

2nd Grade STEM Standards + SwiSTEM Lending Service= More Hands-On Learning!

2-PS1-1 *“Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.”*

1. Stirring Hot Plate

This might seem like an odd choice, but we think our stirring hot plate would be an easy way to demonstrate how water can be a liquid, solid, and a gas. We will supply beakers so that all you need is ice for an amazing classroom demonstration. Place ice in the beaker (solid), then turn on the plate. It will quickly melt (liquid). Then as it starts to create steam, place another beaker on top of the first one. Students will be able to see the vapor (gas). Technically you don't need to do that step for the standard, but it can be fun. It may look complicated, but it is very easy to use!



2. For a creative way to address this standard (and teach a little bit about coding at the same time), try our Spike Essentials sets. We have 12 of these sets, and students first build a model and then do some coding. You must have a device with Bluetooth capabilities to use these sets. The lesson entitled **Classify and Choose Materials** addresses this standard well. Click for the [Lesson Plan](#). The lesson plan does not include building instructions. Click on [Classify and Choose Materials Build](#) for instructions. To learn more about Spike Essentials, see the [Web Site](#).



2-PS1-2 “Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.”

1. We love this lab from the Vernier company. You will collect real data using simple equipment, and students will be able to use the data to determine the purpose of each shoe (the lab looks at different types of shoes and their purposes). Vernier equipment is easy to use. You just plug the sensor into the Labquest unit, and data appears! The [Sole Purpose Lab](#) requires a Labquest unit, a Vernier temperature probe, and 4 shoes. Perfect for a classroom demonstration.

2-PS1-3 “Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.”

1. **Keva Planks.** We have two classroom sets of this amazing tool. Each set has hundreds of wooden planks, and they can be used for free building or defined building challenges. See the [educator guide](#) for lessons and activity ideas. For more information and to see the planks in action, [Keva Planks web page](#)



2. **K-Nex Building Sets.** Each set has 705 pieces and an instruction book. The prescribed builds would probably be too difficult for most 2nd graders, but the sets would be perfect for free builds. We have 7 sets available.



3. **Tangrams.** We have a classroom set of these helpful plastic shapes. Includes squares, triangles, and other shapes that can be formed into other shapes or art forms. It also comes with a teacher guide.
4. For a creative way to address this standard (and teach a little bit about coding at the same time), try our Spike Essentials sets. We have 12 of these sets, and students first build a model and then do some coding. You must have a device with Bluetooth capabilities to use these sets. The lesson entitled **Redesigning to Make New Objects** addresses this standard well. Click for the [Lesson Plan](#). To learn more about Spike Essentials, see the [Web Site](#).



5. [Magnetic Tiles](#). Each set has 102 building tiles of different shapes and colors. The tiles can be overlapped to demonstrate color relationships (blue stacked with yellow makes green), teach shapes and colors, and can even be helpful for counting. And, of course, they are a great building set! Perfect for pre-school through elementary students. We have 2 sets available.



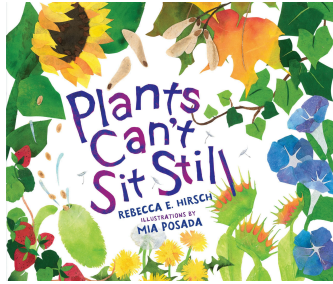
2-PS1-4 *“Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot”*

1. **Stirring Hot Plate.** (see description above under **2-PS1-1**). You could even use the hot plate to boil an egg.

2-LS2-2 *“Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.”*

1. We have a classroom copy of the book **“Plants Can’t Sit Still”** which provides great background for meeting this standard. Vivid verbs and creative vocabulary words show students all the different ways that plants move. The focus is on the

reasons that movements are important to the plant's growth and survival. These movements are the foundation for plants dispersing seeds.

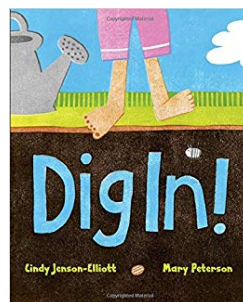


2. For a creative way to address this standard (and teach a little bit about coding at the same time), try our Spike Essentials sets. We have 12 of these sets, and students first build a model and then do some coding. You must have a device with Bluetooth capabilities to use these sets. The lesson entitled **Pollination** addresses this standard well. Click for the [Lesson Plan](#). To learn more about Spike Essentials, see the [Web Site](#).

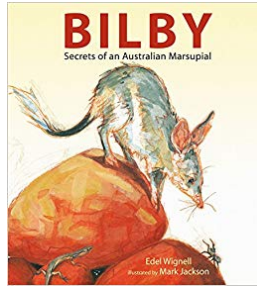


2-LS4-1 *"Make observations of plants and animals to compare the diversity of life in different habitats."*

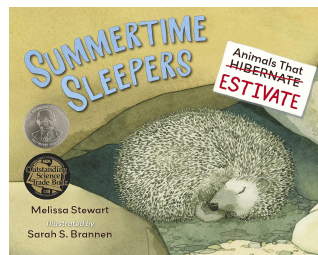
1. We have a classroom copy of the book **"Dig In!"** which provides great background for meeting this standard. Although the text is very simple for this age group, it thoroughly explains how living things in an environment can cause changes to the earth.



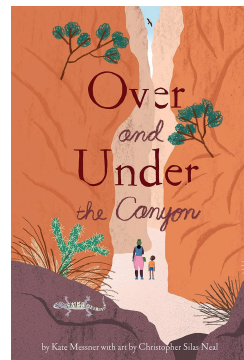
2. We have a classroom copy of the book **"Bilby: Secrets of an Australian Marsupial"**. Introduce students to a lesser-known Australian marsupial! Vivid paintings portray this species in the rugged Australian terrain.



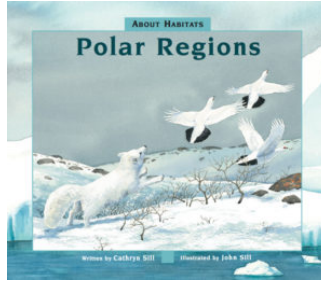
3. We have one copy of the book **“Summertime Sleepers”**. From the ladybug to the salamander, from the lungfish to the desert hedgehog, twelve estivating animals (animals that sleep in the summer) and their habits--both when sleeping and awake--are explained through clear text and elegant watercolor illustrations.



4. We have one copy of the book **“Over and Under the Canyon”**. This book takes young readers on a tour of a desert canyon ecosystem. Over the canyon, the sun scalds the air, baking desert mud to stone. But under the shade of the cliffs hides another world, where bighorn sheep bound from rock to rock on the hillside, roadrunners make their nests in sturdy cacti, and banded geckos tuck themselves into the shelter of the sand.



5. We have one copy each of books in a series that focus on different habitats. We have **“About Habitats: Polar Regions”** and **“About Habitats: Forest”**. These books both provide an excellent overview of Polar Regions and Forests!



6. For a creative way to address this standard (and teach a little bit about coding at the same time), try our Spike Essentials sets. We have 12 of these sets, and students first build a model and then do some coding. You must have a device with Bluetooth capabilities to use these sets. The lesson entitled **Habitats** addresses this standard well. Click for the [Lesson Plan](#). To learn more about Spike Essentials, see the [Web Site](#).



2-ESS1-1 *“Use information from several sources to provide evidence that Earth events can occur quickly or slowly.”*

1. We have three **Volcanoes** that are perfect for demonstrating a quick Earth event. They are fairly basic models, and they do come with an easy recipe to make “lava” that simulates a volcanic eruption.



2-ESS2-1 *“Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.”*

1. For a creative way to address this standard (and teach a little bit about coding at the same time), try our Spike Essentials sets. We have 12 of these sets, and students first build a model and then do some coding. You must have a device with Bluetooth capabilities to use these sets. The lesson entitled **Protection from Wind** addresses this standard well. Click for the [Lesson Plan](#). To learn more about Spike Essentials, see the [Web Site](#).



2-ESS2-3 *“Obtain information to identify where water is found on Earth and that it can be solid or liquid.”*

1. **Globes.** We know these are not standard in classrooms anymore, so we have 7 available for loan. An easy way for students to visualize the world and see where the water is!



Engineering Standards

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.” AND*

K-2-ETS1-2 *“Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.”*

1. We have an amazing set of Legos called **Lego Learn to Learn**. We have 45 of these kits, so each student can have his or her own set of 72 Legos, including

mini-figurines. The [curriculum](#) that comes with it includes directions for three activities that would help you address this standard:



- [Across the River](#) guides students in building a simple bridge to help Emma and Thomas cross a river (p.11 in curriculum manual)
 - [Maggie's Wheelchair](#) helps students design a new wheelchair for Maggie (p.12 in curriculum manual)
 - [My Machine Invention](#) challenges students to invent a machine (p.13 in manual)
2. **Lego BricQ Motion Essentials Sets** would be an even more advanced way to meet this standard. We have 12 sets, so students would work in groups. Both activities involve the students building a Lego model and then testing and improving it. The [web site](#) gives you a good overview of this set.
- a. [Dog Obstacle Course](#) teaches push and pull as well as guides students through a process to create and improve obstacles as part of a Dog Show.
 - b. [Relay Race](#) also teaches push and pull as students create and improve on designs for a car.

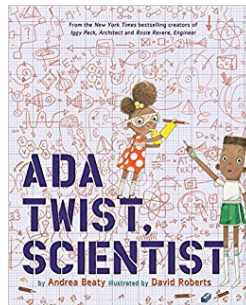


3. **Lego STEAM Park Sets** have an activity written to address these Engineering standards. These sets have lots of pieces that make addressing these standards fun as well as educational.

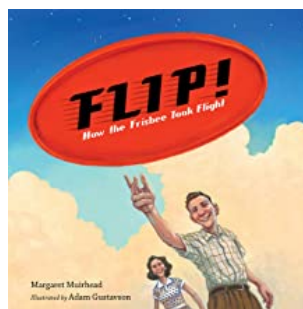
- a. **Moving on Water**: This activity helps students understand why things float and test different sails
- b. **Gears**: This activity teaches students how gears work (this really only addresses ETS 1-1 well)



4. To incorporate a little literature about engineering into your classroom, why not read “**Ada Twist, Scientist**” to your students? We have one copy of this book about a girl who couldn't stop asking questions. While the book includes information on force and motion, it goes beyond by including a focus on inquiry. Students will see how they can use the scientific process to understand how our world works.

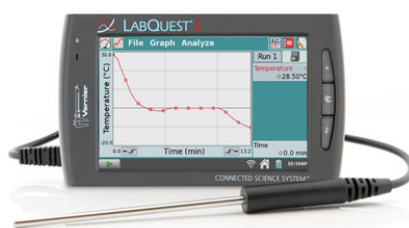


5. Another great book about engineering is “**Flip! How the Frisbee Took Flight**”. We have one copy of this biography about the inventor of the Frisbee that follows the twists and turns of innovation and highlights the persistence it takes to succeed.



K-2-ETS1-3 “Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.”

1. **Vernier Labquest and Temperature Probe** allow you to set up a very simple experiment and collect easy-to-use data. The folks at Vernier have written a lab using this equipment designed just for Elementary School students. The lab guides students in designing a simple thermos and then using the temperature probe to see how well it works. Vernier equipment is very easy to use— you just plug in the temperature probe and it starts to take temperature readings! We have over 30 of each available, but we would recommend just 1-2 so you could conduct the testing with the students. For more information, see [Vernier Thermos Lab](#). Another great Vernier lab is [Baggie Mittens](#). It does something similar but has students create mittens instead.



Math Standards

2.NS.3 and 2.NS.4 *Determine whether a group of objects (up to 20) has an odd or even number of members AND Define and model a "hundred" as a group of ten tens. Model place value concepts of three-digit numbers, multiples of 100, and equivalent forms of whole numbers using objects and drawings*

1. **Keva Planks:** see description in **2-PS1-3**. Each set has enough planks for students to group planks as needed.

2.G.1: *“Identify, describe, and classify two- and three-dimensional shapes (i.e., triangle, square, rectangle, cube, right rectangular prism) according to the number and shape of faces and the number of sides and/or vertices.”*

1. **Clear Geometric Shapes.** We have a large box of these fillable plastic shapes that can be used to demonstrate 3D shapes.



2. **Manipulite Geometric Solids.** We have a large box of these foam shapes that help students to actually “see” 3D objects.



2.G.2 *“Investigate and predict the result of composing and decomposing two- and three-dimensional shapes.”*

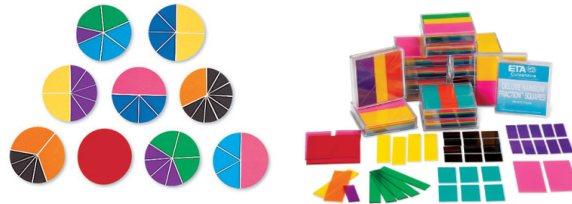
1. **Folding Geometric Shapes.** We have 3 sets of the folding shapes, and they are perfect for demonstrating the relationship between 2- and 3-D shapes.



2.G.4 *“Partition circles and rectangles into two, three, or four equal parts; describe the shares using the words halves, thirds, half of, a third of, etc.; and describe the whole as*

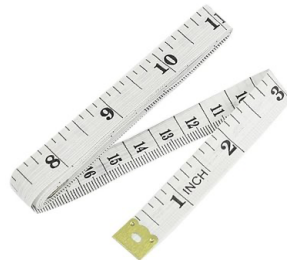
two halves, three thirds, or four fourths. Recognize that equal parts of identical wholes need not have the same shape."

1. **Deluxe Rainbow Fraction Circles and Squares.** We have a class set of 30 of these sets. Perfect for showing how circles can be divided into fractions.



2.M.2 *"Estimate and measure the length of an object by selecting and using appropriate tools, such as rulers, yardsticks, meter sticks, and measuring tapes to the nearest inch, foot, yard, centimeter, and meter."*

1. We have classroom sets (30 each) of **rulers** and **yardsticks**. We also have 30 flexible **cloth measuring tapes**.



2.M.3 *"Estimate and measure volume (capacity) using cups and pints. Add and subtract to solve real-world problems involving capacities that are given in the same units or obtained through investigations."*

1. We have large sets of **measuring cups**, including cups and pints. Ask us for more specifics when you know exactly what you are looking for– we probably have everything you need!



Enrichment

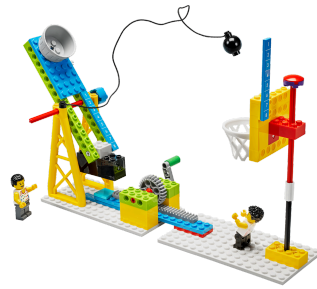
We have many excellent resources that are perfect for enrichment or that you could use to meet standards with a little creativity. Here are some of our favorites (but feel free to look for more on our website!):

Keva Planks



We have two classroom sets of this amazing tool. At lower Elementary levels, they can be used to teach letters and basic math concepts. (Perfect for any of the **Number Sense Math Standards** or even the **Computational and Algebraic Thinking Standards**). But they are also perfect for building! See the [educator guide](#) for lessons and activity ideas. For more information and to see the planks in action, [Keva Planks web page](#)

Lego BricQ Motion Essentials



We have 12 of these great kits, and most second graders are able to benefit from these sets (especially when working in groups). No technology is needed, and the sets use a sports context to help students understand concepts like forces and motion. Students will also develop building and problem solving skills. It comes with excellent lessons ([example lesson](#))— and no technology is needed. Each set also includes a student building guide. You can learn more at the Lego Education [BricQ Motion Essentials Web Page](#)

Indi Cars

We have two classroom sets of these cars. Each set has 8 cars that help teach the basics of coding. Best of all, you don't need any additional technology to use them! Each car comes with tiles that the cars drive on, and each color tile “tells” the car to do something different. These cars have been a hit wherever they go. Perfect for teaching **Programs and Algorithms** in the 2nd grade Computer Science standards. For more info: [Indi](#) It also has an excellent [Educator Guide](#).



Frog Development Set

We have 7 of these sets which include embedded specimens featuring various stages of frog development. Your students get a close-up look at frog eggs, a tadpole, a

tadpole with hind legs, a tadpole that has developed hind legs and forelegs, a tadpole with a shrunken tail, a froglet, and an adult frog. Each mount is numbered from 1 to 7, and each number corresponds to the developmental stage described on the included information card.



You could also add our microslide viewers to this lesson so that the students could see these stages through a simulated microscope. We have a microslide viewer set that goes with it called **"Egg to Tadpole to Frog"**

