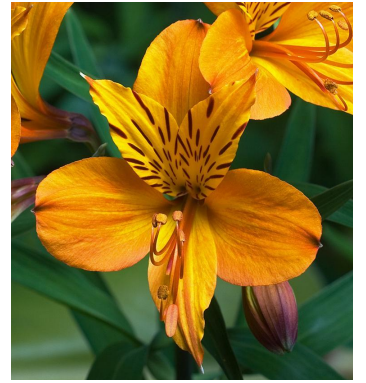


Station 1: Reverse Engineering - Pollinator Attraction



Guiding Questions: (Things to think about!)

- What are the parts of a flower and how do they work together?
- What parts of your flower function to attract pollinators (bees, moths, butterflies)?
- What role does each part play in helping the flower to survive and thrive?

Directions:

1. Read through “Pollinator Guide” to learn more about flower anatomy and flower strategies for attracting pollinators.
2. “Reverse Engineer” your flower. Carefully take apart your flower and sketch its different components.
3. Describe the colors, textures, parts and structure of your flower.

Station 1: Reverse Engineer a Flower (Student Page)

Sketch and describe your flower's parts.

Questions:

1. Describe the colors and textures of the flower. Why was the flower created with these materials?
1. Describe the overall shape and structure of the flower. What challenge might the flower be solving by having this shape and structure?

Extension: How could you, as an engineer, mimic the material, color, shape, and structure of the flower to design something new? On the back of this page, sketch and describe a new product or design.

Station 2: Beaks - Exploring Structure, Function and Habitat



Part 1: Tools Made for Food

Guiding Questions: (Things to think about)

- Which tools are best suited for collecting, catching and accessing specific types of food?
- Which types of tools are best for herbivores, carnivores or omnivores? Why?

Directions:

Use the different tools to pick up, collect, and/or open different types of food.

Part 2: Investigating Birds Beaks

Guiding Questions: (things to think about)

- Why do birds have different types of beaks?
- What does the shape and function of each bird's beak tell you about what it normally eats and where it lives?
- How could you use the design (shape, material) and purpose of different bird beaks to improve the function of everyday tools?

Directions:

- 1) As a team, match each tool with a bird whose beak has similar structure (shape, material) and function.
- 2) Record your findings on the graphic organizer.

Macaw



Uses its beak to crush

Cardinal



Uses strong beak to crack open food

Sparrow



Uses fine-tipped beak to pick up food

Spoonbill



Uses its beak to sift for food

Avocet



Uses its long beak to catch food

Woodpecker



Uses its strong beak to poke holes

Eagle



Eagles use beak to tear and shred

Heron



Uses its beak to stab and/or grab

Pelican



Uses its pouch-like beak to scoop up and filter food

Duck



Uses comb-like structures in its beak to strain and collect food

Beaks - Exploring Structure, Function & Habitat (Student Page)

Bird	Tool	Food	Environment
Macaw			
Cardinal			
Sparrow			
Hummingbird			
Spoonbill			
Avocet			
Woodpecker			
Pelican			
Heron			
Eagle			

Station 3: Flying High



Guiding Questions: (Things to think about!)

- Why are wings of birds different?
- How have inventors used ideas from nature to design plane wings?

Part 1: Build and Test a Glider

- 1) Follow the directions (on separate page) to build your glider
- 2) Test your glider. Describe its motion. When have you seen a bird fly like this?

Part 2: Matching Wing Shape - Birds and Planes

Many plane wings have been designed based on bird wing shapes and functions.

- 1) Read about different types of bird wings and planes on the “Wing Types Guide”.
- 2) Match the image of the plane with the bird that it was designed from.



Elliptical Wings



Soaring Wings



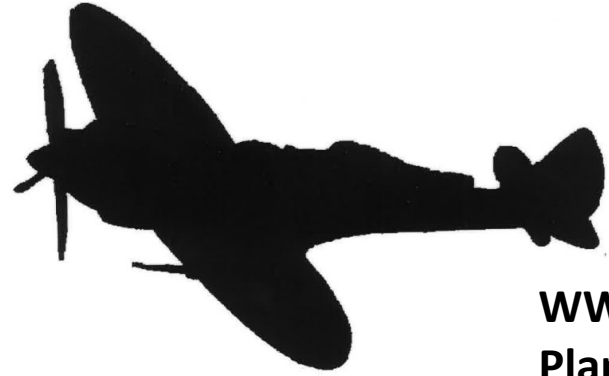
Heavy-Lifting Wings



High-Speed Wings



Glider



**WWII Fighter
Plane**



Passenger Jet



Cargo Plane