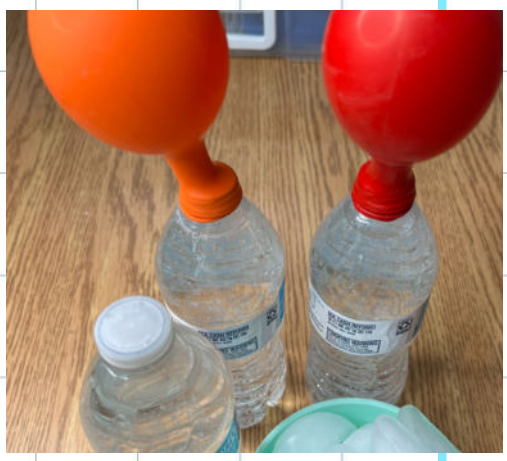
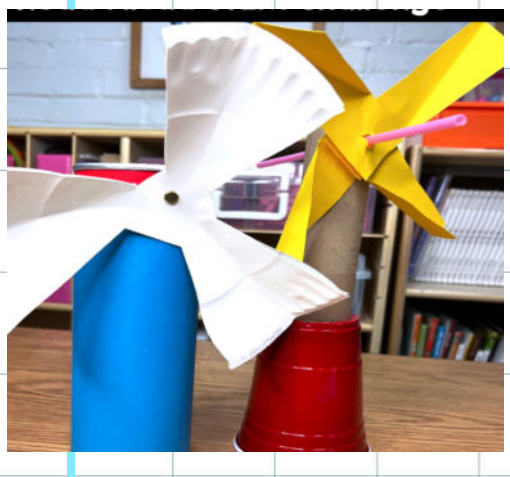
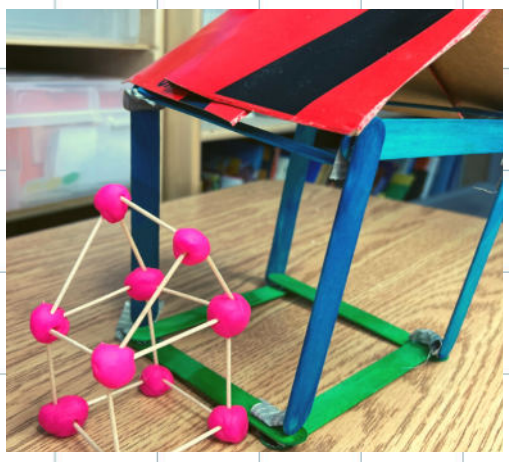


NGSS STEM CURRICULUM GUIDE





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Carly & Adam

I CAN STATEMENTS

THIRD GRADE

Engineering Design

Rosie Revere, Engineer

3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

- I can define simple design problems based on needs or wants.

The Boy Who Harnessed the Wind

3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

- I can generate and compare multiple possible solutions to a problem.

After the Fall

3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

- I can plan and carry out tests to identify aspects of a prototype that can be improved.

Physical Science

Just a Little Bit

3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

- I can investigate forces and motion of different objects.

Oscar and the Cricket

3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

- I can make observations to predict an object's motion.

Magnet Max

3-PS2-3 Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

- I can ask questions to learn about how objects interact.

Magnets Push and Magnets Pull

3-PS2-4 Define a simple design problem that can be solved by applying scientific ideas about magnets.

- I can solve problems using what I know about magnets.

I CAN STATEMENTS

THIRD GRADE

Life Science

999 Tadpoles

3-LS1-1 Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

- I can create a model to show what I know about the life cycle of an organism.

The Honeybee Man

3-LS2-1 Construct an argument that some animals form groups that help members survive.

- I can explain why some animals form groups.

Different? Same!

3-LS3-1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

- I can use information and look for patterns of traits in plants and animals.

Gregor Mendel: The Friar Who Grew Peas

3-LS3-2 Use evidence to support the explanation that traits can be influenced by the environment.

- I can find evidence that traits can be influenced by the environment.

Fossils Tell Stories

3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

- I can use data from fossils to learn about organisms.

What If You Had Animal Teeth?

3-LS4-2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

- I can explain how different characteristics can be helpful to a species.

Beaks!

3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

- I can explain how some organisms are able to survive better than others.

The Water Hole

3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

- I can determine possible solutions to problems caused by changes in the environment.

I CAN STATEMENTS

THIRD GRADE

Earth and Space Science

Weather Forecasting

3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

- I can show weather conditions using charts and graphs.

Recess at 20 Below

3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.

- I can find information to describe climates in different regions of the world.

Planting the Trees of Kenya: The Story of Wangari Mathaai

3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

- I can provide feedback about a solution to a weather-related problem.

Dear STEM Teacher,

You are about to embark on an exciting journey into this hands-on STEM curriculum! We have created lessons to develop your students as designers, engineers, and scientists. They will engage in critical thinking, collaboration, communication, and creativity throughout these lessons.

The elementary lessons that we have designed for kindergarten through fifth grade follow the NGSS (Next Generation Science Standards). The standards are categorized into four domains: Engineering, Physical Science, Life Science, and Earth and Space Science. Not only do the standards help students learn about scientific ideas and practices, but they also demonstrate the connections between different aspects of science, technology, engineering, and math.

While the lessons focus on the NGSS, we have also provided a student-friendly "I Can" statement for you to use in the classroom. The lessons also include a few key vocabulary words that will help to build student understanding. Every lesson includes a STEM read aloud that connects with the content along with a hands-on component that includes experimenting, researching, or designing. Our goal is for students to gain proficiency in science and engineering while engaging in fun, hands-on learning experiences.

Tips for Planning

As you plan for the lessons, you will want to make sure that you have the necessary materials. For most lessons, we suggest general classroom supplies or recyclable STEM/makerspace materials. Some lessons do require more specific items based on the standard that is being studied.

It will be important to determine if the challenges or activities within the lesson should be done independently or in a small group, as that will determine how many sets of materials you will need to gather. You may also want to check your school library for the recommended read aloud selections. If your library doesn't have it, we've included a YouTube link to the read aloud for you to use.

As you prepare to teach the lesson think about any possible misconceptions students may have or any background knowledge that you may need to provide prior to the lesson. We've shared some video links and websites in the resource section of each lesson that includes some background information on the topic/standard.

Why the 3 E's?

We considered a variety of formats for the framework of these lessons. The 3 Es really embody what we believe is an effective lesson:

Engage
Explore
Explain

It is critical that we engage our students, grabbing the interests of the students and pulling them into the lesson. Whether with a game, an interesting item, an image, or a video, the lessons attempt to hook the learners and make them want to learn more about the topics.

Once the topic has been introduced and we have shared some content with our students, it is important for them to dive in. Learners need to explore materials, dig into some research, or engage in scientific processes. In our lessons, students may engage in the engineering design process or the scientific method during the exploration portion of the lesson.

Lastly, students need to explain their thinking. In this part of the lesson, students might present their ideas, create a written response or demonstrate something that they've created. This is also a time for you to further explain ideas and extend student learning.

How to use our Lessons

The lessons are intended to offer a plan that can be used from beginning to end or for teachers to choose the components that they like best. Some lessons may be shorter, taking 30-45 minutes, while others could be broken apart and stretched into multiple days. You have the flexibility to determine which activities will work best for your students and for what period of time.

Lessons are categorized by grade level, but books and activities with the lessons could likely be used in multiple grades. (Again, you are the experts. Do what is best for your students.) If you see a challenge that would be a better fit for another grade level, give it a try!

With any lesson, feel free to make modifications or accommodations that will meet the needs of your students. If a small group is suggested, but you think partner work makes more sense, then go for it. If the lesson suggests a video but there's one that you think will drive home the point a little better, use it (and share it with the Carly & Adam community as well!).

Many of the lessons include challenges that require students to work through the engineering design process. We have offered some ideas for materials, but you may prefer others. Some challenges may include a time constraint. Feel free to increase or decrease the time depending on the needs of your students and the time you have.

We've included some suggested criteria, like the height of a tower or the amount of evidence needed to support a scientific argument. These are recommendations for the age and development of your grade level, but adjust the lessons as needed to make it work for your students. You may look at a lesson and feel like it is too challenging for students or maybe not rigorous enough. We would love your feedback so that we can continually improve our content, making it most useful for you.

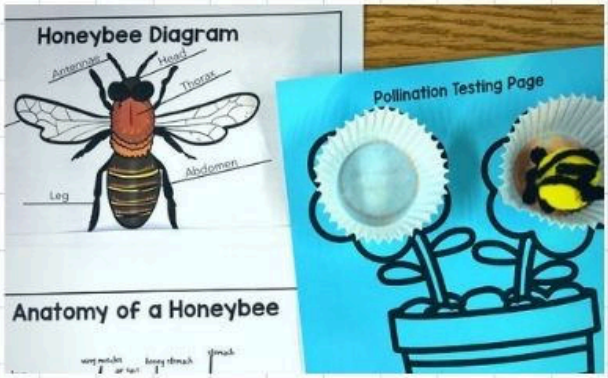
Are You Ready?

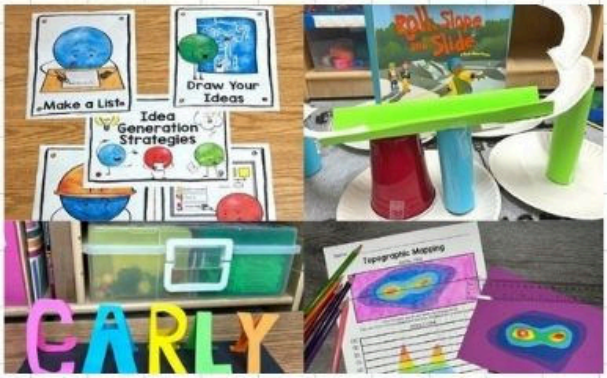
These lessons were designed to support your teaching and promote student learning in fun and engaging ways. Your students will enjoy observing, documenting, designing, and building. As they engage in the lessons, they will be introduced to quality children's literature and new science concepts. Students will use familiar materials and processes to further their understanding of science and engineering. They will work collaboratively on projects and share what they've learned. We are excited to share these lessons with you and hope you are ready to get started!

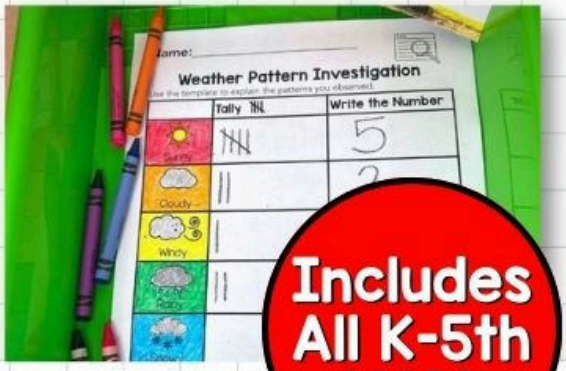
We teach STEM better together!
Carly and Adam

K-5 MEGA BUNDLE

K-5th Elementary STEM BUNDLE







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GRADE LEVEL BUNDLES

Kindergarten NGSS BUNDLE

Covers every NGSS Standard for Kindergarten

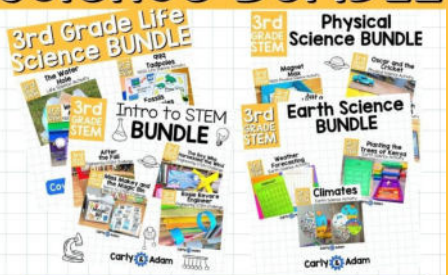
First Grade NGSS BUNDLE

Covers all NGSS Standards

2nd Grade NGSS BUNDLE

Covers all NGSS Standards

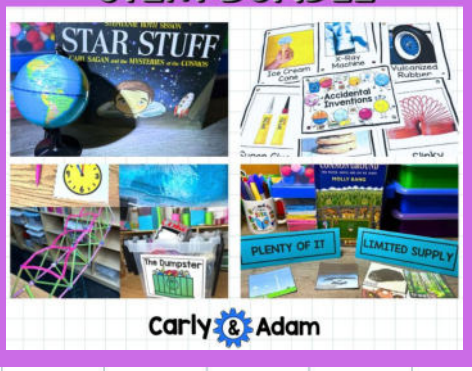
3rd Grade Science BUNDLE



Covers every NGSS Standard for 3rd Grade!

4th Grade Science BUNDLE

5th Grade STEM BUNDLE



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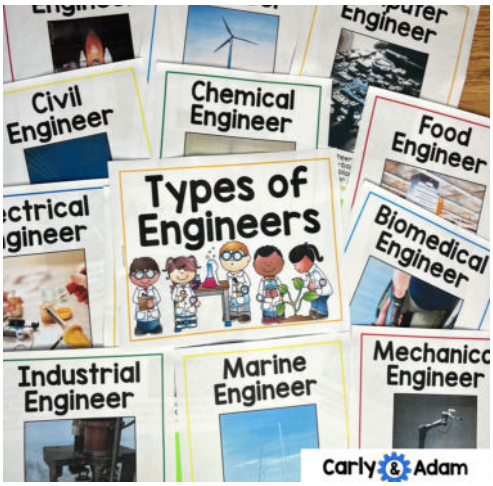
MISS MAKEY



One part of STEM is thinking about materials and using them creatively to solve problems. If we want our third graders to be resourceful and use materials in different ways, we need to provide them with a variety of opportunities to do so. We can introduce ways that student learning can connect with the work of engineers in the field. By learning about different types of engineering, students can begin to build their understanding of what STEM looks like in various careers.

Just like engineers, we can encourage students to use their imaginations to think about how materials can be combined or changed. They will use this mindset to create a nameplate that represents them and share it with their classmates. As students continue to build relationships in school, we can foster communication and collaboration skills so that students can successfully navigate challenges in the STEM classroom and beyond.

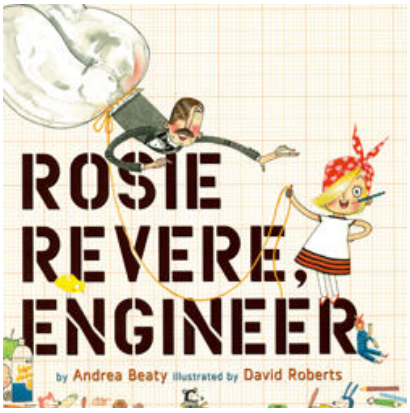
Effective STEM classrooms need to have rules and routines in order for them to function efficiently. Starting in second grade, we introduce the GROUPS acronym: G-Get along, R- Respect others, O- On task, U- Use quiet voices, P-Participate, and S-Stay in your group. These rules will help students to not only work well with others during a STEM challenge but in any collaborative task.

To practice the application of these rules, we designed a mini-challenge where students will work together as a team to complete a challenge. Using various recyclable materials students will construct a model that will represent a type of engineering.

THIRD GRADE
ENGINEERING DESIGN

3-5-ETS1-1

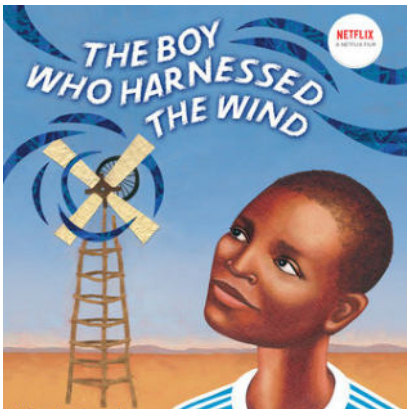
I can define simple design problems based on needs or wants.



Materials:
- Paper
- Tape
- Plastic straws

3-5-ETS1-2

I can generate and compare multiple possible solutions to a problem.



Materials:
- Cardboard
- Paper/cardstock
- Paper plates
- Straws
- Brads
- Tape
- Scissors
- Clean recyclables
- Hair dryer (test windmills)

3-5-ETS1-3

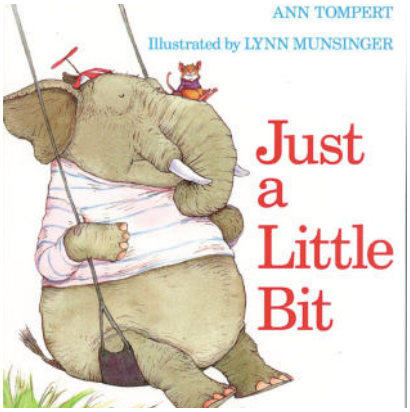
I can plan and carry out tests to identify aspects of a prototype that can be improved.

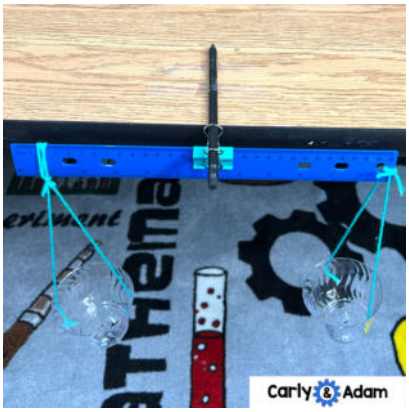
Materials:
- Newspaper
- Tape
- Cardboard
- Plastic Bags
- Recyclable materials
- Can of Pringles

THIRD GRADE
PHYSICAL SCIENCE

3-PS2-1

I can investigate forces and motion of different objects.

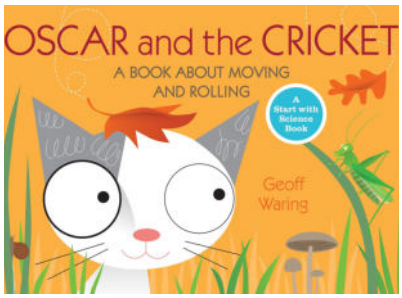




Materials:
- Toy cars/vehicles that roll
- Balls (plastic, inflated, rubber, any size)

3-PS2-2

I can make observations to predict an object's motion.



Materials:
- Painter's tape (or duct)
- Toy car
- Tennis ball
- General classroom supplies

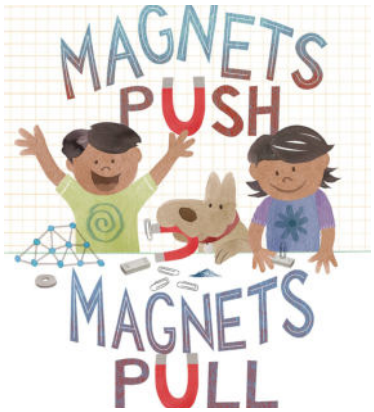
3-PS2-3

I can ask questions to learn about how objects interact.

Materials:
- Magnets
- Magnetic objects
- Non-magnetic objects
- Tray to hold items

3-PS2-4

I can solve problems using what I know about magnets.

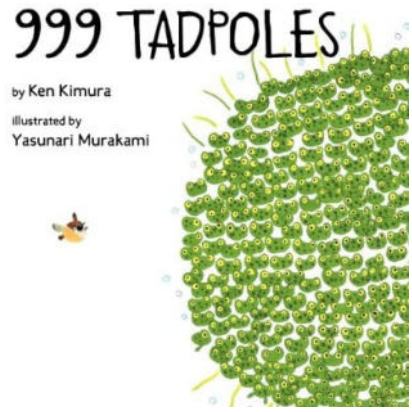


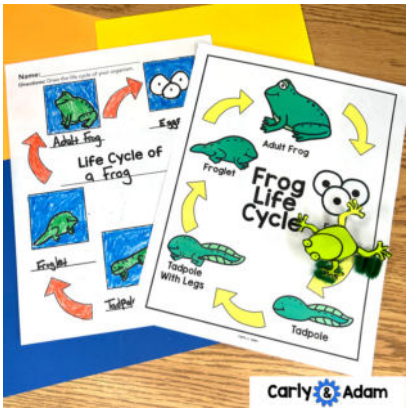
Materials:
- Magnets (wands)
- Bar magnets
- Toy Cars
- Small adhesive craft magnets
- Race track template
- scissors
- Tape
- Cardboard
- Car cutouts
- Paper clips or binder clips

THIRD GRADE
LIFE SCIENCE

3-LS1-1

I can create a model to show what I know about the life cycle of an organism.

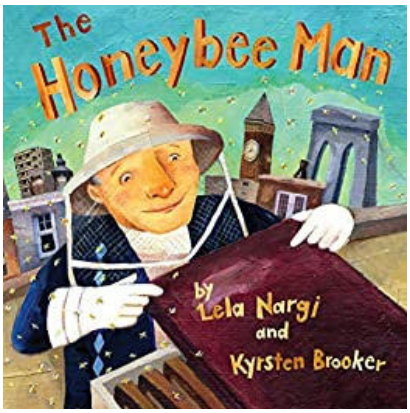




Materials:
- Frog templates (included)
- Paper
- Tape
- Pipe cleaners
- Crayons or markers

3-LS2-1

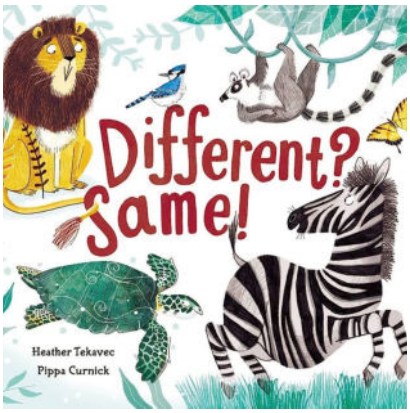
I can explain why some animals form groups.



Materials:
- Stackables (cups, cardstock, plates, etc.)
- Printable job cards

3-LS3-1

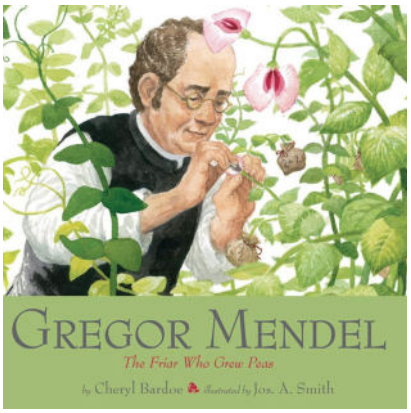
I can use information and look for patterns of traits in plants and animals.



Materials:
- Trait scavenger hunt (included)
- Animal cards (included)

3-LS3-2

I can find evidence that traits can be influenced by the environment.

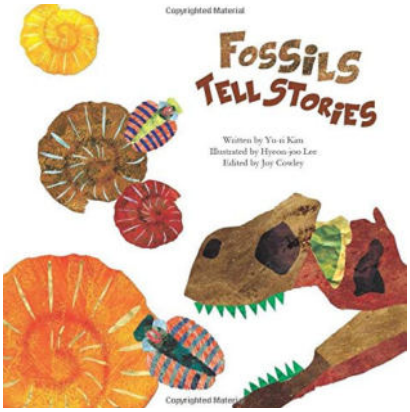


Materials:
- Monster body copies
- Crayons/Markers/Stickers
- Dice
- Monster body parts
- Trait headers
- Picture print outs
- Post-its
- Dry erase markers

THIRD GRADE
LIFE SCIENCE

3-LS4-1

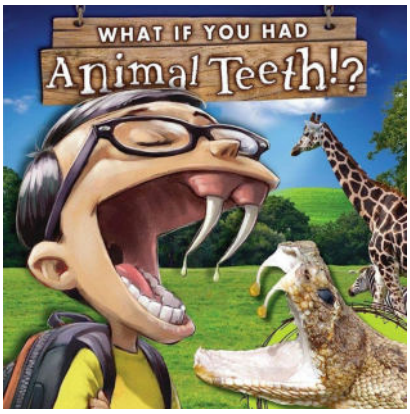
I can use data from fossils to learn about organisms.



Materials:
- Fossil Images (included)
- Books about fossils or access to technology for research

3-LS4-2

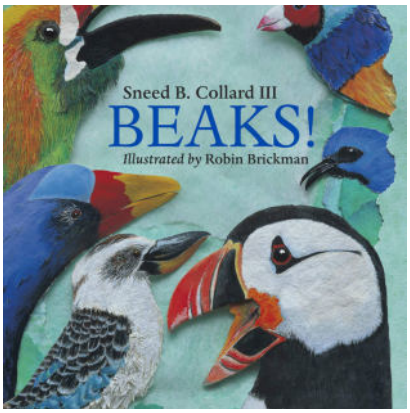
I can explain how different characteristics can be helpful to a species.



Materials:
- Construction paper
- Crayons/Markers
- Glue or tape
- Pipe cleaners
- Cotton balls
- Cups
- Books about animals

3-LS4-3

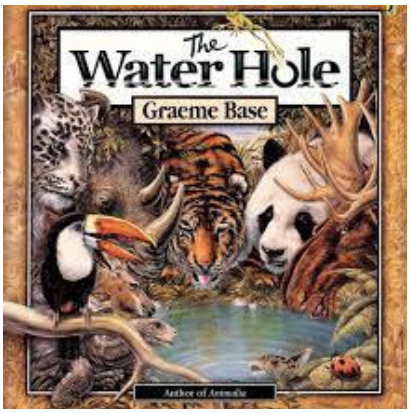
I can explain how some organisms are able to survive better than others.



Materials:
- Paper
- Pencils
- Crayons/Markers
- Grabbing tools
- Small materials to pick up
- Dish with water
- Books about beaks

3-LS4-4

I can determine possible solutions to problems caused by changes in the environment.

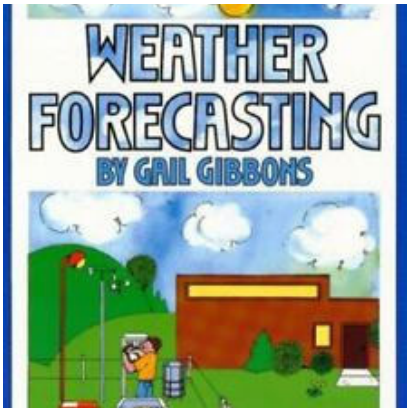


Materials:
- Makerspace consumables (cardboard, paper towel rolls, cups, bowls, straws, plastic bottles)
- Aluminum foil
- Tape
- Aluminum or plastic tray
- Water source (faucet, watering can)
- Blue food coloring (opt.)
- Measuring cup
- Sticky notes
- Chart paper

THIRD GRADE
EARTH AND SPACE SCIENCE

3-ESS2-1

I can show weather conditions using charts and graphs.

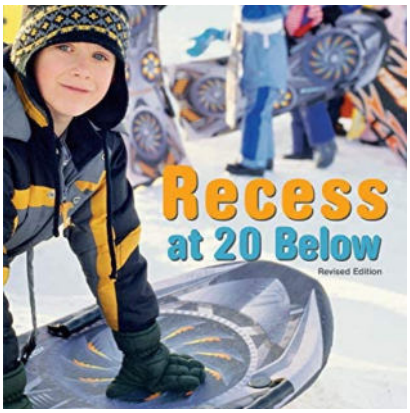


Materials:

- Chart templates (included)
- Weather calendars (included)
- Crayons/markers/color sticks

3-ESS2-2

I can find information to describe climates in different regions of the world.

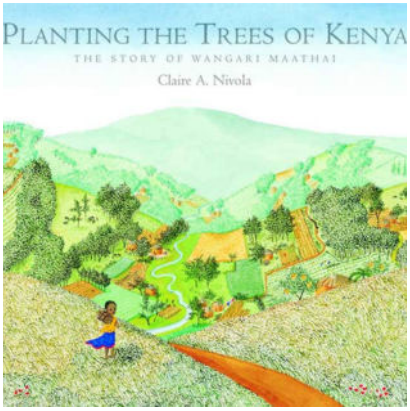


Materials:

- Crayons/markers/color sticks
- Glue
- Scissors
- Yarn/string/ribbon
- Library books about climates/online resources

3-ESS3-1

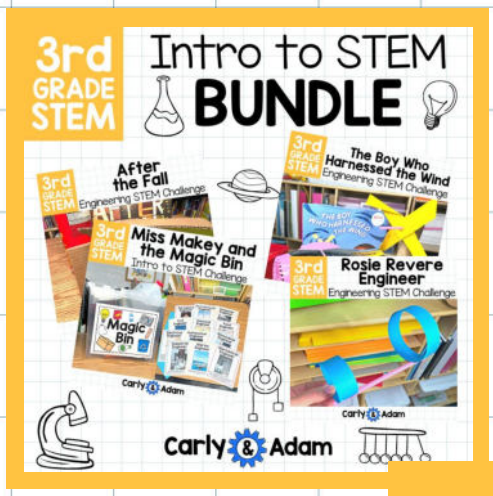
I can provide feedback about a solution to a weather-related problem.

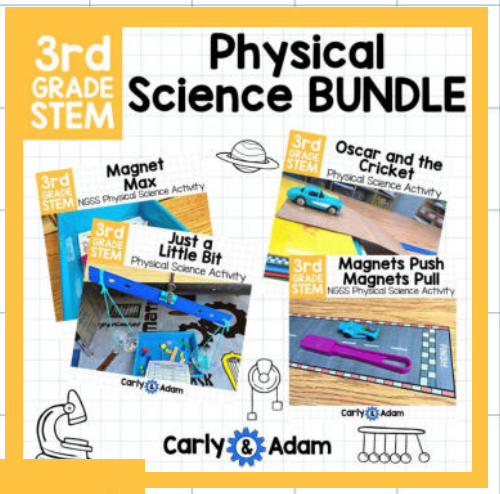


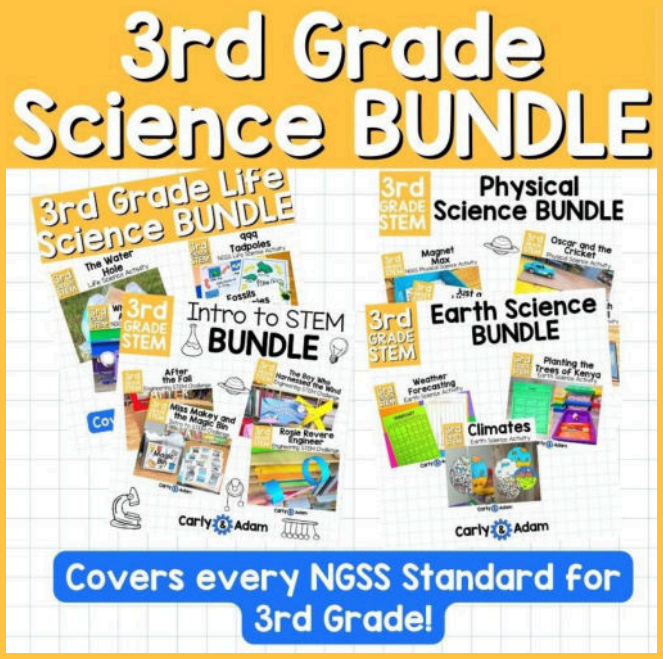
Materials:

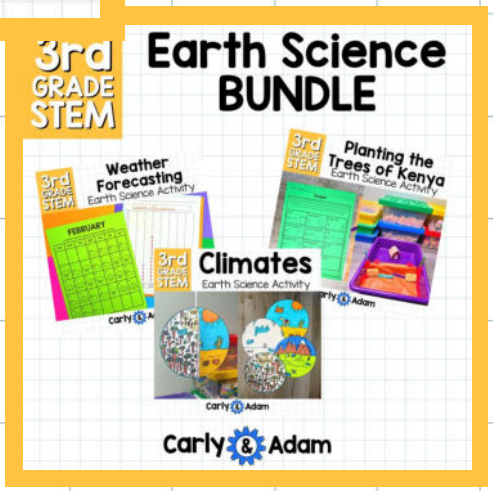
- Aluminum or plastic tray
- Measuring cup
- Various barrier materials: cotton balls, paper towels, modeling clay, sponges, straws, popsicle sticks, cups, pieces of plastic bags
- Attachment materials: tape, paper clips, rubber bands
- Toilet paper rolls with door printable
- Sticky notes

THIRD GRADE NGSS STEM BUNDLES









3-5 MEGA BUNDLE

Click for more info!