

Amazing Birds

Have you ever noticed the similarities and differences between birds' wings and an airplane? Explore the adaptations that help birds fly and investigate the wingspans of an albatross, falcon, and vulture. Determine how a bird's wingspan affects flight and design an airplane that will remain in flight for as long as possible.

TEKS:

- 4.10A Explore how adaptations enable organisms to survive in their environment such as comparing birds' beaks and leaves on plants.
- 5.10A Compare the structures and functions of different species that help them live and survive such as hooves on prairie animals or webbed feet in aquatic animals.
- 7.12A Investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants.

How To:

1. Using the *Wing Model Template* (attached below), print each template on cardstock and cut out each wing model.
2. Peregrine falcon wing setup: fold the template in half, then fold the wings and tail flaps down so that they lay flat.
3. Try throwing the peregrine falcon model like you would a paper airplane. Measure and record the distance traveled and the time it stayed in the air.
4. Attach a binder clip to the front of the wing model and try throwing it again. Compare the time and distance traveled.
5. Follow the same procedure for the wandering albatross model and the turkey vulture model (do not cut the three finger slots until next step).

Materials:

- Scissors
 - 3 small binder clips
 - Stopwatch
 - Measuring tape
 - Wing model template for each bird (attached below):
 - Turkey Vulture
 - Wandering Albatross
 - Peregrine Falcon
- For airplane design:
- Cardstock or construction paper
 - Straw
 - Scotch tape

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How To (continued):

6. *Did you notice the turkey vulture model did not fly very smoothly?* This time cut out the three finger slots at the tip of each wing. Notice that the finger slots help the wing shape glide more smoothly just like the feathers would on an actual bird.
7. Now that you have explored how different types of birds have different shaped wings and how wing shape affects birds' ability to stay in the air, use this knowledge to design an airplane that can stay in the air for the longest period of time. Use cardstock or construction paper, a straw, scissors, and tape to design your airplane.
8. Think about which birds' wing design worked the best and cut out the shape of the wings you want for your airplane using cardstock or construction paper. Make sure that your wings are symmetrical, try folding your piece of paper in half to make your wings symmetrical.
9. Tape a straw underneath the center of the airplane wings (along the line of symmetry or fold line) with the end of the straw sticking out about three inches from the front of the wing.
10. Cut out 2 small triangles from the cardstock or construction paper to make the tail of your plane. Cut a slit in the top of the straw about 1 inch from the back end of the straw. Slide one of the triangles into the slit so that it is vertically sticking out of the straw and tape it down. This is the rudder to help steer the plane and keep it from spinning.
11. Tape the other triangle to the bottom of the straw so that it is oriented horizontally (perpendicular) beneath the rudder - make sure it is centered so that when you look down the length of the straw, everything on your plane is symmetrical. This is the elevator to help the plane get high into the air.
12. Now test your plane and modify if necessary to keep it in flight as long as possible.

The STEM Explanation:

Wings are important to flight, but wing shape helps determine how a bird will fly. The longer and straighter birds' wings are, the easier it is for them to glide through the air rather than flap their wings, since the heavy weight of their wings would be exhausting to continuously flap. Gliding helps birds, like the albatross, move slower through the air as they are searching for food on the ground. Birds with a shorter wingspan, like falcons, have wings that look bent that allow them to maneuver quickly to catch food.

Career Connection:

Ornithologists study the biology and habits of birds. Studies may focus on bird species' instinct or learning abilities, anatomy, ecosystem development and conservation, or individual and group behavior. Many ornithologists work with other professionals to apply their research to other disciplines, such as incorporating bird adaptations into the design of aircraft.

Resources:

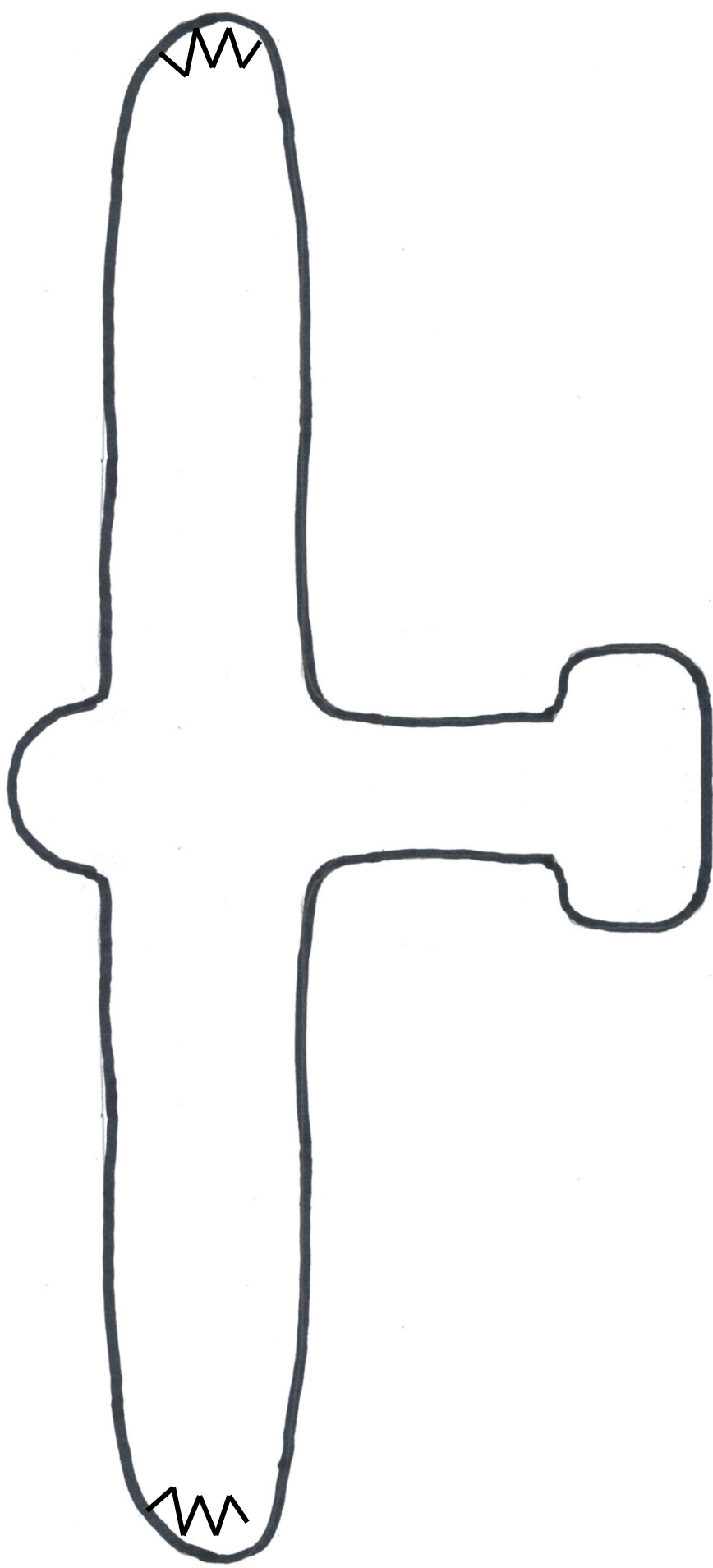
- All About Birds: <http://www.allaboutbirds.org>
- Champion Birds: <http://www.pbs.org/lifeofbirds/champions/index.html>
- Amazing Birds: <http://www.birds.cornell.edu/physics/lessons/elementary/pdfs/tm>
- Bird Adaptations: http://projectbeak.org/adaptations/skeletal_hollow.htm

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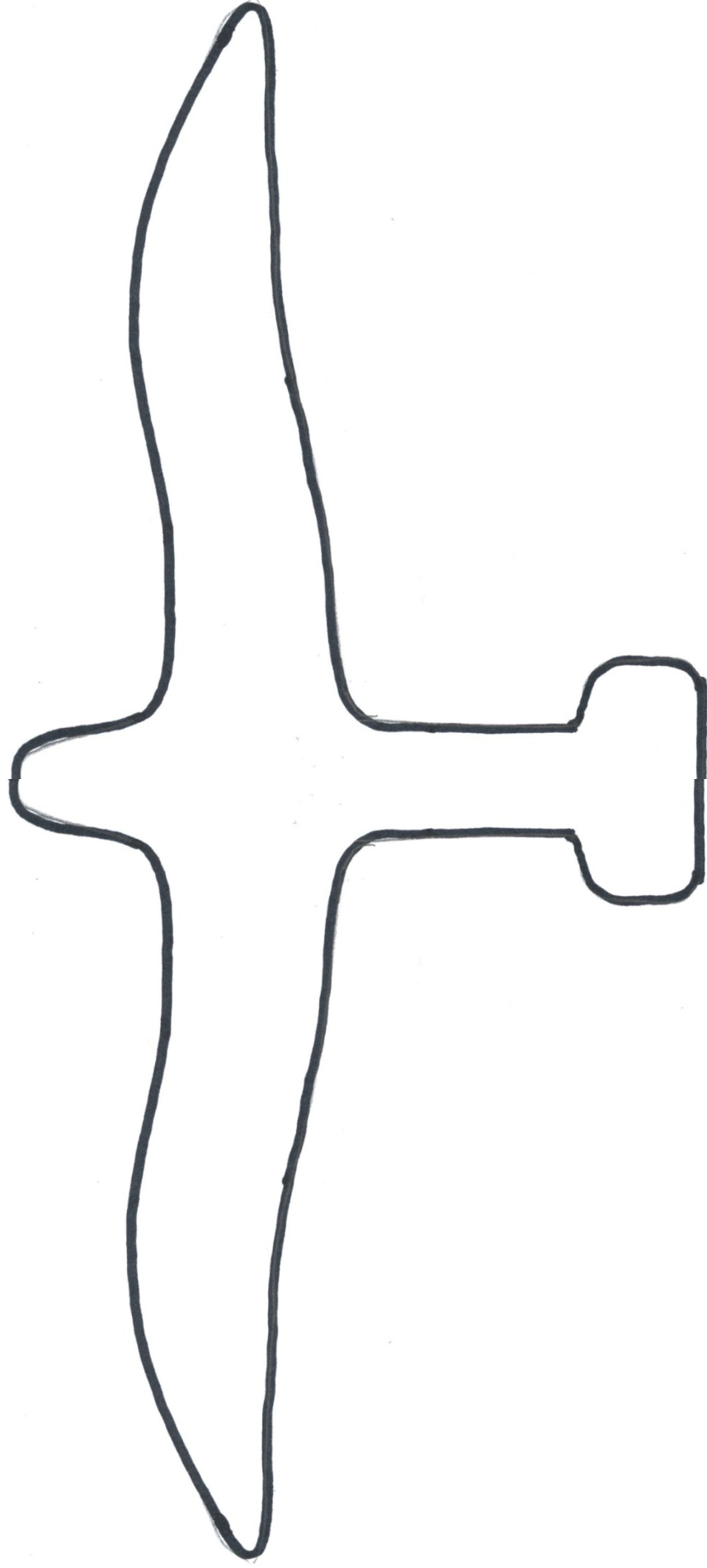
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Turkey Vulture



Wandering Albatross



Peregrine Falcon

