

Here you will find lesson ideas for students in First Grade. They have been organized so that each experiment relates to a New Generation Science Standard. In cooperation with your classroom teacher, the experiments you choose, you will cultivate a love of STEM. Some of the lessons you will find here have been previously taught by RESET volunteers. If you create something new, please share RESET so that your experiment can be added to the experiment list. With ALL lessons, always attempt to:

- Teach concepts in multiple ways; Choose activities that reinforce learning goals
- Make things hands on & avoid power points!
- Include real life examples as you connect concepts to learning goals.

The Next Generation Science Standards

There is no doubt that science—and, therefore, science education—is central to the lives of all Americans. Never before has our world been so complex and science knowledge so critical to making sense of it all. When comprehending current events, choosing and using technology, or making informed decisions about one’s healthcare, science understanding is key. Science is also at the heart of the United States’ ability to continue to innovate, lead, and create the jobs of the future. All students—whether they become technicians in a hospital, workers in a high tech manufacturing facility, or Ph.D. researchers—must have a solid K–12 science education.

Through a collaborative, state-led process, new K–12 science standards have been developed that are rich in content and practice and arranged in a coherent manner across disciplines and grades to provide all students an internationally benchmarked science education. The Next Generation Science Standards are based on the *Framework for K–12 Science Education*

<https://www.nextgenscience.org/get-to-know>

A few details about the Next Generation Science Standards

- Every NGSS standard has three dimensions: disciplinary core ideas (content), scientific and engineering practices, and cross-cutting concepts.
- Scientific and Engineering Practices and Crosscutting Concepts are designed to be taught in context – not in a vacuum. The NGSS encourage integration with multiple core concepts throughout each year.
- The NGSS are standards, or goals, that reflect what a student should know and be able to do— they do not dictate the manner or methods by which the standards are taught.

The performance expectations are written in a way that expresses the concept and skills to be performed but still leaves curricular and instructional decisions to states, districts, school and teachers. The performance expectations do not dictate curriculum; rather, they are coherently developed to allow flexibility in the instruction of the standards. Thus, you will need to work

closely with your classroom teacher(s) to choose important lessons that assist the teacher in meeting his/her educational goals.

The lesson ideas found below are merely suggestions of experiments that can be taught in a particular grade or unit of study. RESET will work closely with you, the volunteer, and the classroom teacher to choose experiments and determine the best ways to present.

Next Generation Science Standards (K-5) listed with experiments that may help teach the standard

PS – Physical Science; LS – Life Science;

ESS –Earth & Space Systems; ETS – Engineering Design, Technology and Application Science

FIRST GRADE

1-PS4-1 Waves and Their Applications in Technologies for Information Transfer

Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

1-PS4-2 Waves and Their Applications in Technologies for Information Transfer

Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.

1-PS4-3 Waves and Their Applications in Technologies for Information Transfer

Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

1-PS4-4 Waves and Their Applications in Technologies for Information Transfer

Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.*

1-LS1-1 From Molecules to Organisms: Structures and Processes

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*

Title: Cattails or any other available plants

Subject Area: Plant Structure

Objective: Students will be able to identify the parts of a plant, as well as understand the role adaptations play in the plant's survival and then on Day 2 of lesson will use materials to design a solution to a human problem by mimicking how plants use their external parts to help them survive.

Summary: In this two-day lesson students will learn about plant structures, their functions and then use that knowledge to create a solution to a human problem

Grade Level: 1st

Vocabulary:

Plant stem: the main stalk of a **plant** that develops buds and shoots and usually grows above ground.

Plant root: part of a **plant** that is usually hidden underground. **Roots** have several purposes. They hold the **plant** in the ground and keep it upright. They take water and food from the soil.

Plant flower: **Flowers** make seeds that can **grow** into new **plants** and attract animals and bugs to spread seeds through their colors, smells and ability to make fruit.

Plant seed: **Seeds** are the small parts produced by **plants** from which new **plants grow**.

Classroom Setup:

Students should be working in groups of four.

*Note: Cattails are dramatic plants to use and students love seeing all the seeds removed, however if a cattail cannot be obtained, then any large flower will do. Azaleas and tulips work really well.

Procedure:

Step 1: Volunteer will dissect and highlight the different parts of a cattail.

Students will draw (or label a worksheet that has been prepared). the various parts as teacher explains.

Parts should include: roots, stem, leaf, flower, fruit, and ovaries. The fuzz alongside the flower may be carefully pulled, and the magnifying lens used to observe fruits and ovaries.

Step 2: Discuss the following questions with the class:

- Describe the leaves.
- How are they attached?
- How thick are they?
- What makes the leaves so difficult to tear?
- Describe the stems and the shoot?
- Is there a difference between the two?
- What is the role of each?
- How are seeds spread?

Step 3: Explain to students that Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. The shape and stability of all designed objects are related to their function(s).

All organisms have external parts. We just learned about all the plant parts and how they each have a different role or function is helping the plant survive. For today we are going to brainstorm what problems we know of that might be solved by looking at plant structure and function to find a solution. ASK: Does anyone have any ideas of a human problem that might be solved by looking at how plants survive? If no one can answer suggest the following one at a time to see if they initiate some ideas.

- Drinking from a special designed straw
- Designing clothing or equipment to protect workers by mimicking the ways plants protect themselves
- Stabilizing structures by mimicking roots on plants
- Have you ever had a hard time finding a good hide and seek spot? Can plants help you solve that problem?

*Note: be sure to highlight parts of a plant that might be useful when designing a solution. (Thorns as protection, Roots for stability, stems for transporting water up, etc. This lesson will require a bit of thinking on your feet as you help students create models or drawings of their solutions.

STEP 4: Now ask students to make a model of an invention they create that uses how a plant part functions. For example, a student could build a silly straw with paper or pipe cleaners and it would work in the same way a plant stem works. An invention (maybe a new piece of clothing) that uses Velcro (comes from how plants protect themselves); a building that has support underground like roots; The newness of the inventions are less important than the students thinking of how one plant part functions and creating something else also using something similar to that function. Roots: underground piping

Materials:

Description	Quantity	Can Be Purchased
Cattails*	One per class	Found in wetland areas
Magnifying lens	At least one per group	Wal-Mart, Target, etc
Plant leaves	At least one per group	Outside
Rubbing alcohol	One large bottle	Drugstore, grocery store, etc

Art supplies for inventions materials

Good selection for the whole class. May be part of classroom

1-LS1-2 From Molecules to Organisms: Structures and Processes

Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

TITLE: What is survival?

SUBJECT AREA: Biology

GRADE: 1

VOCABULARY:

CLASSROOM SET-UP:

PROCEDURE:

Step 1: Play Gloria Gaynor's song "I Will Survive? So kids can hear it (From your phone should work)

ASK: What does the singer say?

"I will not lay down and die"

"I will survive"

Take suggestions, but do not respond or correct.

Step: ASK: What do you think survive means? If no one raises their hand, try this:

"Okay if you think it means stay alive raise your hand, but if you think it means die cross your arms." Basically, give two choices, with the correct one being very obvious, so that students learn the answer in a fun way.

Step 3: After 2 or 3 minutes SAY: Today we are going to start leaning about survival, and we are going to figure out what animals need to survive.

Step 4: Hold up a picture of a polar bear and read out loud

This is a Polar bear. Polar bears live in the Arctic where it is VERY cold. They have a very good sense of smell and hunt seal for food. Before it gets too cold in the winter months, polar bears eat and drink a lot and then climb in a warm cave to live while hibernating through the cold winter. (To add more visuals here, you can find a video of a polar bear)

Step 5: ASK: What did the polar bear do to survive?

(As student's answer, confirm their answers with "Yes, that is right they need food, shelter, water, air)

Step 6: Review with the students. SAY: Animals need food & water to survive – What did the polar bear eat?

SAY: Animals need a place to live or a shelter to survive? Where did the polar bear go when it gets very cold in the Arctic?

ASK: So, what do animals need to survive? If answers are not generated by the students,

ASK: If animals need **food** raise your arm, if they don't cross your hands over your chest.

If the need **water**, raise your arm, if they don't cross your hands over your chest.

If they need **air**, raise your arm, if they don't cross your hands over your chest.

If they need **shelter**, raise your arm, if they don't cross your hands over your chest.

Or switch up the options on each question for fun...touch your head, clap your hands, etc.)

Step 7: Watch this short video for reinforcement, if you like

https://www.youtube.com/watch?v=k4UDf3tF_O4

Step 8: ASK students to get a piece of paper and make it look like this:

<hr/>
FOOD:
WATER:
SHELTER:

Ask students to draw a picture of their favorite animal at the top of a piece of paper.

Underneath the picture they should write the words (you will have to put them up on the screen so they can see how to spell these words)

Food:

Water:

Shelter:

Finally, ask each student to complete their drawing, by drawing a picture of what their animal eats next to the word food, what the animal drinks next to water, and where the animal lives when it finds shelter. At the bottom they should also write the word AIR as all animals need to breath.

PRIOR to class we ask that each student make a baggie of various color pipe cleaners each cut into 4 or 5 pieces. Colors should include brown, yellow, red, orange, black, tan, blue, green + any other colors would like.

TITLE: Camouflage

SUBJECT: Biology & Camouflage

Objective: Identify that camouflage is an adaption that helps animals to survive in more than one way.

Big Idea: Now you see it! Now you don't! Let's explore how camouflage can help animals hunt and hide.

Grade: 1st grade

VOCABULARY

Camouflage

Predator

PROCEDURE:

Step 1: Today we are going to talk about another way animals can survive. Who knows what camouflage means?

Take all answers.

Step 2: SAY: Yes, camouflage is when animals blend into their surroundings so they are not seen by other living things. ASK: How does camouflage help an animal survive? ([You can show photos here for visuals](#))

Step 3. SAY: We are going to get our brains ready to study camouflage by doing an experiment. You will each pretend to be a predator. (What is a predator?) A predator is an animal that lives mostly by killing and eating other animals.

Step 4: Great. We are going to pretend that you are a bird predator and you are hungry. Birds eat worms so you will be hunting for worms. Take the baggie you made filled with cut up pipe cleaners, all different colors and gently throw them around the room you are in.

Step 5: I will set my timer for 20 seconds and you will hunt for pipe cleaner worms. When I say stop you will immediately bring the pipe cleaners you have collected back to your work surface. Are we ready to pretend?

Step 6: OK birds, I am going to say 3,2,1 HUNT and you will go and collect as many worms as possible.

READY: 3,2,1 HUNT....

Measure 20/25 seconds and say STOP!

Step 7: SAY: Good job predators. How many worms did you catch.

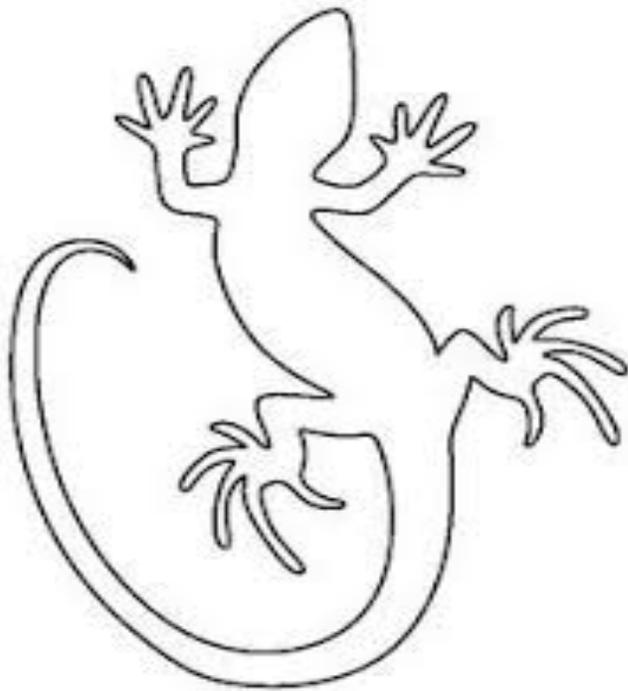
Now I want you to count ONLY your orange worms, and place them on your floor or desk one above the other in a column. Now count only your red worms red. Place them in a column next to the orange worms. Now do the same thing with each color you collected as a bird.

Step 7: SAY – You have created a GRAPH.

Step 8: Ask students to share how many orange (blue, green, etc) they caught. Next ASK students to look and see what worm color did the catch the least? Why do you think you caught the least number of ___"color"___? Now look what color your floor is? Why do you think you caught less ___"color"___ worms on your ___"color"___ floor? Allow several students to try this analysis and share their results.

Step 9: Allow students to come to the realization that if you are an animal that is the same color as your background, you are camouflaged and thus not being eaten as much. You are surviving.

Step 10: Take out your lizard pattern on the sheet of 8.5 x 11 piece of paper



Step 11: SAY: So we just pretended we were birds and caught worms. We caught the least number of worms that matched the color of our floor. They were camouflage so they were harder to see.

Step 12: Watch the short video

<https://www.youtube.com/watch?v=tG8556WuyDo>

Step 13; ASK: Who can remember which animal in the video disguised itself by the color? by pattern on its body?

Which animal could imitate another object? Which animal behaved like another animal?

Step 14: Today you have a lizard picture? This lizard is white. Can you color in your lizard and it's background so the lizard is hiding/camouflaged? Remember you can use color, pattern, imitation of an object or imitating a different animal to camouflage your lizard.

STEP 4: Depending on time remaining, allow a few students to share and explain their lizard camouflage.

MATERIALS: Lizard Pattern (not cut out, just a print of a lizard on a 8.5 x 11 inch piece of paper.

Item	Quantity	Where to purchase
Lizard pattern	1/student	Copy from the teacher

Pipe cleaners, one of brown,, yellow, red, orange, black, tan, blue, green + any other colors would like	1 of each color/student	Craft store
Sandwich size baggie	1/student	Grocery

1-LS3-1 Heredity: Inheritance and Variation of Traits

Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Use observations of the sun, moon, and stars to describe patterns that can be predicted.

1-ESS1-2 Earth's Place in the Universe

Make observations at different times of year to relate the amount of daylight to the time of year.