrive.



Wildlife Biologist Quick Guide



| ACTIVITY SECTION | DO | ASK |
|------------------|--|--|
| Engage | Use poster to discuss career | <p><i>What do you think this person is doing?</i></p> <p><i>What do you think a wildlife biologist does or studies?</i></p> |
| | Introduce story: <ul style="list-style-type: none"> • Work for a nature preserve • Hummingbird's food plant blooms too early | <p><i>What could we do to get the birds to come and feed in our preserve again?</i></p> |
| Explore | Observe photos and facts of bird and preferred flowers | <p><i>What part of the flower contains the nectar?</i></p> <p><i>How does the bird drink it?</i></p> |
| | List key elements for feeder design | <p><i>What do these flowers have in common?</i></p> |
| | Brainstorm design ideas | <p><i>What parts of the flower shape do you think are most important?</i></p> |
| | Build model of feeder design | <p><i>Have you seen any other kinds of bird feeders? What parts did they have?</i></p> <p><i>What could you change to... [help the feeder hang more like the flower]?</i></p> <p><i>You had the same problem with your design. How did you solve it?</i></p> |
| Reflect | Share and discuss feeder designs | <p><i>What challenges did you have? What would you change or add?</i></p> |
| | Recommendations for the nature preserve | <p><i>What is similar about our designs? What advice should we give about best designs?</i></p> |
| | Reflect on career connections | <p><i>How were we like wildlife biologists today?</i></p> |
| | Use stickers & notebook to draw/write reflections | <p><i>What science skills did you use?</i></p> |