

# Lesson Plan: What Can We Learn From Plants and Animals?

By: Darby Feldwinn

**Target Grade:** 1<sup>st</sup>

**Teacher Prep Time:** 20 minutes

**Lesson Time:** 3 hour

## Learning Goals:

- Students will know that humans mimic properties/traits of plants and animals to improve our lives.
- Students will engage in argument from evidence to come to a class consensus.

## NGSS:

- 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.\*
- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- Science and Engineering Practice
  - #7 Engaging in argument from evidence
    - Engaging in argument from evidence in K-2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).
      - Construct an argument with evidence to support a claim.
- Disciplinary Core Ideas
  - LS1.A Structure of Function
    - All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.
  - LS1.D Information Processing
    - Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.
- Cross Cutting Concepts
  - Structure and Function
    - The shape and stability of structures of natural and designed objects are related to their functions(s).

## CCSS:

- SL-1-b: Participate in collaborative conversation with diverse partners about grade 1 topics and texts with peers and adults in small and large groups.
  - Build on others' talk in conversations by responding to the comments of others through multiple exchanges.

## Where this lesson fits in:

- This lesson provides a great ending activity to performance expectation 1-LS1-1 (from molecules and organisms). During the activity students identify external parts

(adaptations) that help animals survive, grow, and meet their needs for the environment. In addition, students are challenged to think about external features that animals and plants have that humans have copied. Students then apply their engineering skills to design a jacket using external features from animals that help to keep animals warm. In addition, this activity introduces students to scientific argumentation and allows students multiple opportunities to practice these skills.

- Before this activity students should review kindergarten performance expectation (K-LS1-1) which requires them to determine what living things need to survive. They should then expand on these ideas by observing both plants and animals and identify their external parts (example: birds -wings). In addition, they should identify how these external parts allow the plants/animals to survive, meet their needs, and grow in their native habitats. An example of an external feature that animals have that allows them to grow is a mouth which is used for eating and for gas exchange. Roots are leaves are examples of external features that plants have that allow them to grow. Roots are used for absorbing water, and leaves are used to absorb sunlight and CO<sub>2</sub>.
- If desired, a similar design activity can be included that focuses on features that humans take from plants.

### Materials Needed:

- Plant/animal/human cards
- Craft Feathers (down and large)
- Cotton (Synthetic Down) (get from a pillow)
- Shammy pieces
- Thick Felt
- Thin Felt
- Ziploc baggies with Crisco
- Ziploc baggies
- Masking tape
- Thermometers
- Butter knife or piece of metal about the size of a butter knife with a smiley face sticker on the handle (this helps students understand that these devices are mimicking metal people)
- 800 mL beakers with hot water
- Timer

### Teacher Prep:

- Print out and cut up enough plant/animal/human cards so each group (~3 students) can have a set.
- Tape the thermometers to the butter knives as seen in the picture on the right. Make sure that the tape does not cover the 40°C mark.
  - It is helpful to put a smiley face sticker on the knives to help students understand that the knife/thermometer is a “metal person.”
- Put each of the animal materials (cotton, craft feathers, fat, shammy thick felt, thin felt) into bowls and set centrally on a table.
- Set out 1 bag, 1 role of masking tape, and 1 timer for each group.
- Heat water up. Make sure that the water is hot but not boiling (this ensures that students will not burn themselves if they touch the water).




60  
minutes

### Beginning Thoughts

- Have students seated in groups of 3.
- Pass out one set of plant/animal/human cards to each group and *Beginning Thoughts* handout to each student. (page 1)
- Tell students that they need to take the cards and match them into pairs. Each card must only be matched to one other card and they must be able to explain why the two cards match together. Once they have decided on their matches they should draw lines between the pictures on the *Beginning Thoughts* handout.
- Each student in the group should pick one pair and fill out the sentence frame: The picture of the \_\_\_ goes with the picture of the \_\_\_ because \_\_\_.
  - Note students in the same group should pick different pairs.
- Put the following handout under a document camera (below left). Tell students that they will now discuss what pictures form pairs using the sentence frames. Show students how to use the sentence frames and how to respond to each other. Tell students to pay attention to the groups that they agree/disagree with so that they will be able to record this at the end of the debate. Then allow students to debate the pairs. It is helpful to keep notes for students on the board so that they can refer back to them. As groups suggest a pair, record their suggested pair as well as why they think the pair go together (example below right).

**Use the Following Sentence Frames to Discuss Which Pictures Make A Pair**



**Pictures**

|           |            |       |
|-----------|------------|-------|
| Bird      | Elephant   | Plane |
| Lily Pads | Scuba Gear | Roots |
| Shower    | Straw      | Raft  |
|           | Fish       |       |

*Starting a discussion of a pair*

I think the picture of the \_\_\_\_\_ goes with the picture of the \_\_\_\_\_ because \_\_\_\_\_.

*Responding to a discussion of a pair*

Group \_\_\_\_\_ said \_\_\_\_\_ and I agree with them because \_\_\_\_\_.

Or

Group \_\_\_\_\_ said \_\_\_\_\_ and I respectfully disagree with them because \_\_\_\_\_.

| Group | Suggested Pair                     | Why                                  |
|-------|------------------------------------|--------------------------------------|
| 1     | lily pad/raft<br>elephant/shower   | float<br>spray water                 |
| 2     | plane/bird<br>raft/lily pad        | fly<br>float                         |
| 3     | fish/scuba gear<br>shower/elephant | breathe<br>underwater<br>spray water |
| 4     | roots/lily pad<br>fish/scuba gear  | plants<br>breathe<br>underwater      |
| 5     | fish/lily pad<br>plane/bird        | in water<br>fly                      |
| 6     | elephant/bird<br>straw/roots       | animals<br>suck up<br>water          |

- By the end of the conversation make sure that students have matched the cards so that each human card has either a plant or animal card matched with them, that students can explain what the plant/animal is doing that humans cannot, and what we have done to copy them.
  - ESR (expected student response):
    - root/straw: ability to take in liquid to drink
    - fish/scuba gear: ability to breathe underwater
    - elephant bathing/ shower: ability to clean ourselves
    - birds flying/ plane: ability to fly
    - water lilies/ raft: ability to float on water
- Pass out page 2 of the activity and have students fill in the sentence frames about students that they agreed with and those that they disagreed with.

- Put the following handout (below) under the document camera. As a class fill out the sentence frames.
  - ESR:
    - Birds have **wings** that allow them to **fly** but humans cannot do this without a **plane**.
    - Elephants have **trunks** that allow them to **spray water** but humans cannot do this without a **shower**.
    - Fish have **gills** that allow them to **breathe under water** but humans cannot do this without **scuba gear**.
    - Lily pads have **flat bottoms** that allow them to **float** but humans cannot do this without a **raft**.
    - Roots have **many small tubes** that allow them to **suck up water** but humans cannot do this without a **straw**.

- Show students the picture of the penguins (below). Ask students if a human could survive in this environment without any external help. Students should realize that humans would not be able to survive in the cold without external help. Ask students what external parts (adaptations) penguins have that help them to survive in a cold environment. Students should point out the penguins' feathers help keep them warm. Then have them fill out the sentence frame at the bottom of page 2.
  - Penguins have **feathers** that allow them to **keep warm in the cold** humans cannot do this without a **jacket**.



- Ask students if there are other animals that survive in cold environments and if feathers are the only external parts (adaptations) that allow animals to

survive in these environments. Students might bring suggest: polar bears (or other mammals)/fur and whales/blubber.

- Tell students that engineers are people who design solutions to problems. Many times engineers look at things in nature to give them ideas to solve problems. Tell students that today they will be an engineer and try to solve the problem of how to stay warm in the cold. Therefore, they are going to design a jacket to keep a metal person warm.

60 minutes

**Jacket Lab**

- Pass out page 3 of the activity.
- Show students each of the materials that they will have access to and ask them what the material is mimicking. Then put the materials page under the document camera (below left).
  - Cotton / Inner feathers (down) of birds
  - Shammy / hide/skin from mammals
  - Craft feathers/outer feathers of birds
  - Fat/blubber from whales
  - Thick felt/ Long fur from mammals
  - Thin felt/ Short fur from mammals



Cotton



Shammy




Craft Feathers



Fat



Thick Felt



Thin Felt

| Group | Materials Used                         | Time to get to 40° C       | Notes         |                            |
|-------|--|----------------------------|---------------|----------------------------|
| 1     | Cotton<br>Craft Feathers<br>Thick Felt | Shammy<br>Fat<br>Thin Felt | 5 min<br>7 s  | temp dropped fast at first |
| 2     | Cotton<br>Craft Feathers<br>Thick Felt | Shammy<br>Fat<br>Thin Felt | 6 min<br>23 s |                            |
| 3     | Cotton<br>Craft Feathers<br>Thick Felt | Shammy<br>Fat<br>Thin Felt | 7 min<br>2 s  |                            |
| 4     | Cotton<br>Craft Feathers<br>Thick Felt | Shammy<br>Fat<br>Thin Felt | 4 min<br>22 s |                            |
| 5     | Cotton<br>Craft Feathers<br>Thick Felt | Shammy<br>Fat<br>Thin Felt | 2 min<br>47 s | temp dropped fast at first |
| 6     | Cotton<br>Craft Feathers<br>Thick Felt | Shammy<br>Fat<br>Thin Felt | 1 min<br>59 s | temp dropped fast at first |
| 7     | Cotton<br>Craft Feathers<br>Thick Felt | Shammy<br>Fat<br>Thin Felt | 6 min<br>53 s |                            |

- Read/go over the procedure at the top of page 3.
- Tell students that they will get 20 minutes to design a jacket that goes over their metal person. The jacket that they make must be removable. They can use any three of the above materials.
- Once they have completed their jacket, have them remove their jacket from their metal person and place it in a beaker of hot water.
- While waiting for the butter knives to warm up (~10 minutes) have students list the materials used and draw a picture of the jacket on the worksheet. Then have each group explain their designs and why they think their jackets will be effective. Record the materials on the group data page (above right).
- Tell students that the next step needs to be done fast. Give each group a metal person and have them insert it into their jacket and start their timer. Students should stop the timer when the temperature gets to 40°C. They will then record the time on their worksheet.

|                |   |                |            |     |                |           |        |         |          |                |           |      |                |
|----------------|---|----------------|------------|-----|----------------|-----------|--------|---------|----------|----------------|-----------|------|----------------|
|                | <ul style="list-style-type: none"><li>• Have each group tell how much time it took for the jacket to get to 40°C and record it on the group data page along with any notes that they have.</li></ul>  |                |            |     |                |           |        |         |          |                |           |      |                |
| 60 minutes     | <p><b>Discussion Questions</b></p> <ul style="list-style-type: none"><li>• Put the following handout on the document camera.<ul style="list-style-type: none"><li>○ It is helpful for students to be able to see both the group data and the discussion handout. Therefore, if possible have the discussion handout written on the board or on a separate chart that can be hung on the board.</li></ul></li></ul> <div data-bbox="633 390 1172 1081" data-label="Complex-Block"><p><b>Use the Following Sentence Frames to Discuss How Well the Materials Functioned</b></p><p><b>Materials</b></p><table border="1"><tr><td>Shammy</td><td>Thick Felt</td><td>Fat</td></tr><tr><td>Craft Feathers</td><td>Thin Felt</td><td>Cotton</td></tr></table><p><b>Animal Structures</b></p><table border="1"><tr><td>Blubber</td><td>Long Fur</td><td>Outer Feathers</td></tr><tr><td>Short Fur</td><td>Skin</td><td>Inner Feathers</td></tr></table><p><i>Starting a discussion of a pair</i></p><p>I think _____ which mimicked _____ worked the _____ because _____.</p><p><i>Responding to a discussion of a pair</i></p><p>Group _____ said _____ and I agree with them because _____.</p><p>Or</p><p>Group _____ said _____ and I respectfully disagree with them because _____.</p></div> <ul style="list-style-type: none"><li>• Pass out page 4. Have students individually fill in the summary sentence frames using the word bank to help them.</li><li>• Tell students that they will now discuss which materials worked the best/worst using the sentence frames. Show students how to use the sentence frames and how to respond to each other.</li><li>• Have students debate which materials worked the best/worst.</li><li>• Go over each of the discussion questions and have students fill them out. See example student work below.</li></ul> | Shammy         | Thick Felt | Fat | Craft Feathers | Thin Felt | Cotton | Blubber | Long Fur | Outer Feathers | Short Fur | Skin | Inner Feathers |
| Shammy         | Thick Felt  | Fat            |            |     |                |           |        |         |          |                |           |      |                |
| Craft Feathers | Thin Felt   | Cotton         |            |     |                |           |        |         |          |                |           |      |                |
| Blubber        | Long Fur  | Outer Feathers |            |     |                |           |        |         |          |                |           |      |                |
| Short Fur      | Skin  | Inner Feathers |            |     |                |           |        |         |          |                |           |      |                |



# Example Student Work:

Name: Darby  
Group Members: Emily and Sierra

**Beginning Thoughts**  
Draw lines between the pictures that you think form a pair:

The picture of the plane goes with the picture of the birds  
because both birds and planes fly

**Discussion Sentence Frames**

You don't need to write in this box.

Starting a discussion of a pair  
I think the picture of the \_\_\_ goes with the picture of the \_\_\_ because \_\_\_

Responding to a discussion of a pair  
Group \_\_\_ said \_\_\_ and I agree with group them because \_\_\_  
Number \_\_\_\_\_ Or  
Group \_\_\_ said \_\_\_ and I respectfully disagree with them because \_\_\_  
Number \_\_\_\_\_

**What can we Learn From Plants and Animals?**

**Discussion Summary**  
I agreed with group 1 when they argued the picture of the lily pad goes with the picture of the raft because both lily pads and rafts float

I disagreed with group 4 when they argued the picture of the Fish goes with the picture of the lily pad because both of the pictures have water

Instead I think the picture of the Fish goes with the picture of the scuba gear because both the fish and the person are breathing underwater

**STOP** \*Have a class discussion and fill out the class sentence frames about what structures plants and animals have that humans have copied.

Fill out the following sentence frame for the picture that your teacher shows:

Penguins have feathers that allow them to keep warm in the cold but humans cannot do this without jacket

**Procedure**

1. Make a "jacket" using up to three materials. The jacket must be one piece and removable.
2. Record the materials that you used and draw a picture of your jacket.
3. Pull the metal person/thermometer out of the hot water and put your jacket on them.
4. Time how long it takes the thermometer to get to 40°C. You are not allowed to touch your jacket while the temperature is dropping.

**Results**  
Materials Used: thin felt shammy craft feathers

Draw a picture of your jacket:

Time to get to 40°C: 5 min 53 sec

**Materials**

- Shammy
- Thick Felt
- Fat
- Craft Feathers
- Thin Felt
- Cotton

**Animal Structures**

- Blubber
- Long Fur
- Outer Feathers
- Short Fur
- Skin
- Inner Feathers

**Summary**  
I think thick felt which mimicked thick fur worked the best because groups 2 and 3 both used thick felt and their jacket stayed warm the longest

I think fat which mimicked blubber worked the worst because groups 1, 5 and 6 used fat and their jackets cooled down the fastest

**Discussion Sentence Frames**

You do not need to write in this box.

Starting a discussion of a pair  
I think the \_\_\_ which mimicked \_\_\_ worked the best/worst because \_\_\_

Responding to a discussion of a pair  
Group \_\_\_ said \_\_\_ and I agree with them because \_\_\_  
Number \_\_\_\_\_ Or  
Group \_\_\_ said \_\_\_ and I respectfully disagree with them because \_\_\_  
Number \_\_\_\_\_

**Review Questions**

1. Do humans do everything better than plants and animals? If not, list one thing that a plant or animal can do better than a human?

No. A cactus can go without water  
for longer than a human

2. What is one feature of an animal that you mimicked in your jacket?

Fur

3. What is one animal that has this feature besides penguins?

polar bear

4. What is something else humans mimic from plants or animals?

Dogs thick pads on foot shoes  
Plant/Animal we are Mimicking What we are Copying Invention

5. Why do scientists argue? Scientists argue to get  
to the best possible answer/solution

