



San Diego Unified School District
Science Department

Grade 2 – Pebbles Sand and Silt
Earth Science
Unit of Study



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**Science Vision for
San Diego Unified School District**
Science is an integral part of the intellectual development of a child. Interest in science begins with attitudes and values established in the earliest years through daily experiences. Students graduating from high school must have a foundation in scientific knowledge and evidence based reasoning.

Updated versions of this unit of study can be found online at www.sandi.net/science.



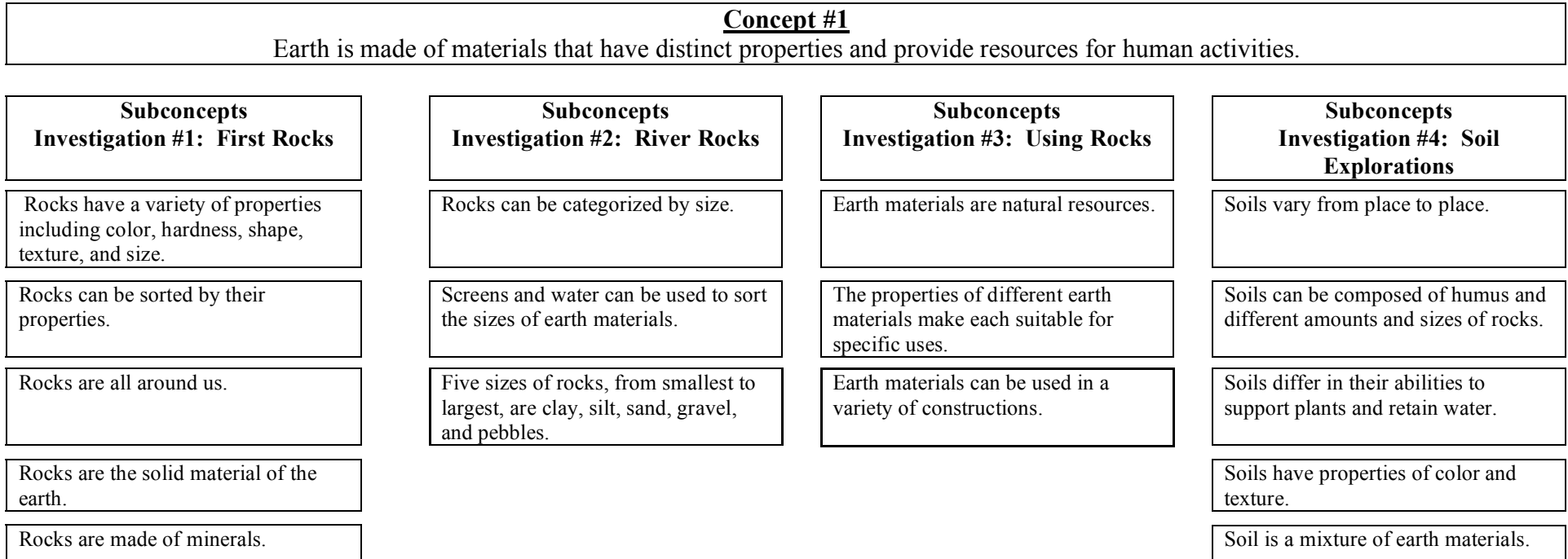
Grade 2 – Pebbles Sand and Silt Module Overview



Overview of the Unit

The **Pebbles, Sand, and Silt Module** consists of four sequential investigations, each designed to introduce concepts in earth science. The investigations provide experiences that heighten students’ awareness of rocks as earth materials, natural resources, and fossils. They will come to know rocks by many names and in a variety of sizes. Pebbles, sand, and silt are the same material—just different in size.

Grade 2 Earth Science Conceptual Flow



2nd Grade Science Content Standards Addressed in this Module

Earth Sciences

- ES3 Earth is made of materials that have distinct properties and provide resources for human activities. As a basis for understanding this concept:
- ES3a Students know how to compare the physical properties of different kinds of rocks and know that rock is composed of different combinations of minerals.
 - ES3b Students know smaller rocks come from the breakage and weathering of larger rocks.
 - ES3c Students know that soil is made partly from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.
 - ES3d Students know that fossils provide evidence about the plants and animals that lived long ago and that scientists learn about the past history of Earth by studying fossils.
 - ES3e Students know rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.

Investigation and Experimentation

- I&E4 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
- I&E4a Make predictions based on observed patterns and not random guessing.
 - I&E4b Measure length, weight, temperature, and liquid volume with appropriate tools and express those measurements in standard metric system units.
 - I&E4c Compare and sort common objects according to two or more physical attributes (e. g., color, shape, texture, size, weight).
 - I&E4d Write or draw descriptions of a sequence of steps, events, and observations.
 - I&E4e Construct bar graphs to record data, using appropriately labeled axes.
 - I&E4f Use magnifiers or microscopes to observe and draw descriptions of small objects or small features of objects.
 - I&E4g Follow oral instructions for a scientific investigation.

Pacing the Unit as a Whole

| | | | | |
|----------------------------------------------|----------------------------------------------|----------------------------------------------|--------------------------------------------|--------------------------------------------|
| Day 1 Start Inv. 1 Part 1 A/W | Day 2 Start Inv. 1 Part 2 A/W/I | Day 3 Start Inv. 1 Part 3 R | Day 4 Start Inv. 1 Part 4 A/W | Day 5 Start Inv. 1 Part 5 A/W |
| Day 6 R/I | Day 7 Review | Day 8 Start Inv. 2 Part 1 A/I | Day 9 A | Day 10 Start Inv. 2 Part 2 A |
| Day 11 A/I | Day 12 Start Inv. 2 Part 3 A | Day 13 A/I | Day 14 R | Day 15 Start Inv. 2 Part 4 A |
| Day 16 A | Day 17 Review | Day 18 Start Inv. 3 Part 1 A | Day 19 R | Day 20 Start Inv. 3 Part 2 A |
| Day 21 Start Inv. 3 Part 3 A | Day 22 Start Inv. 3 Part 4 A | Day 23 A | Day 24 Start Inv. 3 Part 5 A | Day 25 A |
| Day 26 R | Day 27 Review | Day 28 Start Inv. 4. Part 1 A | Day 29 A | Day 30 A/W |
| Day 31 Start Inv. 4. Part 2 A/I | Day 32 A/W | Day 33 Start Inv. 4. Part 3 A/W | Day 34 R | Day 35 Start Inv. 4. Part 4 A |
| Day 36 A/W | Day 37 R | Day 38 Start Inv. 4. Part 5 A/I | Day 39 R | Day 40 Review |
| Day 41 End-of-Module Assessment | | | | |

A – Active Investigation sessions include firsthand observations about energy and matter, active thinking about the experiences, small group discussion, simulations, writing in science notebooks, learning new vocabulary in context, viewing a video, and completing written embedded assessments to inform instruction. (Approximately 60 minutes)

W – Wrap-up sessions are teacher-directed vocabulary reinforcement and science content review. (Approximately 30 minutes)

R – Reading sessions (*Science Resources* book) include individual and interactive reading, answering review questions, and discussing the reading to ensure that students integrate the information. (Approximately 30 minutes)

I-Individual Assessments The goals of FOSS assessment system fall into three categories called assessment variables; (1) contents knowledge, (2) conducting investigations, and (3) building explanations. **Content knowledge** reflects the “facts” of science that students learn throughout the module. **Conducting investigation** focuses on skills needed for a successful scientific investigation. **Building Explanation** refers to students’ discourse – how they communicate observation and how they organize their observation and interpretations of them.



Grade 2 – Pebbles, Sand, and Silt
Pacing Guide – Investigation 1: First Rocks

Investigation Overview

| Investigation 1: First Rocks | | |
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| <p>Concept: Earth is made of materials that have distinct properties and provide resources for human activities.</p> <p>Students are introduced to the mineral portion of Earth. They investigate several kinds of rocks and begin to understand the properties of rocks and describe rocks based on their physical properties. Students rub rocks, wash rocks, sort rocks, and describe rocks. They also begin to organize a class rock collection. Through two readings, students learn about the properties of rocks and the colorful minerals they contain.</p> | | |
| Part 1: Three Rocks | Part 2: Washing Three Rocks | Part 3: First Sorting |
| <p><u>Summary</u> Students investigate and sort a set of six rocks. They gather information about the rocks by matching the rock samples and rubbing them together to simulate weathering.</p> | <p><u>Summary</u> Students wash their samples to see how the rocks change when they are wet and what happens to the wash water</p> | <p><u>Summary</u> Students are introduced to river rocks. They listen to the story <i>Peter and the Rocks</i> and use ideas from the story and Part 2 to compare and sort their river rocks.</p> |
| <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Rocks have a variety of properties. ▪ When rocks are rub together, some (softer) rocks may be chipped or scratched, or make rock dust. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Rocks have a variety of properties. ▪ When rocks are washed in water, the colors become brighter. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Rocks can be compared and sorted by their physical properties. |
| <p><u>Time Allocation</u> Active Investigation: 1 day</p> | <p><u>Time Allocation</u> Active Investigation: 1 day</p> | <p><u>Time Allocation</u> Active Investigation: 1 day</p> |
| <p><u>CA Science Standards</u> ES3a, ES3b</p> | <p><u>CA Science Standards</u> ES3a</p> | <p><u>CA Science Standards</u> ES3a</p> |

Investigation Overview (continued)

Investigation 1: First Rocks

Concept: Earth is made of materials that have distinct properties and provide resources for human activities.

Students are introduced to the mineral portion of Earth. They investigate several kinds of rocks and begin to understand the properties of rocks and describe rocks based on their physical properties. Students rub rocks, wash rocks, sort rocks, and describe rocks. They also begin to organize a class rock collection. Through two readings, students learn about the properties of rocks and the colorful minerals they contain.

| Part 4: Sorting Game | Part 5: Start a Rock Collection | |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <u>Summary</u> Students use sorting mats to compare and sort the river rocks. | <u>Summary</u> Students start to organize a classroom rock collection. They read | |
| <u>Subconcepts</u> <ul style="list-style-type: none"> ▪ Rocks can be sorted by their properties. | <u>Subconcepts</u> <ul style="list-style-type: none"> ▪ Rocks are all around us. ▪ Rocks are the solid material of the earth. ▪ Rocks are made of minerals. ▪ Rocks break and weather to form smaller rocks. | |
| <u>Time Allocation</u> Active Investigation: 1 day | <u>Time Allocation</u> Active Investigation: 1 day Reading: 1 day Wrap-Up: 1 day | |
| <u>CA Science Standards</u> ES3a | <u>CA Science Standards</u> ES3a, ES3b | |



Grade 2 – Pebbles, Sand, and Silt
Pacing Guide – Investigation 1: First Rocks

Pacing Guide – Investigation 1: First Rocks

| Day 1 | | Day 2 | | Day 3 | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| <input type="checkbox"/> Read “At a Glance” <i>TG p. 36-37</i> <input type="checkbox"/> Read “Science Background” <i>TG p. 38-39</i> <input type="checkbox"/> Read “Teaching Children About Rocks” <i>TG p. 40-41</i> <input type="checkbox"/> Watch Video demo of Inv. 1, Pt 1 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 42-44</i> | Guiding the Investigation <input type="checkbox"/> “Part 1: Three Rocks” Steps 1-9 <i>TG p. 45-47</i> <input type="checkbox"/> Wrapping Up, Steps 10-11, <i>TG p. 47</i> | <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 48-49</i> <input type="checkbox"/> Watch Video demo of Inv. 1, Pt 2 | Guiding the Investigation <input type="checkbox"/> “Part 2: Washing Three Rocks” Steps 1-12 <i>TG p. 50-51</i> <input type="checkbox"/> “Wrapping up Part 2” Steps 13-14 <i>TG p. 52</i> <input type="checkbox"/> Body of Evidence; Prompt #1 <i>TG p. 191</i> | <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 53-54</i> <input type="checkbox"/> Watch Video demo of Inv. 1, Pt 3 | Guiding the Investigation <input type="checkbox"/> Part 3 “First Sorting” Steps 1-10 <i>TG p. 55-56,</i> <input type="checkbox"/> Wrapping Up Part 3, Steps 10-11 <i>TG p. 57</i> |

Pacing Guide – Investigation 1: First Rocks (continued)

| Day 4 | | Day 5 | | Day 6 | |
|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| <input type="checkbox"/> Watch Video demo of Inv. 1, Pt 4 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 58-59</i> | Guiding the Investigation <input type="checkbox"/> “Part 4: Sorting Games” Steps 1-4, <i>TG p. 60, 212, 213</i> <input type="checkbox"/> Wrapping up Part 4” Steps 5-6 <i>TG p. 61</i> | <input type="checkbox"/> Watch Video demo of Inv. 1, Pt 5 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 62-63</i> | Guiding the Investigation <input type="checkbox"/> “Part 5: Start a Rock Collection” Steps 1-8, <i>TG p. 64-65, 191,192</i> <input type="checkbox"/> “Wrapping Up Part 5” Steps 9-10, <i>TG p.65</i> | | <input type="checkbox"/> Reading in Science Resource, Part 5” Steps 11-15 <i>TG p. 66-67</i> Student Reading: Science Resources p. 3-10 <input type="checkbox"/> Body of Evidence Prompt #2 <i>TG p. 193</i> |
| Day 7 | | | | | |
| Prep | Instruction | | | | |
| | <input type="checkbox"/> Review/ Interdisciplinary Extensions <i>TG p. 68-72, 215, 218, 224</i> | | | | |



Grade 2 – Pebbles, Sand, and Silt
Pacing Guide – Investigation 2: River Rocks

Investigation Overview

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| <p>Investigation 2: River Rocks Concept: Earth is made of materials that have distinct properties and provide resources for human activities. Students investigate a river rock mixture of earth materials of different sizes. They separate the rocks, using a series of three screens to identify five sizes of rocks: large pebbles, small pebbles, large gravel, small gravel, and sand. They add water to a vial of sand to discover silt and clay. Students learn how sand is formed by reading the Story of Sand.</p> | |
| <p>Part 1: Screening River Rocks</p> | <p>Part 2: River Rocks by Size</p> |
| <p><u>Summary</u> Students separate a river rock mixture using a set of three screens. At the end of the separation, students discover they have five sizes of materials: large pebbles, small pebbles, large gravel, small gravel, and sand.</p> | <p><u>Summary</u> Students use a student sheet to reinforce the idea of grouping rocks based on their size. They learn how to weigh rocks using the balance and report in the standard metric units of grams.</p> |
| <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Screens can be used to sort different sizes of earth materials. ▪ Rocks sizes include sand, small gravel, large gravel, small pebbles, and large pebbles. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Rocks can be categorized visually by size. ▪ Rock sizes include sand, small gravel, large gravel, small pebbles, and large pebbles. ▪ Rocks larger than pebbles are cobbles; rocks larger than cobbles are boulders. ▪ Rocks can be weighed in grams. |
| <p><u>Time Allocation</u> Active Investigation: 2 days</p> | <p><u>Time Allocation</u> Active Investigation: 2 days</p> |
| <p><u>CA Science Standards</u> ES3b, I&E4a, I&E4g</p> | <p><u>CA Science Standards</u> ES3b, I&E4b, I&E4c, I&E4d, I&E4g</p> |
| <p>Part 3: Sand and Silt</p> | <p>Part 4: Exploring Clay</p> |
| <p><u>Summary</u> Students take a closer look at sand with a hand lenses and separate sand particles from silt particles, which are smaller than the sand, by mixing the sand with water and allowing the particles to settle. They observe that the sand settles to the bottom and the silt forms a layer on top of the sand. Students read “The Story of Sand” and write a description of the sequence of events in the breakdown of rock to form sand.</p> | <p><u>Summary</u> Students investigate the physical properties of very small rock particles, clay.</p> |
| <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Sand often contains smaller particles, called silt. ▪ Water can be use to sort the sizes of earth materials. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Clay particles are very small, even smaller than silt. |
| <p><u>Time Allocation</u> Active Investigation: 2 days Reading: 1 day</p> | <p><u>Time Allocation</u> Active Investigation: 2 days Wrap-Up: 1 day</p> |
| <p><u>CA Science Standards</u> ES3b, I&E4f, I&E4g</p> | <p><u>CA Science Standards</u> ES3b, I&E4g</p> |



Grade 2 – Pebbles, Sand, and Silt
Pacing Guide – Investigation 2: River Rocks



Pacing Guide – Investigation 2: River Rocks

| Day 8 | | Day 9 | | Day 10 | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| <input type="checkbox"/> Read “At a Glance” <i>TG p. 74-75</i> <input type="checkbox"/> Read “Science Background” <i>TG p. 76-77</i> <input type="checkbox"/> Read “Teaching Children About River Rocks” <i>TG p. 78-79</i> <input type="checkbox"/> Watch Video demo of Inv. 2, Pt 1 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 80-81</i> | Guiding the Investigation <input type="checkbox"/> “Part 1: Screening River Rocks” Steps 1-10 <i>TG p. 82-83</i> <input type="checkbox"/> Body of Evidence; Prompt #3 <i>TG p. 194</i> <input type="checkbox"/> Body of Evidence; Prompt #4 <i>TG p. 195</i> | | Guiding the Investigation <input type="checkbox"/> “Part 1: Screening River Rocks” Steps 11-16 <i>TG p. 83-84</i> <input type="checkbox"/> Wrapping Up Part 1, Steps 17-19, <i>TG p. 85</i> | <input type="checkbox"/> Watch Video demo of Inv. 2, Pt 2 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 86-87</i> | Guiding the Investigation <input type="checkbox"/> “Part 2: River Rocks by Sizes” Steps 1-6 <i>TG p. 88-89</i> <input type="checkbox"/> Body of Evidence; Prompt #5 <i>TG p. 196</i> |
| Day 11 | | Day 12 | | Day 13 | |
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| | Guiding the Investigation <input type="checkbox"/> “Part 2: River Rocks by Sizes” Steps 7-12 <i>TG p. 89-90</i> <input type="checkbox"/> Wrapping Up Part 2, Steps 13-14, <i>TG p. 91</i> | <input type="checkbox"/> Watch Video demo of Inv. 2, Pt 3 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 92-93</i> <input type="checkbox"/> Body of Evidence; Prompt #6 <i>TG p. 199</i> | Guiding the Investigation <input type="checkbox"/> “Part 3: Sand and Silt” Steps 1-10 <i>TG p. 94-95</i> | | Guiding the Investigation <input type="checkbox"/> “Part 3: Sand and Silt” Steps 11-18, <i>TG p. 96-97</i> <input type="checkbox"/> “Wrapping Up Part 3” Steps 19-20, <i>TG p. 97</i> |

Pacing Guide – Investigation 2: River Rocks (continued)

| Day 14 | | Day 15 | | Day 16 | |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| | Reading in Science Resources <input type="checkbox"/> “Part 3: Sand and Silt” Steps 21-23, <i>TG p. 98</i> Student Reading: Science Resources p. 11-15 | <input type="checkbox"/> Watch Video demo of Inv. 2, Pt 4 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 99-100</i> | Guiding the Investigation <input type="checkbox"/> “Part 4, Exploring Clay” Steps 1-9, <i>TG p. 101-102</i> | | Guiding the Investigation <input type="checkbox"/> Part 4, Exploring Clay” Steps 10-17, <i>TG p. 103-104</i> <input type="checkbox"/> “Wrapping up Part 4” Steps 16-20, <i>TG p. 104</i> |
| Day 17 | | | | | |
| Prep | Instruction | | | | |
| | <input type="checkbox"/> Review/ Interdisciplinary Extensions <i>TG p. 105-108, 219, 220, 225</i> | | | | |



Grade 2 – Pebbles, Sand, and Silt
Pacing Guide – Investigation 3: Using Rocks



Investigation Overview

| Investigation 3: Using Rocks | | |
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| <p>Concept: Earth is made of materials that have distinct properties and provide resources for human activities. Students learn how people use earth materials to construct objects. They make rubbings from sandpaper, sculptures from sand, decorative jewelry from clay, and bricks from clay soil. They also read two articles about how rocks move, and how people use large rocks, gravel, sand, and clay to build things.</p> | | |
| Part 1: Rocks in Use | Part 2: Looking at Sandpaper | Part 3: A Sand Sculptures |
| <p><u>Summary</u> Students learn how people use rocks as natural resources to construct objects and to make useful materials. They start by looking outside the school building for places where earth materials can be found naturally or as building materials. They read about how water and wind move rocks.</p> | <p><u>Summary</u> Students observe sandpaper and compare it to sand. They make and compare rubbings of three grades of sandpaper.</p> | <p><u>Summary</u> Students mix sand with a cornstarch matrix to make durable sand sculptures.</p> |
| <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Earth materials are natural resources. ▪ The properties of different earth materials make each suitable for specific uses. ▪ Earth materials are commonly used in the construction of buildings and streets. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ The properties of different earth materials make each suitable for specific uses. ▪ Different sizes of sand are used in sandpaper to change the surface of wood from rough to smooth. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ The properties of different earth materials make each suitable for specific uses. ▪ Earth materials are used to make sculptures. |
| <p><u>Time Allocation</u> Active Investigation: 1 day Reading: 1 day</p> | <p><u>Time Allocation</u> Active Investigation: 1 day</p> | <p><u>Time Allocation</u> Active Investigation: 1 day</p> |
| <p><u>CA Science Standards</u> ES3b, ES3e, I&E4g</p> | <p><u>CA Science Standards</u> ES3e, I&E4g</p> | <p><u>CA Science Standards</u> ES3e</p> |

Investigation Overview (continued)

Investigation 3: Using Rocks

Concept: Earth is made of materials that have distinct properties and provide resources for human activities.

Students learn how people use earth materials to construct objects. They make rubbings from sandpaper, sculptures from sand, decorative jewelry from clay, and bricks from clay soil. They also read two articles about how rocks move, and how people use large rocks, gravel, sand, and clay to build things.

| Part 4: Clay Beads | Part 5: Making Bricks | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p><u>Summary</u> Students use clay to make beads or something decorative, which they paint and keep as a memento of their investigation of clay.</p> | <p><u>Summary</u> Students make adobe clay bricks with a mixture of clay soil, dry grass or weeds, and water. After the bricks dry, they can be used to build a class wall. Students read about how humans use rocks to make things from buildings to clay pots. They list ways that people use plants, water, and soil.</p> | |
| <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ The properties of earth materials make each suitable for specific uses. ▪ Earth materials are used to make Jewelry and sculptures. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ The properties of earth materials make each suitable for specific uses. ▪ Simple bricks are made by combining clay soil with plant material. ▪ Rocks, water, plants, and soil provide many resources for humans. | |
| <p><u>Time Allocation</u> Active Investigation: 2 days</p> | <p><u>Time Allocation</u> Active Investigation: 2 days Reading: 1 session</p> | |
| <p><u>CA Science Standards</u> ES3e, I&E4g</p> | <p><u>CA Science Standards</u> ES3e, I&E4g</p> | |



Grade 2 – Pebbles, Sand, and Silt
Pacing Guide – Investigation 3: Using Rocks



Pacing Guide – Investigation 3: Using Rocks

| Day 18 | | Day 19 | | Day 20 | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| <input type="checkbox"/> Read “At a Glance” <i>TG p. 110-111</i> <input type="checkbox"/> Read “Science Background” <i>TG p. 112-113</i> <input type="checkbox"/> Read “Teaching Children About Using Rocks” <i>TG p. 114-115</i> <input type="checkbox"/> Watch Video demo of Inv. 3, Pt 1 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 116-117</i> | Guiding the Investigation <input type="checkbox"/> “Part 1: Rocks in Use” Steps 1-4 <i>TG p. 118</i> <input type="checkbox"/> “Wrapping Up Part 1” Steps 5-7, <i>TG p. 119</i> | | <input type="checkbox"/> Reading in Science Resources “Part 1: Rocks in Use” Steps 7-8 <i>TG p. 120</i> Student Reading: Science Resources p. 16-17 | <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 121-122</i> | Guiding the Investigation “Part 2, “Looking at Sandpaper” <input type="checkbox"/> Steps 1-8 <i>TG p. 123-124</i> <input type="checkbox"/> “Wrapping Up Part 2” Steps 9-10 <i>TG p. 125</i> |
| Day 21 | | Day 22 | | Day 23 | |
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 126-127</i> | Guiding the Investigation “Part 3 Sand Sculptures” <input type="checkbox"/> Steps 1-5 <i>TG p. 128-129</i> <input type="checkbox"/> “Wrapping Up Part 3” Steps 6-7, <i>TG p. 129</i> | <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 130-131</i> | Guiding the Investigation <input type="checkbox"/> “Part 4: Clay Beads” Steps 1-5 <i>TG p. 132</i> | | Guiding the Investigation <input type="checkbox"/> “Part 4: Clay Beads” Step 6 <i>TG p. 133</i> <input type="checkbox"/> “Wrapping Up Part 4” Steps 7-8, <i>TG p. 133</i> |

Pacing Guide – Investigation 3: Using Rocks (continued)

| Day 24 | | Day 25 | | Day 26 | |
|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 134-136</i> | Guiding the Investigation <input type="checkbox"/> “Part 5, Making Bricks” Steps 1-7 <i>TG p. 137-138</i> <input type="checkbox"/> Body of Evidence; Prompt #7 <i>TG p. 202</i> | | Guiding the Investigation <input type="checkbox"/> “Part 5: “Making Bricks” Steps 8-10 <i>TG p. 138-139</i> <input type="checkbox"/> “Wrapping Up Part 5” Step 11, <i>TG p. 139</i> | | Reading in Science Resources <input type="checkbox"/> “Part 5, Steps 12-14” <i>TG p. 140-141</i> Student Reading: Science Resources p. 18-22 |
| Day 27 | | | | | |
| Prep | Instruction | | | | |
| | <input type="checkbox"/> Review/ Interdisciplinary Extensions <i>TG p. 142-146, 221, 222, 226</i> | | | | |



Grade 2 – Pebbles, Sand, and Silt
Pacing Guide – Investigation 4: Soil Explorations



Investigation Overview

| Investigation 4: Soil Investigations | | |
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| <p>Concept: Earth is made of materials that have distinct properties and provide resources for human activities.</p> <p>Students put together and take apart soils. They are introduced to humus as an ingredient in soil. They compare homemade soil and local soils for texture, water retention capacity, color, and components. Through a video, students learn about what fossils tell us about the Earth’s past. Through readings, students learn more about soil, why soils important for plants, and a famous dinosaur fossil.</p> | | |
| Part 1: Homemade Soils | Part 2: Water in Soil | Part 3: Soil Research |
| <p><u>Summary</u> Students put together and take apart soils. They are introduced to humus, an important soil ingredient. They mix together homemade soil containing sand gravel, pebbles, and humus. They shake some of the soil on a paper plate, they use screens to separate the homemade soil, and they shake soil and water together in a vial and draw their observations.</p> | <p><u>Summary</u> Students pour equal amounts of water through equal amounts of soil and gravel. They measure the amounts of weather that drains through and compare the results, using a balance and a graduated cylinder.</p> | <p><u>Summary</u> Students study their schoolyard soil samples. They try to find soils in as many places as possible: next to sidewalks, near trees, and in landscaped area. Students read about soil, and how soil helps plants, people, and other animals.</p> |
| <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Soil is a mixture of earth materials. ▪ Humus is decayed material from plants and animals. ▪ The ingredients of soil can be observed by mixing soil with water, shaking it, and letting it settle. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Some earth materials, like soils, absorb or retain more water than other earth materials, like gravel. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> • Soils vary from place to place. • Soils have properties of color and texture. • Different soils differ in their ability to support plants, including the retention of water. |
| <p><u>Time Allocation</u> Active Investigation: 2 days Wrap-Up: 1 day</p> | <p><u>Time Allocation</u> Active Investigation: 2 days</p> | <p><u>Time Allocation</u> Active Investigation: 1 day Reading: 1 day</p> |
| <p><u>CA Science Standards</u> ES3c, I&E4a, I&E4f, I&E4g</p> | <p><u>CA Science Standards</u> ES3c, I&E4b, I&E4d</p> | <p><u>CA Science Standards</u> ES3 c, ES3e</p> |

Investigation Overview (continued)

Investigation 4: Soil Investigations

Concept: Earth is made of materials that have distinct properties and provide resources for human activities.

Students put together and take apart soils. They are introduced to humus as an ingredient in soil. They compare homemade soil and local soils for texture, water retention capacity, color, and components. Through a video, students learn about what fossils tell us about the Earth's past. Through readings, students learn more about soil, why soils important for plants, and a famous dinosaur fossil.

| Part 4: Studying Local Soils | Part 5: Fossils | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p><u>Summary</u> Students study their schoolyards soil samples. They shake some of the soil with water in vials and draw the results. They compare the vials and drawings of their schoolyard samples with the vials and drawings of the homemade soil. Through a reading, students learn how humus in soil is important for plant growth.</p> | <p><u>Summary</u> Through a video and reading, students learn what fossils are, some of the ways fossils form, and how people find and study fossils of all sizes.</p> | |
| <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Soils can be composed of humus and different amounts and sizes of rocks. | <p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Fossils are parts of plants and animals that turned to rock a long time ago. ▪ Scientists study fossils to learn about the past. ▪ Scientists study dinosaur fossils because no one has ever seen a dinosaur. | |
| <p><u>Time Allocation</u> Video: 1 day Reading: 3 days</p> | <p><u>Time Allocation</u> Video: 1 day Reading: 1 day</p> | |
| <p><u>CA Science Standards</u> ES3c, I&E4d, I&E4f</p> | <p><u>CA Science Standards</u> ES3d, ES3e</p> | |



Grade 2 – Pebbles, Sand, and Silt
Pacing Guide – Investigation 4: Soil Explorations



Pacing Guide – Investigation 4: Soil Explorations

| Day 28 | | Day 29 | | Day 30 | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| <input type="checkbox"/> Read “At a Glance” <i>TG p. 148-149</i> <input type="checkbox"/> Read “Science Background” <i>TG p. 150-151</i> <input type="checkbox"/> Read “Teaching Children About Soil” <i>TG p. 152-153</i> <input type="checkbox"/> Watch Video demo of Inv. 4, Pt 1 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 154-155</i> | Guiding the Investigation <input type="checkbox"/> “Part 1: Homemade Soil” Steps 1-6 <i>TG p. 156</i> | | Guiding the Investigation <input type="checkbox"/> “Part 1: Homemade Soil” Steps 7-18 <i>TG p. 157-158</i> | | Guiding the Investigation <input type="checkbox"/> “Part 1: Homemade soil” Steps 19-23 <i>TG p. 159-160</i> <input type="checkbox"/> “Wrapping Up Part 1” Steps 24-25 <i>TG p. 160</i> |
| Day 31 | | Day 32 | | Day 33 | |
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| <input type="checkbox"/> Watch Video demo of Inv. 4, Pt 2 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 161-162</i> | Guiding the Investigation <input type="checkbox"/> “Part 2: Water in Soil” Steps 1-9, <i>TG p. 163-165</i> <input type="checkbox"/> Body of Evidence; Prompt #8 <i>TG p. 205</i> | | Guiding the Investigation <input type="checkbox"/> “Part 2: Water in Soil” Steps 10-11, <i>TG p. 166</i> <input type="checkbox"/> “Wrapping Up Part 2” Step 12, <i>TG p. 166</i> <input type="checkbox"/> Make Content Entries, <i>TG p. 166</i> | <input type="checkbox"/> Watch Video demo of Inv. 4, Pt 3 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 167-168</i> | Guiding the Investigation <input type="checkbox"/> “Part 3, Soil Search” Steps 1-5 <i>TG p. 169</i> <input type="checkbox"/> “Wrapping Up Part 3” Steps 6-7, <i>TG p.170</i> <input type="checkbox"/> Body of Evidence; Prompt #9 <i>TG p. 206</i> |

Pacing Guide – Investigation 4: Soil Explorations (continued)

| Day 34 | | Day 35 | | Day 36 | |
|--------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| | <input type="checkbox"/> Reading in Science Resources Steps 8-9, <i>TG p. 171-173</i> Student Reading: Science Resources p. 23-27 | <input type="checkbox"/> Watch Video demo of Inv. 4, Pt 4 Review “Materials” and “Getting Ready” <i>TG p. 174-175</i> | Guiding the Investigation <input type="checkbox"/> “Part 4: Studying Local Soil” Steps 1-7, <i>TG p. 176-177</i> | | Guiding the Investigation <input type="checkbox"/> “Part 4: Studying Local Soil; Steps 8-13, <i>TG p. 177-178</i> <input type="checkbox"/> “Wrapping Up Part 4” Steps 14-15, <i>TG p.179</i> |
| Day 37 | | Day 38 | | Day 39 | |
| Prep | Instruction | Prep | Instruction | Prep | Instruction |
| | <input type="checkbox"/> Reading in Science Resources Steps 16-17, <i>TG p.180</i> Student Reading: Science Resources p. 28-29 | <input type="checkbox"/> Watch Video demo of Inv. 4, Pt 5 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 181-182</i> | Guiding the Investigation <input type="checkbox"/> “Part 5: Studying Fossils” Steps 1-2, <i>TG p. 183</i> <input type="checkbox"/> Body of Evidence; Prompt #10 <i>TG p. 207</i> | | <input type="checkbox"/> Reading in Science Resources Steps 3-5, <i>TG p. 184</i> Student Reading: Science Resources p. 30-36 |
| Day 40 | | Day 41 | | | |
| Prep | Instruction | Prep | Instruction | | |
| | <input type="checkbox"/> Review/ Interdisciplinary Extensions <i>TG p.185-190, 208, 209, 223, 227</i> | | <input type="checkbox"/> END-OF-MODULE ASSESSMENT Step 5 <i>TG p. 182, 244-247</i> | | |



Grade 2 – Pebbles, Sand, and Silt Recommended Body of Evidence



Overview

This guide is intended to support the collection of a Body of Evidence. A student's Body of Evidence should, at a minimum, include work from the listed prompts and in-class investigations. Other class work and assessments that demonstrate a student's level of proficiency may be included.

Download samples of proficient work @ <https://eteams.sandi.net/sites/sbrc>

Note: Administer Grade 2 FOSS Earth Science End-of-Module assessment (can also be used as a pre-assessment at the beginning of the unit).

Recommended Body of Evidence – Grade 2 Earth Science

Concept #1

Earth is made of materials that have distinct properties and provide resources for human activities.
(CA Standards ES3a, ES3b, ES3c, ES3d, ES3e)

**Prompt #1: (I&E) FOSS: Pebbles, Sand, and Silt: Investigation 1: First Rocks Part 2: Washing Three Rocks
(TG p. 191 – Rock Record – No. 1 – Science Notebook)**

This rock is ...

**Prompt #2: (I&E) FOSS: Pebbles, Sand, and Silt: Investigation 1: First Rocks Part 5: Start A Rock Collection
(TG p. 193 – Colorful Rocks Review – No. 3 – Science Notebook)**

1. What makes rocks colorful? 2. How many different kinds of minerals can you see in granite? What color are they?

**Prompt #3: (I&E) FOSS: Pebbles, Sand, and Silt: Investigation 2: River Rocks Part 1: Screening River Rocks
(TG p. 194 – Create A Graph – No. 4 – Science Notebook)**

After separating their river rocks with screens, each group in Mrs. Lee's class counted their large and small pebbles. This is what they found. Make a graph of the number of rocks of each size. Label the axes of the graph. What information does this graph tell?

**Prompt #4: (I&E) FOSS: Pebbles, Sand, and Silt: Investigation 2: River Rocks Part 2: River Rocks By Size (session 1)
(TG p. 195 – Sand, Gravel, and Pebbles – No. 5 – Science Notebook)**

Have students use the notebook sheet to make a permanent record of the size groups of the rocks. Have them draw the rock particles in each circle.

Recommended Body of Evidence – Grade 2 Earth Science (continued)

Prompt #5: (I&E) FOSS: Pebbles, Sand, and Silt: Investigation 2: River Rocks Part 2: River Rocks By Size (session 2)
(TG p. 196 – How Many Grams? – No. 6 – Science Notebook *and* TG p. 197 – Steps For Weighing An Object – No. 7 – Science Notebook)

1. How many grams does it take to balance each pebble? Select three large pebbles. Weigh each pebble. Record you measurements. 2. How many grams does it take to balance all three of those pebbles at one time? 3. Can you find two pebbles that weigh the same amount? Draw the two pebbles here.

Prompt #6: FOSS: Pebbles, Sand, and Silt: Investigation 2: River Rocks Part 3: Sand and Silt
(TG p. 199 – The Story of Sand Review – No. 9 – Science Notebook)

1. Put these rocks in order by size, from the largest to the smallest. 2. Tell the story of sand in your own words.

Prompt #7: FOSS: Pebbles, Sand, and Silt: Investigation 3: Using Rocks Part 5: Making Bricks
(TG p. 202 – Uses of Earth Materials – No. 12 – Science Notebooks *and* TG p. 203 – Making Things With Rocks Review)

Circle the things that are made with earth materials. Write the kinds of earth material that each thing is made from.

1. What is a quarry? 2. What kinds of things are made from big pieces of rock? 3. What kinds of things are made from gravel and sand? 4. What kinds of things are made of clay?

Prompt #8: (I&E) FOSS: Pebbles, Sand, and Silt: Investigation 4: Soil Explorations Part 2: Water In Soil
(TG p. 205 – Water and Soil – No. 15 – Science Notebook)

Our class studied what happens when you pour water through soil and through water. This is what we did. This is what we found out.

Prompt #9: FOSS: Pebbles, Sand, and Silt: Investigation 4: Soil Explorations Part 3: Soil Search
(TG p. 206 – What Is In Soil? Review – No. 16 – Science Notebook)

1. What is humus? 2. What does humus do for soil? 3. How are worms good for soil? 4. Describe different kinds of soil.

Prompt #10: FOSS: Pebbles, Sand, and Silt: Investigation 4: Soil Explorations Part 5: Fossils
(TG p. 207 – Fossils Review – No. 17 – Science Notebook)

1. What are fossils? 2. Where are fossils found? 3. What do fossils tell us? 4. Why are fossils important?



**Grade 2 – Pebbles, Sand, and Silt
Module Materials and Equipment**



Materials Provided

The FOSS kit comes with most of the supplies that are needed to teach the unit. The kits will be delivered to the school site prior to the start of the 12-week unit of instruction. At the end of the 12-weeks, the kit will be returned to the Science Resource Center where it will be refurbished and prepared for its next use. Please review the refurbishment calendar for kit drop-off and return dates. Kits must be returned according to the refurbishment calendar to ensure that all kits are checked and restocked with consumable materials.

Materials Supplied by the Teacher or School Site

Be aware that the classroom teacher or school site must supply a few items. These are indicated in the materials list for each part of the investigation with an asterisk (*). Here is a summary of those items.

| | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Investigation 1: First Rocks</p> <ul style="list-style-type: none"> ▪ Flip chart or chart paper ▪ Crayons ▪ Marking Pens ▪ Overhead Projector (optional) ▪ Overhead –transparency markers ▪ Paper Towels ▪ Pitcher or 2-liter soda bottle ▪ Sponges ▪ Transparencies (optional) ▪ Tub ▪ 16 sheets of white paper | <p>Investigation 2: River Rocks</p> <ul style="list-style-type: none"> ▪ White Glue (optional) ▪ Large knife ▪ Overhead Projector (optional) ▪ Paper Towels ▪ Pitcher or 2 liter soda bottle ▪ Scissors ▪ Sponges ▪ Transparencies ▪ Transparent Tape ▪ 32 Pieces of white paper | <p>Investigation 3: Using Rocks</p> <ul style="list-style-type: none"> ▪ Brick ▪ Bucket ▪ Clay Soil 8 liters ▪ Container, zip bag or jar ▪ Box of Cornstarch ▪ Crayons (optional) ▪ White Glue ▪ Dry Grass, weeds or straw ▪ Large knife ▪ Newspaper ▪ Notebooks or clipboards ▪ Painting supplies ▪ Aluminum mini-loaf pans ▪ Paper Towels ▪ Pitcher or 2-liter soda bottle ▪ Clean sand 3 liters (7 pounds) ▪ Piece of landscaping sandstone (optional) ▪ Saucepan ▪ Scissors ▪ Soda Straws ▪ Sponges ▪ Plastic Table Cloth or placemat (optional) ▪ Trowel or shovel ▪ Pieces of white paper ▪ Yarn, 25 yards | <p>Investigation 4: Soil Exploration</p> <ul style="list-style-type: none"> ▪ Overhead projector (optional) ▪ Paper towels ▪ Pitcher or 2-liter soda bottle ▪ Scratch paper ▪ Transparency (optional) ▪ Transparent Tape ▪ VCR and Monitor ▪ 32 Zip lock bags, 1-liter (1 quart) (optional) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|