



An Animal Tail

Subject: Biomimicry

Grade Level: 3-8

Topic: Adaptations and the Engineering Design Process

Time: 60 minutes

Learning Objectives

Students will:

- examine how animal tail structures (shape, flexibility, strength) relate directly to their functions such as balance, communication, defense, and grasping.
- analyze how different tail adaptations increase survival and design their own tail adaptations based on specific survival needs.
- design, build, test, and revise tail prototypes using the engineering design process.

Materials

Nametags, pencils, paper, *Tail Pictures* sheet

- Supplies for Build a Prehensile Tail: Sock tails (sock filled with beans), paper clips, rubber bands, fabric strips, clothespins, yarn, chenille stems, other craft supplies, 2 dowel rods.
- Supplies for What If I Had an Animal Tail: Plush otters, clothespins, chenille stems, yarn, fabric, building blocks, book: *What If You Had an Animal Tail* by Sandra Markle.

Procedure

Engage: To promote student curiosity, Read “What If You Had an Animal Tail” to the students. Ask: “If you had a tail, what purpose would it serve?” If there is time, allow students to share (or do a pair share).

Explore: Help students build understanding by showing or passing around tail pictures and ask what they think each animal uses it’s tail for: prehensile-tailed porcupine (balance, hanging, grasping); kangaroo

(balance, as a stool); leopard gecko (fat/energy storage); ring-tailed lemur (flag to communicate and keep troop in a line); stingray (defense with barb on tail); superb lyrebird (courtship); beaver (swimming paddle, communication). If time permits, have students work in groups to identify how each animal uses its tail. Have them write down their ideas.

Explain: Have students begin to show what they have learned by having a group discussion where students can share their ideas. Ask student what else animals use their tails for? Have students brainstorm some other uses for animal tails aside from the ones in the book and in the pictures.

Elaborate: Have students use their new knowledge by completing one of the following two activities.

What if you Had an Animal Tail? Give each group a plush otter and have them build a tail for it using the supplies provided. The tail must have a specific use that helps the animal survive. (Grades 3-5)

Build a Prehensile Tail. Give each group a sock animal. The students will use the supplies provided to build a tail onto the sock that will allow it to hang. Allow them to test their creations on the dowel rod and go back to make changes to their design. (Grades 5-8)

Assessment

Evaluate: Evaluate student learning by having students share their creations and evaluate how theirs and other's turned out. For the prehensile tail project, have them reflect on what worked and what did not.

Extension Activities

- Invite a local wildlife specialist to bring in an animal with a prehensile tail.
- Have students create comic strips that incorporate animal tails and how animals use them to survive.

NGSS Alignment

Grades 3–5

3-LS4-3 - Construct an argument that animals have traits that help them survive.

3–5-ETS1-2 - Generate and compare multiple solutions to a problem based on criteria.

Middle School (5–8)

MS-LS1-4 - Use evidence to support explanations about how structures affect functions.

MS-ETS1-2 - Evaluate competing design solutions using a systematic process.



Created by the Akron Zoo