

**\*Standards listed in bold font are Utah Core Science Standards. Those that are not in bold are supplemental.**

**\*\*Words that are in bold font in the lesson are vocabulary words that your child should know by the end of the lesson.**

**\*\*The general supplemental science standards (1, 1.1, 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.2, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.3, 1.3.1, 1.3.3, and 1.3.4) are included naturally in the lessons and will not always be listed in the Standards Taught for each lesson**

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## Title of Lesson 1: Properties

Standards Taught: 2.S.2.3.1, 2.S.2.3.2, 2.S.1.1, 2.S.1.1.1, 2.S.1.1.2, 2.S.1.1.2, 2.S.1.2

Materials:	Preparation:	Implementing the Lesson:
Wood		Tell your child that today we have <b>various</b> (meaning several different) materials. Ask them to name some of the objects in front of them.
Water		Next, ask your child to sort the objects into three groups by size: small, medium, and large. When they are done, briefly discuss your child's sorting choices and compare and contrast the objects by size. Tell your child that sorting in science is called classifying.
Sponge		Continue classifying by bringing all the materials back together and then asking your child to sort by each of the following in turn: color, flexibility, hardness, texture, and solid vs. liquid.
Stuffing		Bring the objects back together. Explain that we just classified these objects by their properties. Now, we are going to <b>identify</b> each object.
Rubber Band		Ask your child to choose an object, identify it (tell you what it is) and point out its properties. Discuss that object's purpose. Finally, ask your child to tell you how the object's properties influence its purpose. An example would be that the shoes have hard bottoms, comfortable insides, and are the same size as your child's feet. This makes them comfortable to wear gives them the ability to protect the wearer.
Shoe Box		Repeat with each object discussing its identity, properties, purpose, and how its properties relate to the purpose of the object.
Carpet or Blanket		
Shoes		
Photo Frame		
Musical Instrument		
Play-doh		
Spoon		
Drinking Straw		
Drinking Glass		
Ceramic Mug		

**Title of Lesson 2: Can You Fix It?**

**Standards Taught:** 2.S.2.3.4, 2.S.1.1, 2.S.1.1., 2.S.1.1.1, 2.S.1.1.2, 2.S.1.1.3, 2.S.1.1.4, 2.1.1.5, 2.S.1.2, 2.1.2.3, 2.S.1.2.4, 2.S.1.3.1

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Water Ice Cube Tray Freezer Match Observation Sheet Lesson 2	Freeze and ice cube in the ice cube tray	<p>Tell your child that today we are going to learn about different kinds of change. Some changes are reversible, meaning they can be undone and we can make the matter (or things) that changed go back to exactly as it was before. Other changes we cannot reverse and we can never make the matter back into what it was before.</p> <p>Give your child the water and work through question one on the observation sheet.</p> <p>Next, take the ice from the freezer and give it to your child. Do question two on the observation sheet.</p> <p>Explain to your child that ice is simply water that was frozen. The heat from the water was taken out in the freezer and it changed from a liquid (water) to a solid (ice). Ask your child what kind of change they think this is and have them record their answer on the observation sheet (question 3).</p> <p>Explain that if we add heat to the ice (by leaving it in a warm room, in the sun, or in a pot on the stove) the change will reverse and the ice will melt into water, just as it was before. Leave the ice to melt using one of the methods above. Later, come back to it and ask your child to answer question 4 on the observation sheet.</p> <p>Next, show your child the match and ask them to work through question 5 on the observation sheet.</p> <p>Light the match, allowing it to burn for a few second and the top to turn to ash. Remind your child that children should not touch matches without help from adults. Explain that this change is similar to the change from ice to water because we are adding heat.</p> <p>Ask your child to answer observation sheet question 6 and 7.</p>

## Observation Sheet: Lesson 2

1. Observe the water and **investigate** its properties. What does it look like? What does it feel like? Does it move? Draw a picture below of the water.
2. Observe the ice and investigate its properties. How is it different than the water? How is it the same? Draw a picture of the ice.
3. Is this a reversible change? Can we turn the ice back into water? If yes, how?
4. How did the ice change? Was the change reversible? How can we turn it back into ice? Draw a picture of the water below.

5. Observe the match and investigate its properties. What does it look like? What does it feel like? Draw a picture of the match below.

6. **Communicate** your **observations** on how the match changed. How is it the same? How is it different? Draw a picture of it below.

7. Is the change we observed in the match a reversible change?

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### Title of Lesson 3: Matter Cannot Be Destroyed

**Standards Taught:** 2.S.3.2, 2.S.1.1, 2.S.1.1.1, 2.S.1.1.2, 2.S.1.1.3, 2.S.1.1.4, 2.S.1.1.5, 2.S.1.2.3, 2.S.1.2.2

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Several Pieces of Paper  Chocolate Chips  Food Scale  Heat source (microwave or stove)  Bowl or Cooking Pot		<p>Remind your child of the last lesson by discussing the types of change: reversible and not reversible. Ask your child to remind you of which change was reversible and which was not. Next, ask your child if they think that there was less matter (stuff), more matter, or the same amount of matter in the ice vs. the water. Explain that matter just means something that takes up space. Everything is made of matter. Point out that though the properties of the ice changed, the amount of matter did not.</p> <p>Give your child the paper. Ask them to describe it. How heavy is it? What does it look like?</p> <p>Have your child fold the paper as many times as they like. Discuss its shape and size again. How does it look different? Was the matter destroyed or is it still made of the same amount of paper?</p> <p>Have your child open the folds of the paper and <b>demonstrate</b> that the matter is still equal to the paper at the start, though we changed its properties.</p> <p>Next, ask your child to tear the paper three times. Discuss shape and size. How did the properties change? Did we destroy the matter?</p> <p>Have your child reconstruct the paper pieces like a puzzle and point out that the paper is still the same amount of matter. Finally, show your child the small bowl or pot of chocolate chips. Place a potholder on the scale and then ask your child to weigh the bowl/pot on the food scale recording the weight below on the <b>data</b> chart. Discuss the physical characteristics of the chocolate (shape, size, color, hardness).</p> <p>Help your child melt the chocolate chips. As they melt, ask your child to describe how the properties of the chocolate are changing (shinier, different shape, not as hard). When the chocolate is melted completely, carefully help your child place the bowl/pot on the scale (make sure the potholder is still there). Ask your child to record the weight on the data chart. Is the weight the same? The chocolate chips changed but did the amount of matter?</p> <p>Ask your child what their conclusion is from this experiment. What did they learn about matter? Discuss the fact that the amount of matter did not change in either experiment, though the properties did. Explain that your conclusion is that we cannot destroy matter, it is always the same amount.</p>

<b>Weight Before</b>	<b>Weight After</b>

#### Title of Lesson 4: Types of Force

Standards Taught: 2.S.3

Materials:	Preparation:	Implementing the Lesson:
Ball Bean bag		<p>Tell your child that today we will be learning about force. Explain that force is something that makes an object move. Give some examples of force in your everyday life (e.g. wind blowing leaves, a car driving down the road, a child on a swing, etc). Discuss the motion of each example and explain that a force is creating that motion.</p> <p>Set the ball on the floor. Ask your child if the ball will move by itself. Explain that the ball is not living and cannot move on its own. We need to exert a force on it to get it to move.</p> <p>Have your child to pick up the ball. Ask the following: Did the ball move? Why did it move? In what direction? Explain to your child that when they picked up the ball, they exerted a force upward, making the ball move.</p> <p>Have your child roll the ball by pushing it forward. Ask the following: Did the ball move? What direction did it move in? Why did it move? Explain that by pushing it, your child exerted a force to the forward and that force moved the ball.</p> <p>Repeat the action, this time asking your child to pull the ball and quickly let go. How was that the same? How was it different?</p> <p>Finally, ask your child to set the ball on a table and gently push the ball. Allow the ball to fall off the table. Ask the following: What happened to the ball? Which direction was it going while it was on the table? Which direction did it go after it fell off? Explain that the force of the gentle push made the ball travel across the table. Point out that there was a second force that made the ball fall down after it reached the edge of the table. That force is called gravity and it is exerted by the Earth, where we live. Gravity pulls us all down so that we don't float away. Discuss life in a world that experiences <b>weightlessness</b> and how difficult it would be. This is a great time to look up a video of astronauts experiencing this phenomena to show your child.</p> <p>Put the ball away and get out the bean bag. Repeat the experiments, questions, and discussions in the same way, this time with the bean bag. Discuss the similarities and differences. Point out that the ball and bean bag are different weights and shapes, making movement change.</p> <p>Finally, allow your child to experiment with different ways of preventing motion. Ask them to do the experiments once again, this time trying to stop the object before it stops on its own. Ideas include placing your hand in the way, adding a block in the path of the object, rolling the object towards a wall, placing a chair at the end of the table so the ball doesn't fall, or pushing or pulling with a softer force so the object doesn't travel as far.</p>

**Title of Lesson 5:** Forces on Different Materials

**Standards Taught:** 2.S.3

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Feather  Toy Car  Heavy Object that is safe to drop  Observation Sheet Lesson 5		<p>Review with your child the definition of force: something that makes an object move.</p> <p>Give your child the observation sheet and explain that forces work differently on different objects. Some objects need less force to move while others need more. Ask them if they have ever lifted a piece of paper. How hard was it? What about a heavy box? What is the difference? Explain that because the box weighs more, it took more force to lift it than it did to lift the paper, which was lighter.</p> <p>Set the feather, toy car, and heavy object in a row on the table. Ask your child to push each object across the table, answering the questions in the “Push” section of their observation sheet for each one.</p> <p>Repeat the experiment, this time exerting force by blowing on the objects in turn. Have your child record their observations.</p> <p>Repeat the experiment, this time picking up each object in turn. Have your child record their observations.</p> <p>Repeat the experiment, this time dropping each item in turn. Have your child record their observations.</p> <p>Briefly discuss your child’s answers for each experiment.</p>

## Observation Sheet: Lesson 5

### **PUSH**

1. What is exerting the force on the objects and making them move?
2. What direction are they moving in?
3. Which object moved the fastest? The slowest?
4. Why did the objects move differently or take more or less effort to move?

### **BLOW**

1. What is exerting the force on the objects and making them move?
2. What direction are they moving in?
3. Which object moved the fastest? The slowest?
4. Why did the objects move differently or take more or less effort to move?

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**PICK UP**

1. What is exerting the force on the objects and making them move?
2. What direction are they moving in?
3. Which object moved the fastest? The slowest?
4. Why did the objects move differently or take more or less effort to move?

**DROP**

1. What is exerting the force on the objects and making them move?
2. What direction are they moving in?
3. Which object moved the fastest? The slowest?
4. Why did the objects move differently or take more or less effort to move?

**Title of Lesson 6:** Gravity Part I

**Standards Taught:** 2.S.3, 2.S.3.1

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Egg, uncooked and still in the shell  Straws  Masking tape		<p>Review with your child the definition of force: something that makes an object move. Ask them if they remember what the force is called that makes things fall and helps us stick to the Earth. Review the term gravity.</p> <p>Show your child the egg. Ask them what happens if they drop an egg and gravity pulls it to the ground. It cracks!</p> <p>Explain that sometimes a force can be too much for an object and break it. Humans have created ways to protect themselves from forces that may be too strong for us. For example, we wear knee pads when we skateboard or roller skate to protect our knees from the force of hitting the ground. We wear helmets to protect our heads from the same thing.</p> <p>Tell your child that today we are going to build a protection for our little egg because it is going on a trip. Explain that we will be dropping our egg from somewhere very high and it is your child's job to build a "helmet" for his/her egg.</p> <p>Give your child the straws, masking tape, and egg. Allow them to build a structure around the egg. Discuss the importance of protecting it from all angles. This project may take more than one day to finish.</p> <p>Explain that we will drop our egg in the next lesson. To avoid the smell of rotten egg, it's a good idea to store this project in the refrigerator between work sessions.</p>

**Title of Lesson 7:** Gravity Part II

**Standards Taught:** 2.S.3, 2.S.3.1

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Egg and Structure from previous lesson  Observation Sheet Lesson 7		<p>Review with your child the definition of gravity and its effects on an egg.</p> <p>Ask them if their egg's protection structure is ready.</p> <p>Give your child the observation sheet and ask them to draw and/or color a picture of their structure and egg. What does it look like? Do you think it's safe?</p> <p>Take your child outside, reminding them of safety rules. Find a place where you can drop your child's egg. The higher up, the better (back deck, second story, standing on a ladder, etc). Allow your child to stand just to the side of the landing zone.</p> <p>Drop their egg.</p> <p>Ask your child to observe what happened and draw it on their observation sheet.</p> <p>Discuss the following: What is the same? What is different? Did the egg survive? Why or why not? How could you have protected your egg better?</p> <p>Explain that part of science is trying your ideas, seeing what worked and what didn't, and making changes based on what we observe. Every time we do this we get a little bit better at what we are trying to do.</p>

Observation Sheet: Lesson 7

**My Egg Structure Before Drop**

**My Egg Structure After Drop**

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**Title of Lesson 8:** Weather at Grandma's

**Standards Taught:** 2.S.2.3

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Observation Sheet Lesson 8	Choose a location that has different weather patterns than your own hometown. This will work best with a location that is meaningful to your child. We chose the hometown of our child's grandparents	<p>Ask your child to tell you what they know about the weather. Discuss local weather, <b>seasonal variations</b>, and weather patterns that your child is familiar with.</p> <p>Next, ask your child if weather is the same everywhere. Explain that weather is different in different locations. For example, it is currently winter and cold here, but summer and hot in Australia. It may be raining in California but snowing in Utah. Tell your child that this week we will be studying the weather for two different places: home and your second location. We will do this by gathering <b>data</b> on the weather patterns, <b>temperature</b>, and amounts of <b>precipitation</b> in two different areas.</p> <p>Give your child the observation sheet. Ask them to write in their secondary location in the box under "Home". During the morning weather check, ask your child to record the information for "Home" on Monday in their chart. Next, look up or contact someone in the secondary location and ask your child to question them about the data they need for their chart. Repeat this process every day.</p> <p>Sometime during the week, discuss ways to measure precipitation (rain gage, ruler, etc.) and tools we use to measure the speed and direction of the wind (weather vane, anemometer).</p> <p>At the end of the week, help your child answer the questions on the observation sheet paying close attention to the bold vocabulary words as you work.</p>

### Observation Sheet: Lesson 8

Location	Monday	Tuesday	Wednesday	Thursday	Friday
<b>Home</b>	Weather:   Precipitation: Temperature:	Weather:   Precipitation: Temperature:	Weather:   Precipitation: Temperature:	Weather:   Precipitation: Temperature:	Weather:   Precipitation: Temperature:
	Weather:   Precipitation: Temperature:	Weather:   Precipitation: Temperature:	Weather:   Precipitation: Temperature:	Weather:   Precipitation: Temperature:	Weather:   Precipitation: Temperature:

1. Are there any patterns in the weather from home? (lots of rain, snow, clouds, sun)
  
2. Are there any patterns in the weather from your second location?
  
3. **Analyze** the **data** you have collected on temperatures. What can you **conclude** about home's weather right now? (hot, warm, cold)
  
4. What can you conclude about the temperature patterns of your second location?
  
5. How does the weather and temperature compare between locations? Were they both hot, both cold, both rainy, both sunny? Or were they completely different?
  
6. Ask someone (or research online) about the seasonal weather patterns in your secondary location. Compare and contrast the differences between what you learn and what you see at home in the different seasons.

**Title of Lessons 9-12: Exploration**

**Standards Taught:** 2.S.1, 2.S.1.1, 2.S.1.1.1, 2.S.1.1.2, 2.S.1.1.3, 2.S.1.1.4, 2.S.1.1.5, 2.S.1.2, 2.S.1.2.1, 2.S.1.2.2, 2.S.1.2.3, 2.S.1.2.4, 2.S.1.3, 2.S.1.3.1, 2.S.1.3.2, 2.S.1.3.3, 2.S.1.3.4

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Vary depending on the experiments you choose	Vary depending on the experiments you choose	<p>Part of science is being willing to ask questions and work to find answers.</p> <p>Ask your child to tell you what they would like to learn about or build in science this month. Maybe they've seen an experiment someone else did. Perhaps they've been wondering how something works. Or maybe they have a new book full of engineering ideas.</p> <p>Allow your child to choose four science experiments based on their own interests. Collect supplies, prepare, and carry out these experiments with your child. Spend time researching the science behind them and teach your child what you learn.</p> <p>Chart, graph, record, and collect and present data from your experiments. Encourage your child to share what they learn with family, friends, or others.</p> <p>*This is a great time for a co-op science fair</p>

**Title of Lessons 13: Slow Change: Weathering and Erosion**

**Standards Taught: 2.S.2.1, 2.S.2.1.2**

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Sugar Cube  Photo of the Grand Canyon found <a href="#">here</a>  Glass of Water  Bowl  Observation Sheet 13		<p>Ask your child if they know where rocks and sand come from. Explain that mountains are broken down by water and wind until they eventually become sand. Point out that this takes a very long time and we cannot see it happening. Over time, though, we can see that mountains get smaller or change shape. This process is called <b>weathering</b> or erosion. Weathering breaks down the rock without moving it. Erosion causes the pieces to move away.</p> <p>Show your child the photo of the Grand Canyon. Explain that this is a mountain that has been eroded and weathered over time. Ask your child to point to the river in the canyon. Explain that this river cut a path through the mountain. That is why there is a canyon, or gap, in the middle of it. This took a very long time (5-6 million years) and was a very slow process.</p> <p>There is a way we can see erosion at work without waiting for a long time. We can use a substance that is smaller and softer than a mountain. Give your child the sugar cube. Ask them to describe its <b>properties</b>. What color is it? Is it heavy or light? Smooth or rough? Hard or soft? What shape is it? Allow your child to draw their observations in the first box of the Observation Sheet</p> <p>Ask your child to place the sugar cube in the center of the bowl. Then, give them the glass of water and ask them to slowly pour the water in the center of the sugar cube and observe what happens. Have your child record their observations in the second box of the Observation Sheet. Point out that erosion happens on a sugar cube much more quickly because of its properties. It is softer than rock and, therefore, breaks down more easily.</p>

Observation Sheet 13

Draw a picture of your sugar cube before erosion

Draw a picture of your sugar cube after erosion

Property

Home

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## Title of Lessons 14: Fast Change: Earthquakes and Landslides

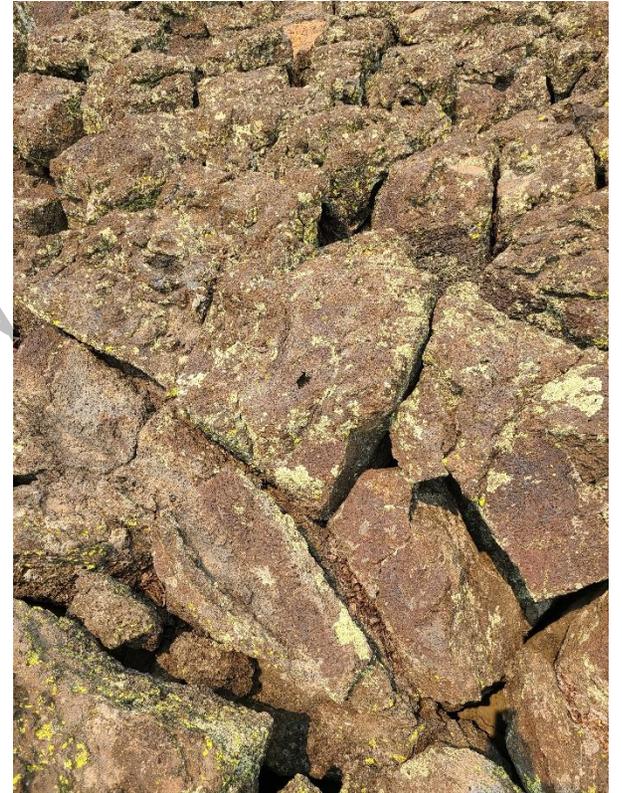
Standards Taught: 2.S.2.1, 2.S.2.1.2		
Materials:	Preparation:	Implementing the Lesson:
<p>Wooden Board (at least 1 ft. X 1 ft.)</p> <p>Items you can stack (blocks, playing cards, small cups, etc)</p> <p>Several towels</p> <p>Two large boxes or storage containers</p> <p>This <a href="https://www.youtube.com/watch?v=EFWnppxgUIU">video</a> (<a href="https://www.youtube.com/watch?v=EFWnppxgUIU">https://www.youtube.com/watch?v=EFWnppxgUIU</a>)</p>		<p>Ask your child to review what erosion and weathering are. Remind them that these two processes can change the earth very slowly over time. They can break mountains into rocks and sand, cut paths for rivers, and create huge canyons. Explain that there are some things that can change the earth very quickly. Things like earthquakes, landslides, and volcanos happen much faster than erosion and weathering, and can, therefore, change the earth faster.</p> <p>Briefly describe tectonic plates to your child. Tell them that the earth is made up of layers. One of those layers is magma, or lava. Above that layer is the ground that we walk on. The ground across the whole world is broken into several pieces, or plates. These plates float on the magma and move very slowly. The movement of these plates sometimes causes quick and very big, events to happen which change the ground on them. For more info on tectonic plates see this <a href="https://www.youtube.com/watch?v=3NKJgSDVCWQ">video</a> (<a href="https://www.youtube.com/watch?v=3NKJgSDVCWQ">https://www.youtube.com/watch?v=3NKJgSDVCWQ</a>)</p> <p>Tell your child that we are going to see one example of what happens when tectonic plates move today: <b>earthquakes</b>. Earthquakes happen when two or more of the tectonic plates bump into or push on each other. This occurs along <b>faults</b>, or where the edge of the plates meet.</p> <p>Fold the towels in half lengthwise and stack them on top of each other. Allow your child to help you and continue until you have enough towels to stack up for at least a foot. Place the boxes or storage containers on either side of the stacked towels. Ask your child to observe the towels, noting how flat they are all lying. Explain that the towels represent the land while the boxes represent the plates that the land is on. The edges of the boxes are faults. Ask your child to place their hands on one of the boxes (the opposite end from where the towels are) while you place your hands on the other. Slowly tell your child to push the box into the towels as you do the same from your side. The towels should start to rise up and fold over themselves. Explain that this shows us what can happen when two of the tectonic plates get close together. The flat land can change to mountains. This is called tectonic <b>uplift</b>. Sometimes this creates just one mountain, but often it creates a mountain range along fault lines.</p> <p>Next, show your child the wooden board. Place it on a level surface that is stable and will not move. Give your child the items to stack and ask your child to build a structure with them. When they are satisfied with their structure, tell them that an earthquake is coming. Grab the board on opposite ends and shake it back and forth gently, explaining that this is what happens when there is an earthquake. Encourage your child to observe what is happening to their structure. Did it change slowly or quickly? What do you think would happen to a building or mountain that was standing where there was an earthquake?</p> <p>Finally, show your child the video listed in the materials section about landslides. Explain that sometimes earthquakes can cause the layers of earth on top of the magma to separate. This can result in a landslide, where the top layer of dirt and rocks slips over the layer underneath it. Show your child the photo of the Grand Canyon from lesson 13 and point out the layers of rock. Explain that this mountain was made through <b>layering</b>, a process where dirt and rock stack on top of each other over time until they are a mountain. Layering is another slow process, but it builds up rather than tears down. Layering, along with earthquakes, can cause landslides.</p>

**Title of Lessons 15: Fast Change: Volcanoes and Lava Flow**

**Standards Taught: 2.S.2.1, 2.S.2.1.2**

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Clay, playdoh, sand, or dirt  Vinegar  Baking soda  Red Food Coloring  An area where your volcano can erupt without making a mess  Photo from Observation Sheet 15	Mix the red food coloring with about 1 c. of vinegar	<p>Briefly review the following vocabulary words with your child: erosion, weathering, layering, tectonic plates, earthquakes, and landslides.</p> <p>Explain that there is another way that the movement of tectonic plates can change the earth quickly: volcanoes. Ask your child to tell you what they know about volcanoes and watch this <a href="https://www.youtube.com/watch?v=mAa8eHiUIYU">video</a> (<a href="https://www.youtube.com/watch?v=mAa8eHiUIYU">https://www.youtube.com/watch?v=mAa8eHiUIYU</a>) together of a recent volcanic eruption in Hawaii.</p> <p>Ask your child if they noticed what they news anchor said happened just before the volcano: an earthquake. Explain that when the plates move, sometimes the magma (or lava) that is on the second layer of the earth can come up through the top layer (the ground we live on). This causes a volcano.</p> <p>Help your child build a volcano model from the clay, playdoh, sand, or dirt. Be sure to leave the center of your volcano hollow.</p> <p>When your volcano is built, put the baking soda (a few tablespoons) inside. If you want your lava to really erupt, add some dish soap in, too. Allow your child to pour the red vinegar into their volcano. This will make a mess so be sure to place it somewhere you don't mind the mess (bathtub, sink, outside).</p> <p>After the eruption, point out that there are some parts of the outside of their volcano where the lava flowed more. Ask them if the lava stayed only on their volcano. Explain that lava flows, like water, and can spread out over a large space very quickly. Discuss what would happen to trees, houses, or other buildings that were in the lava flow. Point out that they may burn, melt, be pushed away, or buried. Explain that lava flow can create very flat spaces at the bottom of the mountain very quickly. Lava flow can also leave behind areas that are flat, but contain several large rocks (made from cooled lava) where it is difficult to grow any plants for a very long time.</p> <p>Show your child the photos from Observation Sheet 15. Explain that these images show an area where a volcano erupted long ago. Point out how flat the land is (no mountains), how barren it is (few to no plants), and how many pieces of lava rock are still there. Explain that this area used to be a mountain with a forest growing on it. The lava swept away the trees and other plants.</p>

Observation Sheet 15



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## Title of Lessons 16: Slowing the Damage

Standards Taught: 2.S.2.1, 2.S.2.1.2, 2.S.2.1.3

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Popsicle sticks Artificial moss Sand Several glasses of water Hot glue gun Wooden board, about 12" X 12" Small fan Sugar cube		<p>Quickly review how erosion and weathering, earthquakes, landslides, volcanoes, and lava flow can affect the earth. Ask your child what would happen if a house was in the way of any of these things. Discuss the damage that can be done by each process. Explain that, because we know that our homes can be damaged by them, we work to avoid, prevent, or slow the damage they can do to our homes.</p> <p>Help your child build a simple house from the popsicle sticks using the hot glue gun. Be sure to make the roof removable so that you can observe what happens inside. Place a sugar cube inside of the house, explaining that the sugar cube represents the people living in the house. Glue the house to the center of the board. Place sand around the house, explaining that this will be the area where the people living in the house will grow food.</p> <p>Ask your child if their house is very well protected. What did they do to help it stand strong in the face of an earthquake, a flood, or strong wind?</p> <p>Shake the board gently. Ask your child to observe what happens to their house. Was it strong enough to stand? What about the sand around it? Would the people living in the house be safe in an earthquake? Would their food? Are there any ways we could make it stronger or safer? Allow your child to make necessary changes</p> <p>Next, place the fan close to the house and turn it on. If you don't have a fan, you can simply blow on the house. As you do, ask your child to observe what happens to their house and the area around it. Are the people safe? Did the sugar cube get sand on it? What about their food supply? Ask your child how they could better protect their house from the wind and allow them to make necessary changes. Suggest a windbreak (build a fence on the side the wind blows) or placing "grass" (moss) on the sand to help hold it down.</p> <p>Finally, using a glass of water, slowly flood the house. Ask your child to observe what happened. Did their house stand still? Was it flooded with water? How are the plants? Are there any changes you would like to make? Allow your child to make the changes they feel necessary. Suggest a dam or retaining wall around the house to protect it.</p> <p>Place a new sugar cube in the house when your child is ready. Test it again with the earthquake, the wind storm, and the flood. Ask your child to compare how protected their house was the first time to how protected it was this time. Discuss how modifications could be made to protect it even more. Allow your child to continue to experiment with and test out their ideas until they lose interest.</p>

**Title of Lessons 17: Modeling the Earth**

**Standards Taught: 2.S.2.1, 2.S.2.1.1**

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
Clay and/or playdoh  A large, flat surface  Water  Small bowl or container  Photo from Observation Sheet 17		<p>Show your child the photo from the Observation Sheet. Ask them to describe what they see. Explain that, over time, this area was eroded, weathered, and changed in other ways to create this picture. You can see a mountain (point out the mountain), a forest (point out the forest), a valley (point out the valley), and a pond (point to the pond). Discuss how different areas have different geological features. Some places, like plains, are very flat. Others have, like the Grand Canyon, have canyons through mountains. Others are all mountain.</p> <p>Give your child the clay or playdoh and ask them to build their own model of a part of the earth's surface. It can have mountains, volcanos, rivers, lakes, valleys, or plains. Allow your child to be creative and experiment with different ways to build.</p> <p>When they are done building the model, ask your child to explain what they have built to you or a friend. Encourage them to create a story about why their land looks the way it does. Was there a lava flow that killed all the plants? A flood that washed away the buildings? How did the water get into the lake? Why do the mountains have a canyon?</p>

Observation Sheet 17



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## Title of Lessons 18: Types of Rocks

**Standards Taught:** 2.S.2.1, 2.S.2.1.2, 2.S.2.1.3

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
<p>An example of each of the following types of rocks: igneous, sedimentary, &amp; metamorphic</p> <p>A piece of sandstone or this <a href="https://www.youtube.com/watch?v=SC6tVJxH6yg">video (https://www.youtube.com/watch?v=SC6tVJxH6yg)</a></p> <p>Photos from Observation Sheet 18</p>		<p>Quickly review the terms weathering and erosion with your child. Remind them that these processes are very slow and can change the way the earth looks.</p> <p>Tell your child that these processes, along with breakage, can also change mountains into boulders, boulders into rocks, rocks into pebbles, and pebbles into sand. Show your child the photos of each stage, asking them to compare the size of the rocks as they break down.</p> <p>Place the different types of rocks in front of your child. Explain that these rocks are all different. They were created in different ways and have different <b>characteristics</b>. A characteristic is something that that types of matter has in common with other matter of the same type.</p> <p>Hand your child the igneous rock. Ask them to describe its characteristics. Is it hard or soft? Heavy or light? What <b>texture</b> is it? What does it look like? Explain that this is called an igneous rock. It was made from lava, which cooled and hardened. If there are holes in it, point out that those holes were made from the bubbles that were in the lava as it cooled.</p> <p>Ask your child to set aside the first rock and pick up the sedimentary rock. Remind them of the layers in the Grand Canyon and how they were made by sand piling on top of sand over a very long time. Explain that sedimentary rock is made like this. Point out the layers you can see in the rock. Ask your child to describe the rock to you. Is it heavier or lighter than the igneous rock? Hard or soft? What is the texture like? What does it look like?</p> <p>Trade your child for the metamorphic rock. Ask them to describe this rock's color, harness, texture, and look. Allow your child to guess how this rock was formed. Explain that this rock was created when something pushed several materials together until they heat up and stick together. Point out the different types of materials you can see in this rock.</p> <p>Next, hand your child the sandstone and ask them to hold it gently as they describe its characteristics. How does it feel different from the other rocks? How is it the same? Ask your child what happens when they squish this rock. How is that different from the other rocks? Point out that this is a quick way to see how rocks turn into smaller <b>particles</b> called sand.</p>

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Observation Sheet 18



## Title of Lessons 19: What is a Habitat? (Part I)

Standards Taught: 2.S.2.2.1

Materials:	Preparation:	Implementing the Lesson:
<p>Images of the following:</p> <p><a href="#">Ocean</a></p> <p><a href="#">River</a></p> <p><a href="#">Desert</a></p> <p><a href="#">Forest</a></p> <p><a href="#">Tundra</a></p> <p><a href="#">Rainforest</a></p> <p><a href="#">Wetland</a></p>		<p>Start the lesson by asking your child to name someone they know who lives far away. Ask them to tell you what that person's home is like. If they don't know, allow them to contact that person and ask the following questions. What is the town around their home like? How is it similar to your own home? How is it different? Does it have the same weather or is it warmer or cooler than your home?</p> <p>Explain that plants and animals also choose different places to live. Their homes are called <b>habitats</b> and the things around them are called their <b>environment</b>.</p> <p>Show your child the images and explain that these are different environments where different animals choose to live. Discuss each place, asking your child to point out differences between them. Point out challenges that plants and animals may face in each environment as well as things that may make life easier. Talk about the weather, the amount of precipitation (how wet it is), the temperature, and the resources in each place. Name any animals that you or your child are familiar with that live in that environment.</p> <p>Ask your child to choose three very different environments to learn about. (For example, ocean, tundra, desert.) Do some online research to find an animal and a plant that your child is interested in that has a habitat in each environment they have chosen. Write down the each animal and plant your child chooses, which environment they belong to, and any other interesting facts your child seems interested in for the next lesson. <b>Compare</b> and <b>contrast</b> each environment against the others with your child.</p>

**Title of Lessons 20: What is a Habitat? (Part II)**

**Standards Taught:** 2.S.2.2.1, 2.S.2.2.2, 2.S.S.4, 2.S.S.4.1, 2.S.S.4.2

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
<p>Images of the environments your child chose in the last lesson</p> <p>Information that your child recorded in the last lesson</p> <p>Books, websites, videos, and/or articles about the plants your child chose in the last lesson</p> <p>3 blank papers</p> <p>Pen/Pencil</p>		<p>Review the terms <i>environment</i> and <i>habitat</i> with your child, asking them to remind you of the environments they choose. Ask your child to tell you how their environments are different from each other. Write one of the environments on each of the three blank papers. Ask your child to describe that environments <b>temperature, precipitation,</b> and unique <b>characteristics</b> and write down a summary on the paper.</p> <p>Next, ask your child to write down the plant they chose on the paper matching that plant's environment. Using the resources you have gathered, learn the following about each plant: what it needs to survive (e.g. lots of water, not much water, lots of sun, cold temperatures, etc), how its environment provides those things (e.g. a desert is warm and sunny, a wetland is very wet, etc), what special ways it protects itself from the challenges of its environment (e.g. thick bark to protect against bugs, shallow roots to get every drop of water as fast as it can, etc.), and seasonal adaptations (e.g. <b>dormancy</b> in the winter). Encourage your child to write the information you discover together in note form on the appropriate environment paper. They may also want to include sketches.</p> <p>Briefly review the information your child has recorded as they learn about the plants in each environment. Compare and contrast the characteristics and behaviors of the plants in each environment. Ask your child what they think would happen if one of the plants were placed in a different environment....would that plant go <b>extinct?</b></p>

**Title of Lessons 21: What is a Habitat? (Part III)**

**Standards Taught:** 2.S.2.2.1, 2.S.2.2.2, 2.S.S.4, 2.S.S.4.1, 2.S.S.4.2

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
<p>Images of the environments your child chose in the last lesson</p> <p>Information that your child recorded in the last lesson</p> <p>Books, websites, videos, and/or articles about the animals your child chose in the last lesson</p> <p>3 blank papers</p> <p>Pen/Pencil</p>		<p>Review the terms <i>environment</i>, <i>habitat</i>, <i>behaviors</i>, and <i>physical characteristics</i> with your child, asking them to remind you of some of the things they learned in the previous lessons.</p> <p>Next, ask your child to write down the animal they chose on the paper matching that animal's environment. Using the resources you have gathered, learn the following about each animal: what resources does your animal need (what does it eat and drink, what does its <b>habitat</b> look like), what unique <b>behaviors</b> help it survive in its environment, what <b>physical characteristics</b> are unique to this animal, how do these characteristics help it survive, does your animal have seasonal behavior changes (<b>migration</b>, <b>hibernation</b>). Encourage your child to write down what they learn on the appropriate environment paper in note form. They may also want to include sketches.</p> <p>Briefly review the information your child has recorded as they learn about the plants in each environment. Compare and contrast the characteristics and behaviors of the animals in each environment. Ask your child what they think may happen to each animal if they were placed in a different environment.</p>

**Title of Lessons 22: What is a Habitat? (Part IV)**

**Standards Taught: 2.S.2.2.1, 2.S.2.2.2, 2.S.S.4, 2.S.S.4.1, 2.S.S.4.2, 2.S.2.2.4**

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
<p>Images of the following:</p> <p><a href="#">Swimming fin</a></p> <p><a href="#">Fur coat</a></p> <p><a href="#">Swimming Pool</a></p>		<p>Ask your child to review what they have learned in the last three lessons. Discuss how each plant or animal has special behaviors and/or characteristics that help them to survive in their environment.</p> <p>Ask your child to describe their environment. What is the weather like? Is there a lot of rain or snow? What about wind? What is the temperature like in the summer? What about in the winter? What are some things they don't like about being outside in each of the seasons?</p> <p>Explain that humans sometimes learn adaptations from animals and change the way they behave as a reaction to their environment. For example, humans build houses. These houses provide shelter, just like the habitats that animals live in. Houses are human habitats.</p> <p>Discuss how humans get the other things they need: food, water, and air. Point out similarities between what humans do and what the animals and/or plants your child chose to study do.</p> <p>Next, show your child the images. Explain that these images show some ways that humans copy animals to make their lives easier. Ask your child to name each image, tell you how it may help a human, and what animal it may mimic. For example, the swimming fin is designed to help us move through the water quicker and its design is based on a duck's foot, a fur coat (like a bear or dog) keeps us warm, and a swimming pool can help cool us down (like a pig rolling in the mud).</p> <p>Finally, ask your child to think of one of the problems they face in their environment in the summer or the winter. Discuss some of the things could we learn from the animals your child studied that may help us with that problem. How would the behaviors or characteristics help with that problem? How would you build something based on that plant or animal trait that would help humans? Allow your child to write notes, sketch, draw, or build a clay model of their design. Encourage them to spend the week testing, modifying, and improving their design.</p>

**Title of Lessons 23: Moving Seeds**

**Standards Taught: 2.S.2.2.4**

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
<p>This <a href="#">video</a></p> <p>Examples or photos of each of the following types of seeds: one that flies in the air (e.g. dandelion), a bur, one that floats on water (coconut), and one that may be eaten by an animal (apple)</p> <p>Pom pom balls (any color)</p>		<p>Ask your child to review some of the plants they have learned about recently. Ask them to explain how those plants take care of themselves.</p> <p>Then, ask your child how new plants grow. Point out that plants don't start as babies like animals do. They start as seeds. Each plant can make hundreds to thousands of seeds. These seeds travel away from their parent plants until they find a place where it is safe for them to grow.</p> <p>Ask your child to guess how a seed may move. Point out that it cannot walk away, ride on a car, or fly in an airplane like humans do.</p> <p>Watch the video with your child. When it is finished, ask them to name a few ways seeds can move. If needed, watch the video a few more times.</p> <p>Next, show your child the seed examples/photos you have collected. Point out the flying seed and discuss how its characteristics (lightweight, wing-shaped, etc) help it fly through the air on the wind. Next, point out the bur and discuss how its traits help it stick to animal fur or clothing to move (sticky or barbed). Move on to the floating seed. Discuss how it is unique to water transport (floats, tough shell). Finally, show your child the seed that could be eaten by an animal. Explain that these seeds are often in the foods that animals eat. After the animal eats the seed it moves away from where it was eating. Eventually, the seed will pass through the animal's digestive system and come out in its poop, hopefully landing somewhere it can safely grow.</p> <p>Ask your child to briefly review the ways a seed can move.</p> <p>Hand your child the pom pom balls and tell them that we are going to pretend that these are seeds. These seeds need a way to move. Ask your child to describe the characteristics of their "seeds" and decide which movement method may be best for them. Allow your child to modify their seeds (e.g. add toothpick barbs, create a water-tight shell, or place them in the middle of a food). Encourage your child to test out and improve their methods of seed dispersion, praising them for their creativity and hard work.</p>

## Title of Lessons 24: Planetarium Field Trip

Standards Taught: 2.S.2.2

Materials:	Preparation:	Implementing the Lesson:
<p>A local planetarium you can visit or a <a href="#">video</a> like this one (<a href="https://www.youtube.com/watch?v=WZp2M9kGKlc">https://www.youtube.com/watch?v=WZp2M9kGKlc</a>) or this one (<a href="https://www.youtube.com/watch?v=sZsJf9FdMtw">https://www.youtube.com/watch?v=sZsJf9FdMtw</a>)</p>		<p>Visit a local planetarium with your child. Look for and plan to catch one of their shows about space, stars, or planets. Allow your child to watch the show, explore, and ask questions. Point out any interesting facts or displays you may see. Encourage your child to learn as much as they can while you are visiting. For those local to Salt Lake or Utah County information can be found here: <a href="#">BYU Planetarium</a> <a href="#">Clark Planetarium</a></p> <p>If you are unable to visit a planetarium in person, check out this <a href="#">website</a> (<a href="#">Virtual Planetarium Shows   National Air and Space Museum (si.edu)</a>) which offers virtual tours through Zoom or use one of the videos in the materials section to catch a virtual show. Allow your child to pause the video to ask questions or point out facts they find interesting. Ask them to tell you all they know about the night sky and space. Then, visit the website of a planetarium you are familiar with and find an activity or two that your child is interested in. We found <a href="#">this</a> one (<a href="#">Interactive Solar System Tour   3D Model of the Solar System (nineplanets.org)</a>) which allows you to click on and learn about different parts of the solar system.</p> <p>This lesson should be a fun, relaxed introduction into this unit.</p>

## Title of Lessons 25: Night Sky Observations (3 days)

Standards Taught: 2.S.2.2

Materials:	Preparation:	Implementing the Lesson:
<p>A star guide like <a href="#">this</a> one</p> <p>A place where your child can view the night sky without lots of light pollution</p> <p>Observation Sheet 25 (3 pages)</p> <p>Pencils, pens, and colored pencils</p> <p>A clipboard</p> <p>Optional: Telescope</p>		<p>Review with your child what they learned during your field trip. Discuss some of the things they may see in the night sky. Explain that sometimes we can see stars, the moon, or even other planets.</p> <p>Ask your child to describe the movement of the earth. Using a flashlight for the sun and a ball for the earth, show your child how the earth rotates on an axis, causing day and night. Then, demonstrate how the earth moves in an orbit around the sun as well. Explain that this causes seasons. Ask your child to describe each season and the changes it brings. Point out that the night sky also changes because of the rotation and orbit of the earth. The sky in the winter does not look the same as the sky in the summer. Even from evening to morning there are changes happening in the night sky.</p> <p>Day one: Give your child the first of the observation sheets and take them outside after dark. Ask your child to fill out the information at the top of the page. Then, ask them to draw what they see in the sky. Encourage them to match the <b>arrangement, patterns</b>, shapes, colors, and <b>locations</b> of stars, planets, and the moon to the best of their ability. Use the star finder to point out a single constellation to your child, encouraging them to add it to their drawing.</p> <p>Day two: Give your child the second of the observation sheets and take them outside after dark and as close to the same time and place as day one as you can. Ask them to look at their picture from last night and see if they notice any changes. Are the arrangements still the same? Is everything in the same place? Does the moon look different? Can they find the <b>constellation</b> they saw last night? Using the observation sheet, ask your child to record and draw their data for tonight, paying special attention to any <b>variations</b> the notice between the two nights.</p> <p>Day three: Give the last of the observation sheets to your child and take them outside after dark. Do your best to keep the same location and schedule. Pull out the observation sheet from day one and ask your child to compare it to tonight's sky, noting the variations between the two. Ask your child to record data of the arrangement, pattern, shapes, colors, and locations of each of the things they drew last night. Finally, give your child the observation sheet from yesterday. Ask them to line up each of their drawings in chronological order. Discuss the changes you and your child see between the days. Point out that the changes from day to day are small but if you put all three days together they are easier to recognize.</p> <p>Finally, watch this <a href="#">video (4K 30FPS Night Sky Time Lapse, April 3, 2021 - YouTube)</a> with your child, explaining that these are the changes they would see if they stayed outside all night. Explain that the movement of the night sky shows us the rotation of the earth. The video is sped up and happening quickly, but it shows an entire night.</p>

**Observation Sheet 25: Day 1**

<b>Date of Observation:</b>	<b>Time of Observation:</b>	<b>Location:</b>
<p>Draw and label the night sky as you observe. Be sure to include location, arrangement, pattern, and location of the stars, planets, and moon.</p>		

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**Observation Sheet 25: Day 2**

<b>Date of Observation:</b>	<b>Time of Observation:</b>	<b>Location:</b>
<p>Draw and label the night sky as you observe. Be sure to include location, arrangement, pattern, and location of the stars, planets, and moon.</p> 		

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**Observation Sheet 25: Day 3**

<b>Date of Observation:</b>	<b>Time of Observation:</b>	<b>Location:</b>
<p>Draw and label the night sky as you observe. Be sure to include location, arrangement, pattern, and location of the stars, planets, and moon.</p>		

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## Title of Lessons 26: Constellation Punch Out

Standards Taught: 2.S.2.2

Materials:	Preparation:	Implementing the Lesson:
<p>This <a href="#">website</a> (<a href="#">What Are Constellations?</a>   <a href="#">NASA Space Place – NASA Science for Kids</a>)</p> <p>Star Guide from Previous Lesson</p> <p>Black construction paper</p> <p>Chalk</p> <p>A sharp pencil/Hole Punch</p> <p>Tape</p> <p>Optional: Telescope</p>		<p>Explore and discuss the website with your child. Talk about what a <b>constellation</b> is, how they can help us, and how they help scientists learn more about the sky. Allow your child to ask questions and look for answers together.</p> <p>Then use the star chart provided on the website, along with your star finder, to learn about which constellations may be visible from your home right now. Ask your child to choose 3-5 of these constellations.</p> <p>Together, research the story behind each of the constellations your child has chosen. <a href="#">This</a> is a great resource. (<a href="#">ConstellationsWithPictures.doc (tcoe.org)</a>) Explain that different cultures have created different stories to explain the pictures they see in the stars. These stories helped others learn, remember, or share their culture and ideas.</p> <p>As you read the story of each constellation to your child, give them a black piece of construction paper and the chalk. Ask your child to carefully draw the arrangement of major stars in that constellation. Then, give your child the sharp pencil or hole punch and ask them to punch a hole where they have drawn each star. (Example <a href="#">here</a>) Allow them to add the lines between each star which draw the imaginary picture the constellation makes. Tape your child's constellation paper to a window and point out that you can see the sun shining through the holes they punched, making a mini version of their constellation.</p> <p>Repeat for each of the constellations your child choose. Ask your child to show off their constellation art and share the story of each with someone they know. Finally, go out at night and look for the constellations they learned about.</p>

## Title of Lessons 27: Oreo Moon Phases

**Standards Taught:** 2.S.2.2

<b>Materials:</b>	<b>Preparation:</b>	<b>Implementing the Lesson:</b>
<p>Oreo cookies (or like kind)</p> <p>Spoon</p> <p>Moon Phases <a href="#">Image</a> (<a href="#">mooncalc_phases2b.png</a> (560x265) (<a href="#">cambridgeincolour.com</a>))</p> <p>Ball and flashlight from previous lesson</p> <p>Additional small ball</p>		<p>Briefly review what your child has learned about astronomy, or the study of the night sky, so far. Talk about planets, constellations, and the movement of the things in the sky as the earth rotates. Ask your child if they can name something that we can see in the sky often that is not a star or a planet. Allow them to keep guessing until they say “the moon.”</p> <p>Explain that, like the Earth, the moon has an orbit. It turns around the earth. Using the balls and flashlight, demonstrate the movement of the moon around the earth. Point out that sometimes the earth is positioned in between the sun and the moon, casting a shadow on the moon. Explain that these <b>moon phases</b> help us to tell time (months), affect movement of water (tides), and even can influence animal behavior (more babies born on full moons, more hyperactivity during full moons, lions hunt when it is darkest, etc).</p> <p>Show your child the moon phases image, pointing out and naming aloud each phase of the moon. Ask them to repeat the names of each phase, pointing to the picture as they do.</p> <p>Next, ask your child to “open” a cookie so that the top cookie comes off and the frosting is all stuck to the bottom cookie. Give your child a spoon and ask them to carve out a new moon on the frosting (removing all of the frosting). Repeat the process until your child has modeled each phase of the moon using a cookie. Ask them to place the phases in order.</p> <p>Finally, allow your child to eat the cookies as you look for tonight’s moon together. Ask your child to tell you which phase the moon is in.</p> <p>It is also fun to monitor the phases of the moon each night for a month. Allow your child to track the shadow on the moon by drawing what they see each night on an observation sheet. See if they can name each phase they observe.</p>