

# STEM Challenge: Bird Feeder

Sample Grade 4

**Task:** Students will work in small groups to design and create a bird feeder that can be used to feed birds.

## Getting Started

### Build Content Knowledge

If you wish to provide students with background knowledge about birds' feeding habits, reproduce and distribute pages 10 and 11. Then have students read and discuss the science concept and the visual literacy graphics on those pages.

### Introduce the Challenge

Reproduce and distribute the STEM Challenge on page 12. Then have students read the challenge and the testable goal. Discuss the materials with the students and decide on a plan for gathering the materials.

Next, have students research local birds and what they eat. Have them use the STEM Planner on page 8 to think about how science, technology, engineering, and math are used to create a bird feeder. Finally, have students independently brainstorm and draw their ideas on page 12.

## Completing the Challenge

Assign students to small groups.

### Optional: Model the Design Process

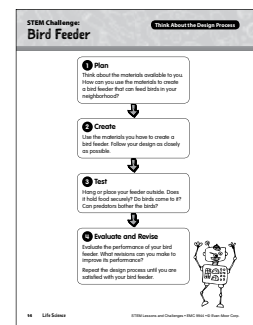
You may wish to reproduce and distribute page 14 to students. This resource is intended to help students think about how to approach each step in the design process.

### Design Process Worksheets

Reproduce and distribute the STEM design process worksheets to students. Provide support when needed to help students describe and evaluate their plans.

### After the Challenge

Have students share their design processes, compare their bird feeders, and brainstorm ideas for improvements.



## Birds' Feeding Habits

While wild birds find food in their natural environment, feeding birds in your neighborhood gives them a little extra food. It also lets you observe wild birds up close. So, what do you feed a bird? It depends on the bird, and there is a wide variety of appetites. Some birds eat meat. Some hunt insects. Many prefer seeds, nectar, berries, plants, or worms. What a bird eats depends on its **habitat**, **energy** needs, and beak **anatomy**, or parts that make up a body's structure.

Birds with cone-shaped beaks crack open seeds. Slender, pointed beaks are for plucking up insects from the ground. Strong, pointed beaks such as a woodpecker's beak are meant for poking holes into wood to find insects. Long, thin, tube-shaped beaks like a hummingbird's work like straws to sip nectar.

Birds that eat meat or fish or that strain food from swamps and ponds probably won't hang out near you. Most backyard birds eat seeds or nectar. They may visit feeders that serve their favorite snack if it is convenient for the birds to access the food in a safe way.

If the bird can hover, it won't need to sit on the feeder or go inside it to get food. Otherwise, it will need a place to **perch**, or sit. The feeder has to be big enough for the bird's weight, or the feeder may tip over and dump food on the ground. Seeds must be kept dry from rain or snow or they will get moldy. Feeders may hang from a tree or a roof, but predators should not be able to steal the food or reach the bird while it's busy munching. It should be easy for people to add food to the feeder. There are as many possibilities for feeders as there are types of birds.

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These ostriches live in an Israeli desert reserve park. Since they can't fly, this seed feeder is just the right height for their long legs and necks.



Songbirds love mealworms. If live worms in a dish or feeder crawl away before the birds find them, use fat balls containing a mix of mealworms, seeds, and fat.



These feeders in snowy habitats have roofs designed to keep the snow off of the bird seed.



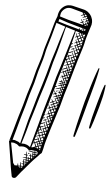
## Bird Feeder

**Challenge:** Design a bird feeder that can be hung outside for local birds.

**Testable goal:** The bird feeder holds bird food and attracts local birds.

**Research:** Find out what kinds of birds live near you and what their food needs are. Think about what kind of bird feeder they need. Think about how science, technology, engineering, and math are used to create the bird feeder.

**Brainstorm:** Draw one or more design ideas for a bird feeder. There are many different ways to complete this challenge. Be creative!



A large, empty rectangular area with rounded corners, outlined by a dashed line, intended for drawing design ideas for a bird feeder.

# STEM Challenge: Bird Feeder

## Suggested Materials List

### Items for each group

- scissors
- wire cutters
- hole puncher

### Items for the whole class

- empty beverage cartons or bottles
- disposable plates or bowls
- empty tissue boxes
- straws
- clothespins
- wooden dowels, pencils, or twigs
- craft sticks
- glue
- duct tape
- wire or wire coat hangers
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### Items for testing

- water/sugar mixture for hummingbirds
- live worms or mealworm fat balls
- bird seed

### 1 Plan

Think about the materials available to you. How can you use the materials to create a bird feeder that can feed birds in your neighborhood?



### 2 Create

Use the materials you have to create a bird feeder. Follow your design as closely as possible.



### 3 Test

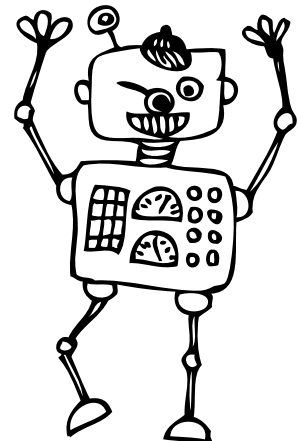
Hang or place your feeder outside. Does it hold food securely? Do birds come to it? Can predators bother the birds?



### 4 Evaluate and Revise

Evaluate the performance of your bird feeder. What revisions can you make to improve its performance?

Repeat the design process until you are satisfied with your bird feeder.



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**1 Plan:** Describe and draw your design. List your materials.



**2 Create**



**3 Test:** Describe and draw your results.



**4 Evaluate**

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## Redesign Process

**1 Redesign:** Describe what you will change. Draw your new design.



**2 Revise** or re-create



**3 Test:** Describe and draw your results.



**4 Evaluate**