



LESSON PLAN

INSPIRED BY NATURE (BIOMIMICRY) GRADES K-2

SUMMARY

Students will design a solution to a problem using ideas from nature. Duration: 45-60 minutes.



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.

Science & Engineering Practices	Connections to Classroom Activity
<p>Constructing Explanations and Designing Solutions</p> <p>Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena.</p> <p>Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)</p>	<ul style="list-style-type: none"> Students will use different materials to create something useful based on ideas from plants or animals.

Disciplinary Core Ideas	Connections to Classroom Activity
<p>LS1.A: Structure and Function</p> <p>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. (1-LS1-1)</p>	<ul style="list-style-type: none"> When designing their creations, students will think about the function of different structures of animals and/or plants. They will then think about a human need these functions could satisfy.

Crosscutting Concepts

Connections to Classroom Activity

Structure and Function

The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

- Students will keep specific plant and animal parts and their functions in mind when deciding on their inventions.



ENGAGE

Show students a picture of a turtle. Ask, “What are some special parts or structures that this turtle has?” Students will most likely mention the shell since this is a common association with a turtle. Next ask, “Does anyone know what the function or purpose of the shell is?” Hopefully someone will suggest it protects the turtle. Follow up with “How does the shell protect the turtle?” They should conclude that the shell is hard and the turtle can hide inside if something tried to eat it or hurt it.

Move on to the concept of biomimicry. Ask students to talk with the person next to them about any human inventions (things we use) that may have been inspired by a turtle’s shell. After a minute or so, ask the student pairs to share their ideas. Hopefully they will come up with things like bike helmets, armor, etc. The goal is that they come up with human inventions that are hard like a shell, but also have the job of protecting something.

Tell students that today they will use different materials to come up with an invention that is inspired by an animal or plant structure. Remind students they need to keep the plant or animal’s structure in mind.



EXPLORE

Show students the variety of materials they have to work with. They can work with a partner or small group which might help them with idea generation. Students will need to brainstorm first, and then sketch out a plan before they start to create. If some groups struggle, you can suggest some animals or plants to consider. Some ideas that might be good: birds (wings that help them fly), sharks (teeth that cut things) or ducks (webbed feet to help them swim). Again, their creation could be something totally new or it could be something that already exists. Make sure that they identify the original plant or animal, what feature they are inspired by and what job that feature does.

MATERIALS

An assortment of random materials that you have on hand.

Some suggestions:

- Paper towel rolls
- Cardboard
- Foil
- Clothespins
- Plastic wrap
- Paper bags
- Rubber bands
- Plastic utensils
- Paper plates
- Cups
- Tape
- Glue
- Paper clips
- Pipe cleaners
- Straws
- Scissors

DIY Activity

- Old pair of canvas shoes (adults permission required)
- Candle
- Hairdryer
- Pitcher of water
- Large plastic tub



EXPLAIN

After about 30 minutes, give the groups a chance to share their creations. Tell them they need to tell the class what animal or plant structure (part) their invention imitates and what the function (purpose) of the structure is. Once students have shared their ideas, write the word *biomimicry* on the board. Explain biomimicry is when people get an idea from living things.



ELABORATE



WATCH THE GENERATION GENIUS INSPIRED BY NATURE VIDEO AS A GROUP

Then facilitate using the Discussion Questions.

After the video you can give your students an opportunity to revise their designs.



EVALUATE

Students can play the online Kahoot! quiz game located below the video which provides downloadable scores at the end of the quiz game. Alternatively, you can use the paper quiz or the exit ticket questions. All these resources are located below the video in the Assessment section.



EXTENSION

For older or more advanced students, you could incorporate the steps of the engineering design process into this activity. There are several versions of the engineering design process. Ask students to talk about where in their activity they did each of the steps of the engineering design process.

