Introduction
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TSL 518  
Introduction to Selected Unit  
May 2, 2012

**Land and Water**

This unit is from the fourth grade science curriculum from Hamden Public Schools and is used in mainstream classrooms with integrated ELLs. The implementation of this curriculum spans a total of six weeks. It was written by me and another fourth grade teacher from the Hamden School district and the draft was approved by the Hamden Board of Education in December 2011.

**Source of Reading Materials**

Land and Water Science Investigations (STC)  
National Science Foundation  
published by Carolina Biological Supply Company

Excerpt from Rocks, Minerals, and Soil  
By Rachel Kamb  
Pages 17-20  
www.sciencea-z.com

The Water Cycle  
www.abcteach.com

Interactive Science Dictionary  
http://player.discoveryeducation.com

Water Cycle Passages in 60 different languages  
http://ga.water.usgs.gov/edu/watercyclehi.html

**Learning Goals**

I want my students to know:

- that water plays a major role in shaping the earth’s surface.
- the energy that causes the water cycle is from the sun.
- erosion is the wearing away of the earth’s surface by water, wind, and ice and the effects can be immediate or occur over a long period of time.
- moving water can create new landforms and reshape existing rivers and streams.
- the slope of the land, speed of the water, and vegetation coverage can affect the amount of erosion.
Lesson 1
Lesson 1: Land and Water

Performance Indicators

<table>
<thead>
<tr>
<th>Domain</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing</td>
<td>Students will write in complete sentences (3 per observation) using vocabulary learned in social studies (regarding landforms) to describe their observations of land.</td>
<td>Students will write in complete sentences (2 per observation) using social studies vocabulary word bank to describe their observations of land.</td>
<td>Students will write in complete sentences (2 per observation) using observation sentence starters and the social studies vocabulary word bank.</td>
<td>Students will write in complete sentences (1 per observation) using sentence frames with the help of a word bank.</td>
<td>Students will draw diagrams of their observations and label them with a word bank.</td>
</tr>
<tr>
<td>Speaking</td>
<td>Students, in small groups, will discuss their observations in complete sentences using vocabulary words.</td>
<td>Students, in small groups, will discuss their observations in complete sentences using vocabulary from word bank.</td>
<td>Students, in small groups, will respond to yes/no, either/or, short answer questions about their observations.</td>
<td>Students, in small groups, will point out their observations with their diagrams and repeat words described to them.</td>
<td></td>
</tr>
</tbody>
</table>
### Lesson 1: Land and Water

<table>
<thead>
<tr>
<th>Function</th>
<th>Situation</th>
<th>Expression</th>
<th>Word/Phrase</th>
<th>Grammar</th>
</tr>
</thead>
</table>
| **Observe** | How water shapes the land | I observed ___________.  
I noticed ___________.  
It reminds me of ___________ because the ___________.  
An area where I noticed the water shaped the land was ___________. I think this because ___________. | *rain, snow, sleet, hail precipitation, erosion, flooding*  
*water flowing, slowly, quickly*  
*size, shape, color, texture words*  
*southwest, land, dry, looks like the Grand Canyon, desert* | *verbs, process verbs nouns, adjectives, adverbs* |
| **Describe** | How water shapes the land | The land in the picture is ___________.  
The water has ___________ the land.  
The water has changed the land by ___________.  
The land changed after it ___________ and now the land is ___________. | *eroding, wet, dry, dark, light, rocky, grainy, green, brown, tan, reddish*  
*flooded, eroded, worn away, reshaped*  
*forming a river, lake, ocean, stream, creating a valley, moved soil from one place to another* | *verbs, process verbs nouns, adjectives, adverbs* |
Lesson 1: Land and Water

| Discuss | How water shapes the land | Sentences will vary based on students observations—many will include those from above | *rained, hailed, snowed, sleeted, wet, white, pitted, eroded,... | *sentence structure |

*It is hard to determine what words/sentences the students will use when writing, describing, and discussing their observations because this is the introduction to a new science unit. The students have had some prior experience with some of the concepts through our social studies curriculum, but nothing has been taught in depth.
Lesson 1: Land and Water

Lesson 1: Thinking About Land and Water

4th Grade Science Unit-Land and Water

Content Objective(s):

1. Students will observe and describe how water shapes land.

Language Objectives:

1. Students will discuss what they already know about land and water.
2. Students will write their observations in their science notebooks.
3. Students will discuss and share their observations in small groups.

Materials:

Science notebooks, photo cards with questions.

Modifications for materials:

**Observation sentence starters, **fill-ins/sentence frames, **questions, poster paper, chart paper, pencils, crayons, markers, and graphic organizers, L1/L2 dictionary, word banks, picture/word/definition cards, word maps, word squares, and LINCS table. **All lessons will include the interactive glossary from [http://player.discoveryeducation.com](http://player.discoveryeducation.com). This website provides a definition, animation, video, and an image explaining what each word/concept means. The definition can be heard/read in both English and Spanish. **Will be posted on the board.

Time:

1 hour

Initiation:

1) Tell students that we are going to begin a new science unit where they will investigate the interactions between land and water. Introduce the content and language objectives for the lesson.

Lesson Development:

1) Pass out science notebooks and remind students to go to the next clean page and write today's date in the corner.
2) Chart paper will be placed on the board with the title, "What We Know About Land and Water". *Students will be asked to spend a few minutes
Lesson 1: Land and Water

independently responding to a “Quickwrite” (SIOP), sharing what they know about land and water in their science notebooks. *Sentence frames (will be posted on the board) can be used such as: One thing I already know about ______ is ______., I remember learning _____ in ______., _____ reminds me of ______ because ______. Level 1-will draw pictures, Level 2- can list words, Level 3/4-can use sentence frames. They will also be reminded to think of previous social studies units that discussed land and water.

2) Students will be asked to share their ideas about land and water and their responses will be written/drawn on the class chart. Checks will be placed next to duplicate responses to acknowledge all contributions.

3) Students will get into their science groups: 4 in a group (these groups will be arranged heterogeneously by level, i.e. a 5, 4, 2,1 or 4, 4, 3,2-thus allowing as many levels to be represented in a group)

4) Students will be asked to spend a few minutes discussing what they would like to learn about land and water. This will be also on a class chart. These charts will be displayed around the room and students will be able to add to them as the unit moves forward. For both charts students will be asked to label the contributions as to what they relate to, L for land, W for water, and LW for land and water.

5) Introduce/discuss vocabulary words: erosion, minerals, soil, weathering, precipitation, natural resources. This list can be added to as the unit develops. These are some of the words I want students to use from social studies. Level 1-will match L1/L2 words to picture, Level 2-will use a word square, Level 3-will use a LINCS table, Level 4/5-will write the word and definition and provide examples from social studies.

6) Students will take a mini field trip around the school to observe and sketch the land. They will label their observations. (weather permitting)

7) Students will work in groups to observe 4-5 photo cards showing different types of land and water. (i.e. erosion, water falls, lakes, rivers, tropical rainforests, mountains, deserts, etc.)

8) Students will be asked to write/draw any observations they have about the photos in their science notebook. Level 1-will draw diagrams and label with a word bank, Level 2-will use fill-ins and a word bank: “It reminds me of ______ because the ______., An area where I noticed the water shaped the land was ______. I think this because ______.”, Level 3- will use observation sentence starters and a word bank: “I observed______, I noticed ______., Level 4- will use a word bank.

9) Students will then be asked to discuss the questions on the back of the cards and to take notes in their science notebooks. *Writing-Level1-will draw diagram(s) and label with a word bank, Level 2-will use sentence frames/fill-ins such as: The land in this picture is ______., The water has ______. the land, The land changed after it ______ and now the land is ______. They will also have a word bank, Level 3-will use sentence starters such as: I noticed....,
Lesson 1: Land and Water

observed..., it reminds me of..., Level 4- will write in complete sentences using a word bank, Level 5- will write in complete sentences using prior knowledge from social studies lesson.*Speaking-Level 1- will point out their observations with their diagrams and repeat words to describe them, Level 2- will respond in group by answering yes/no, either/or questions about their observations, Level 3- will use prompts such as: I noticed..., I wondered..., it reminds me of ______ because the ______, Level 4/5 will discuss in complete sentences.

10) After their discussion students will create a chart or poster, using words, illustrations, or a graphic organizer to show what they have learned from the lesson.

Closure:
1) Using the, “You Are the Teacher!” SIOP model, students will use their chart, poster, using words, illustrations, or graphic organizer to teach other groups what they have learned.
2) One (the students from each group will take turns presenting) student will stay with their work, while the rest of the group will rotate to another group’s presentation. All students will have the opportunity to visit every groups work.
3) The student who stays behind will “teach” (*Level 1 and 2 students may buddy up with a 4 or 5 when it is their turn to teach) what their group has learned during the lesson. Students will be able to use sentence frames to share what they do/don’t understand from each group. I understand that this is about ______., I don’t understand ______., I have a question about ______., Can you explain ______ to me again?
4) Their observations will be added to the class chart. A check mark will be placed next to any duplicate responses thus acknowledging all answers.
5) Tell students that in the next lesson we will use a stream table and learn about the components that make up soil.

Assessment:
1) Were the students able to discuss what they already know about land and water?
2) Did the students write their observations of the “field trip”/land and water photo cards?
3) Were the students able to discuss their observations in their group and whole class?

*indicates modifications
Lesson 1: Land and Water

"Quickwrite" Sentence Frames

One thing I already know about _____ is _____.
I remember learning _____ in _____.
_____ reminds me of _____ because _____.
This is similar to ______.
_____ comes from the sky.
_____ is shown in many different forms.

- More sentence frames can be generated (and used for future reference) as students share their responses.

"You Are the Teacher" Sentence Frames

I understand that this is about _____.
I don't understand _____.
I have a question about _____.
Can you explain ______ to me again?

- More sentence frames can be generated (and used for future reference) as students share their responses.
Lesson 1: Land and Water

Sentence Frames

I observed ____________.

I noticed ____________.

It reminds me of ____________ because the ____________.

An area where I noticed the water shaped the land was _____________. I think this because ____________.

The land in the picture is _________________.

The water has ____________ the land.

The water has changed the land by _________________.

The land changed after it ____________ and now the land is _______________.

Lesson 1: Land and Water

Word Bank

rain, snow, sleet, hail, precipitation, flooding, erosion, worn away, weathering

water flowing, slowly, quickly

southwest, land, dry, Grand Canyon, desert

wet, dry, dark, light, rocky, pitted, grainy, green, brown, tan, reddish

river, lake, ocean, stream, valley

*word banks are developed by the class- this would be a sample. Other words could be added as needed
## Observations

Think of the four senses (not taste).

<table>
<thead>
<tr>
<th>Size, shape, color, lines, patterns, texture, weight, smell/odor, sound, behavior . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>I observed _____ .</td>
</tr>
<tr>
<td>I noticed _____ .</td>
</tr>
</tbody>
</table>

Connect it with what you know or have investigated.

| It reminds me of _____ because _____ . |

Observe and record cause and effect.

| When _____ , it _____ . |

Note any changes.

| At first, _____ . But now _____ . |

Be curious, and ask questions you might investigate.

<table>
<thead>
<tr>
<th>I am curious about _____ .</th>
</tr>
</thead>
<tbody>
<tr>
<td>It surprised me that _____ because _____ .</td>
</tr>
<tr>
<td>I wonder what would happen if _____ .</td>
</tr>
<tr>
<td>How does _____ affect _____ ?</td>
</tr>
</tbody>
</table>

the organic component of soil that is composed of plant decay

erosion

soil

humus (noun)
Minerals, Rocks, and Soil

subsoil

Minerals, Rocks, and Soil

topsoil

Minerals, Rocks, and Soil

weathering
Soil  
(noun)  

Subsoil  
(noun)  

The top layer of the ground, in which plants grow; dirt

The middle layer of soil, which contains more rocks than topsoil
ore
(noun)

a rock that has useful metals or other minerals inside it

organic
(adj)

having to do with or coming from living organisms
(noun) **Rock**

and is found in nature

(a hard, solid material)

Minerals, Rocks, and Soil

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(noun) **Resources**

useful to people
are valuable or very
supplies of things that

Minerals, Rocks, and Soil
energy resources
(noun)

supplies of materials that can be used by people to do work and to supply power

erosion
(noun)

the process of transporting and wearing away rocks or soil as loose particles are moved by water, wind, ice, or gravity
topsoil
(noun)

the top layer of soil, in which most plants have their roots

weathering
(noun)

the process of wearing away or otherwise changing Earth's surface, caused by natural forces
Lesson 1: Land and Water

**Word Square or is it a Rectangle?**

<table>
<thead>
<tr>
<th>Word</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>In your own words (clue)</th>
<th>What do you think of?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Definition</th>
<th>What is it not?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
<td>Term</td>
</tr>
<tr>
<td>---</td>
<td>------</td>
</tr>
<tr>
<td>3</td>
<td>Reminding Word</td>
</tr>
</tbody>
</table>

List the parts  Identify a Reminding Word  Note a LINCing Story  Create a LINCing Picture  Self-test

The Vocabulary LINCing Routine
Word Map

Describe it!

Give examples!
**Note about photo cards**

The original photo cards come from our STC science kit on land and water. These photo cards were unavailable to put into this lesson. I have attempted to print some pictures, as a sample, which could be used with the questions. The questions can also be modified to suit the picture. The overall objective is to get the students thinking and discussing what they see and how it relates to the unit. 😊

Thank you!

The pictures are great!
Land and Water Photographs

Photo Card 1

1. What do you see in this picture?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. How do you think this canyon formed?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Photo Card 2

1. Why can you see the roots of this tree?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. When it rains, what do you think happens to the soil near the tree?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Photo Card 3

1. Why do you think there is a waterfall on this land?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. Describe the speed of the water in this picture.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Photo Card 4

1. Name all of the places in this picture where you see water in any form.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. Describe the water cycle using this picture.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Photo Card 5

1. Name all of the places in this picture where you see water in any form.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. What might be happening to the stream at the bottom of this picture?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Photo Card 6

1. How is this picture different from others you have seen? Where do you think this picture may have been taken? Why?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. What do you notice about the shape of the valley? Why do you think it has this shape?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
**Photo Card 7**

1. How do you think this land got its shape?

2. Why do you think the soil in this picture has different colors?

**Photo Card 8**

1. Compare this picture with photo card 9. How are they alike? How are they different?

2. Why do you think there is a lot of plant growth on this water?

**Photo Card 9**

1. What is the water doing to the land in this picture?

2. How did the shape of the land in this picture affect the way the water is flowing?
Lesson 2
## Lesson 2: Land and Water

### Performance Indicators

<table>
<thead>
<tr>
<th>Domain</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speaking in science groups</strong></td>
<td>Students will discuss their observations of the soil components using adjectives and/or verbs in complete sentences.</td>
<td>Students will discuss their observations using adjectives and verbs from word bank in complete sentences.</td>
<td>Students will discuss their observations of the soil components using prompts provided.</td>
<td>Students will share their observations of the soil components by respond to yes/no, either/or, and short answer questions.</td>
<td>Students will point out their observations of the soil components using real objects to compare look and touch, point to what the components did in water, and repeat words to describe them.</td>
</tr>
<tr>
<td><strong>Writing</strong></td>
<td>Students will write in complete sentences using adjectives and/or verbs, and vocabulary to describe their observations of the soil components.</td>
<td>Students will write in complete sentences using an adjective/verb vocabulary word bank to describe their observations of the soil components.</td>
<td>Students will write in complete sentences using observation sentence starters and the adjective/verb vocabulary word bank.</td>
<td>Students will write in complete sentences by filling in the blanks (sentence frames) with the help of the adjective/verb vocabulary word bank.</td>
<td>Students will draw diagrams of their observations of the soil components and label them with an adjective/verb word bank.</td>
</tr>
<tr>
<td><strong>Reading</strong></td>
<td>Students will read text providing additional information on soil. Identifying key information.</td>
<td>Students will read text providing additional information on soil using a vocabulary list for assistance.</td>
<td>Students will read text providing additional information on soil. Key information will be highlighted in order to assist them.</td>
<td>Students will follow text read by teacher matching some words to pictures identifying soil components.</td>
<td>Students will point to photographs of the different components of soil and repeat words that identify each.</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Function</th>
<th>Situation</th>
<th>Expression</th>
<th>Word/Phrase</th>
<th>Grammar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discuss/Observe/Describe</td>
<td>The four components of soil</td>
<td>The color is _______.</td>
<td>*red, brown, white, speckled, tan, orange, dark brown, any color that would apply</td>
<td>*verbs, process verbs, nouns, adjectives, adverbs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>It looks like _______.</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>It feels _______.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I observed _______________.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I noticed _______________.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>It _______ to the bottom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>It _______ to the top.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>It is _______ in the cup.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The _______ is _______ so it floats to the top.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The _______ is _______ so it sinks to the bottom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The _______ and the _______ are the same because they both ________.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>In addition</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*sentence structure</td>
</tr>
</tbody>
</table>
Lesson 2: Land and Water

they, __________.
The ________ and the
________ are different
because __________,
and __________. Also,
__________ but
__________.

One interesting thing I
noticed __________.
I discovered __________.
I learned __________.
I wonder __________.
I was surprised that
__________.
When I __________, it
__________.
________ changed after
__________, and now it
__________.

*gravel, sand, clay,
sink, are heavy, small,
chunky...

*humus, clay, sand,
gravel, one sinks, the
other floats...color,
size, shape, texture is
different...

*answers will vary
based on observations
<table>
<thead>
<tr>
<th>Discuss</th>
<th>Reading additional information on soil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I wonder if...</td>
<td>What did you understand about...?</td>
</tr>
<tr>
<td>I learned...</td>
<td>I discovered...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predict</th>
<th>What happens to the soil components when it rains?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think ______ will happen to ______ when it rains because ______.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Questions/answers will vary based on understanding of text (i.e. what they feel is important, interesting to them...)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*nothing, gravel, it is very heavy...</td>
</tr>
<tr>
<td>*something, humus, it is very light...</td>
</tr>
</tbody>
</table>

Sentences will vary based on students observations—many will include those from above.
Lesson 2: Examining Earth Materials

4th Grade Science Unit-Land and Water

Content Objective(s):
1. Students will observe and compare and contrast the four soil components.
2. Students will be able to read and identify facts in the text about soil.

Language Objectives:
1. Students will use adjectives to discuss the similarities and differences of the soil components.
2. Students will record in writing their observations of the properties of each soil component.
3. Students will be able to discuss and ask questions about soil from the readings.

Materials:
Stream tables with soil components (the stream tables are already assembled), magnifying glasses, science notebooks, small graduated cups, water bottles, spoons, rinse buckets, newspaper, chart paper, directions for examining components, question and answer sheets, observation recording sheet, and reading materials.

Modifications for materials:
**Compare and contrast sentence starters, **observation sentence starters, **sentence frames/fill-ins, L1/L2 dictionary, picture cards for senses and words (see/touch), realia to compare/contrast to soil materials (i.e. sandpaper for rough, cotton for smooth, salt/sugar, crayons for color), **key vocabulary words, adjective word bank in English and Spanish, signal words for comparing and contrasting, compare and contrast graphic organizers, reading materials. ***All lessons will include the interactive glossary from http://player.discoveryeducation.com. This website provides a definition, animation, video, and an image explaining what each word/concept means. The definition can be heard/read in both English and Spanish.

**Will be posted on board

Time:
1 hour

Initiation:
1) Ask students to review what was learned in lesson 1. * Students will use the, “Oh, Yesterday” SIOP activity for building background. Students will be chosen at random by means of a stick jar to share using one of the following sentence starters, “Oh yesterday I learned that..., Oh yesterday we studied..., Oh yesterday I discovered that..., Oh yesterday our class..."
2) Tell students that in this lesson, they will examine more closely the four soil components that make up their stream tables in order to better understand how each component interacts with water. Introduce the content and language objectives for the lesson.

3) Students will get into their science groups: 3-4 in a group assigned in lesson 1.

**Lesson Development:**

1) Brainstorm a list of possible adjectives students may use when describing their soil components (i.e. size, shape, color, texture)* A word bank will be given to levels 1-4 prior to brainstorming with the class.

2) Brainstorm a list of possible verbs students may use when describing their soil components actions in the water* A word bank will be given to levels 1-4 prior to brainstorming with the class.

3) Distribute the observation recording sheet to each student. Students will be encouraged to use adjectives when recording their observations.

4) Students will collect their supplies at this time.

5) Students will complete the following steps for each soil component. The first soil component will be modeled for the class. A copy of the steps will be posted on the board. Written directions will also be provided:

- pour the component(gravel) on a sheet of paper
- use a magnifying glass to look closely at the component (gravel)
- What do you notice about the appearance?*adjective word bank can be used to list characteristics of each component. Picture cards for adjectives will be used and realia (i.e. sandpaper, safety mirror, crayons, blocks,-to allow the level 1 students something that feels or looks the same to compare it to)
  - How does it look?
  - discuss your observations with your group* (level 2) fill-ins/ (level 3) sentence starters, “The color is _________, It looks like__________, I observed..., I noticed....”
  - record your observations on your recording sheet*, level 1 students will be able to use a crayon to draw the color)
  - use your fingers to feel the texture of the component (gravel)
  - discuss and record your observations * level 1 students will be able to draw the object that the component feels like, (level 2) fill-ins/sentence starters, “It feels __________, I observed..., I noticed....”
  - gently fold your sheet of paper like a funnel and drop your soil component (gravel) into the cup of water and watch it fall
  - discuss and record your observations on your record sheet*(level 1) picture cards will be used to show items floating/sinking, level 2/3 verb word bank, fill-ins and sentence starters will be used, “It _______ to the bottom., It __________ to the top., It is _________ in the cup., The_________is___________ so it floats to the top., The_________ is __________ so it sinks to the bottom., I noticed..., I observed....”
  - stir the water gently with a spoon and record your observations
  - repeat the above steps using sand, clay, and then humus using the same cup each time
Lesson 2: Land and Water

- record your observations on the record sheet each time*level 1 students can draw diagrams and use the word banks, more fill-ins and sentence starters and can be added when students begin to compare/contrast the components."The ______ and the ______ are the same because they both _________. In addition they, ________, The ________ and the ________ are different because ________, and ________. Also, ________, but _________. One interesting thing I noticed..., I discovered..., I learned..., I wonder..., I was surprised that..."

- after testing all four components stir the mixture of soil again and record any additional observations on the record sheet*fill-ins/sentence starters."When I ________, it ________, ________ changed after ________, and now it ________. (see sentence starters above)

6) Students will then clean up their areas and put their materials away

7) Students will be given text to read further about soil. They will work independently or with a partner (same levels will read together and then go back and share with their group) using the Insert Method. *Students will add codes to the text as they read.

   • √ A check mark indicates a concept or fact that is already known by the students.
   • ? A question mark indicates a concept or a fact that is confusing or not understood.
   • ! An exclamation mark indicates something that is new, unusual, or surprising.
   • + A plus sign indicates an idea or concept that is new to the reader.
   • * An asterisk indicates a question has been answered.

8) When students have finished marking the text they will form groups of four to share their questions and new learning.

   • Sentence starters will include: I wonder if..., What did you understand about...?, I learned..., I discovered...

9) As questions are answered/misconceptions cleared up, the question marks will be replaced by the asterisk.

10) Text can then be discussed and learning shared as a whole class.

Closure:

1) Groups will be asked to share what they have learned about the properties of each of the four soil components. * Students can use outcome sentences such as: I learned, I noticed, I wonder...

2) Their observations will be recorded on a class chart labeled, "Soil and their Properties". A check mark will be placed next to any duplicate responses thus acknowledging all answers.

3) Ask students based on what we observed in lesson 1 and 2, what predictions do you think you can make about what happens to the soil components when it rains? Their answers will be written on chart paper to use in a future lesson. * students will be given prompts as noted the Functional Notional chart. "I think __________ will happen to ______ when it rains because __________."
Assessment:
1) Were the students able to use adjectives to discuss the similarities and differences of the soil components?
2) Did the students record in writing their observations of the properties of each soil component?
3) Were the students able to discuss and ask questions about soil from the readings?

*indicates modifications
Student Instructions for Examining Earth Materials

Directions: Read all the directions before you begin. You will do each of the following steps four times, once for each of the four soil components, in the order listed on Record Sheet 5-A: Examining Earth Materials. Start with gravel. Then test sand, clay, and finally humus. Work as a group. Complete your record sheet as you make observations about each soil component.

1. Pour the gravel onto the sheet of paper.

2. With your hand lens, look closely at the gravel.

3. What do you notice about the appearance of the gravel? How does it look? Discuss your observations with the group. Record your observations on Record Sheet 5-A.

4. Use your fingers to feel the texture of the gravel. Discuss and record your observations.

5. Gently fold your sheet of paper. Using it like a funnel or chute, drop the gravel into the cup of water. Watch it fall. Discuss and record your observations on your record sheet.
6. Stir the water gently with your spoon. Record your observations.

7. Repeat Steps 1 through 6. This time use sand. Record your observations on your record sheet. Use the same cup of water that you used for the gravel.

8. When you are finished testing sand, test clay, then humus. Use the same cup of water each time. Record your observations on the record sheet each time.

9. When you have tested all four soil components, stir the mixture of soil and water again. Record any additional observations on the record sheet.

10. Clean up by doing the following:

- Pour the soil and water from the cups into the rinse bucket. Rinse the cups.

- Return all materials to their original positions on the distribution table.

- Throw away any soiled newspaper. Sponge down and dry your work space.
What Is Soil?

Earth's land is more than nonliving rocks and minerals. Land also has organic matter that is alive or once was alive. Plants, dead animals, and animal waste are organic. **Soil is a mix of rocks, minerals, and organic matter.** The organic matter in soil is called **humus** (HYOO-muss). Soil also has air and water. Plants need soil, and many animals eat plants.

---

Kinds of Soil

The world has many kinds of soil. Each kind has a different mix of minerals, bits of rock, and humus. It can take many years for each kind of soil to form.

**Soil comes in many colors.** One soil may not feel the same as another one. Soil can be packed tightly or loosely.

**WOWSER!**

Soil scientists have found over 10,000 different kinds of soil in Europe.
Layers of Soil

Soil changes and moves near the surface. It changes less underground. As a result, soil often has layers.

The thin layer on top is *topsoil*. It is often soft. It usually has more air and water than deeper soil.

*Subsoil* is the middle layer. It is drier and harder than topsoil. It has more rocks.

*Bedrock* is often far underground. Little air or water reaches bedrock. It is often very hard and dry.

Texture is how something feels. It is one way to describe soil.

Sand feels gritty because of its hard bits of rock. Silt feels like flour. It is made of bits that are smaller than sand. Clay feels sticky. It is made of even smaller bits mixed with water.

---

*Science In Your World*:

The United States has lost a lot of topsoil. This is because of farming, logging, and grazing. With fewer plants, wind and water cause more soil erosion.

**TOPSOIL LOSS PER YEAR IN THE UNITED STATES**

- Low
- Moderate
- High
- Very High
What Is Soil?

Earth's land has rocks and minerals. It also has organic matter. This is matter that is living or was once alive. It is made up of rotting plants, dead animals, and animal waste. Soil is a mixture of rocks, minerals, and organic matter. Soil also contains air and water.

The organic matter in soil is called humus (HYOO-muss). It is full of nutrients. Plants need nutrients to grow and to live. Many animals, including people, use those plants for food.

Kinds of Soil

There are many kinds of soil around the world. Each kind is made of its own mix of minerals, bits of rock, and humus. It can take many, many years for each soil mixture to form.

Soil comes in many colors and textures. Some soils are dense, or packed together tightly. Other soils are packed loosely.

WOWSER!

Soil scientists have identified over 10,000 different kinds of soil just in Europe.
Layers of Soil

Like rocks, soil can change and move. It changes most near the surface. So soil often has different layers.

The thin layer on most of Earth's land is topsoil. It is often soft and rich in humus. It contains more air and water than deeper layers.

The middle layer is subsoil. It is drier and harder than topsoil. It has more rocks.

Bedrock is often far below the surface. Here, not much has changed the rock. Bedrock is often very hard and dry.

One way to describe soil is by its texture. Sand feels gritty. Silt is made of smaller bits. It feels like flour. Clay is made of even smaller bits mixed with water. It feels sticky. Loam is a mixture of sand, silt, clay, and humus.

Science In Your World

In the last 200 years, the United States has lost a lot of its topsoil. This is due to farming, logging, and grazing. With fewer plants in the soil, wind and water cause more erosion. Soil washes down rivers and streams.

TOPSOIL LOSS PER YEAR IN THE UNITED STATES

Low
Moderate
High
Very High
What Is Soil?

Earth isn't just covered with broken rocks and minerals. The land also has a lot of organic matter. This material is living or once was alive. It includes rotting plants, dead animals, and animal waste. The mixture of rocks, minerals, and organic matter is called soil.

Soil also contains air between all the bits of solid material. Most soils contain some amount of water, too.

The organic matter in soil is called humus (HYOO-muss). It is full of nutrients. Plants rely on the air, water, and nutrients in soil to grow and to live. Many animals eat those plants. So you have soil to thank for the foods you eat.

Kinds of Soil

There are thousands of kinds of soil around the world. Each one is made up of a unique combination of minerals, bits of rock, and organic material.

It can take hundreds or thousands of years for each kind of soil to form. Because of all the possible mixtures, soil comes in many colors and textures. Some soils are dense, or packed together tightly. Others are packed more loosely.

Wowser!

Soil scientists have identified over 10,000 different kinds of soil in Europe alone.
Layers of Soil

Just like rocks, soil changes and moves. Weathering and erosion affect soil most on the surface. As a result, soil often forms in different layers.

The thin layer found on most of Earth’s land is called topsoil. It is often soft and rich in organic material. It usually contains more air and water than the deeper layers.

The middle layer is called subsoil. It tends to be drier and harder than topsoil and contains more rocks.

Bedrock is usually far below the surface. Here, weathering and erosion have not changed the rock much. Less water and air can reach it, so bedrock is often very hard and dry.

One good way to describe soil is by its texture. Scientists also measure how compact, or pressed together, the soil is. They describe the soil’s color and temperature, too. They may even find out how much water, air, and humus it contains.

Sand feels gritty, while silt is made of smaller bits and feels powdery like flour. Clay is made of even smaller bits mixed with water, so it feels sticky. Loam is a mixture of sand, silt, clay, and organic matter.

In the last 200 years, the United States has lost from 25–70 percent of its topsoil due to farming, logging, and grazing. With fewer plants, soils have been eroded by wind and water and have washed down rivers and streams.
Our 5 Senses
eyes
feel
gooey
hands
<table>
<thead>
<tr>
<th>density</th>
<th>temperature</th>
<th>shape</th>
<th>texture</th>
<th>color</th>
<th>SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>fragile</td>
<td>cold</td>
<td>big</td>
<td>bumpy</td>
<td>red/reddish</td>
<td>Big</td>
</tr>
<tr>
<td>hard</td>
<td>cool</td>
<td>small</td>
<td>fuzzy</td>
<td>orange/orangish</td>
<td>small as a pencil eraser</td>
</tr>
<tr>
<td>heavy</td>
<td>hot</td>
<td>flat</td>
<td>jagged</td>
<td>yellow/yellowish</td>
<td>size of a bean</td>
</tr>
<tr>
<td>light</td>
<td>lukewarm</td>
<td>flexible</td>
<td>rough</td>
<td>green/greenish</td>
<td>size of a head of a pin</td>
</tr>
<tr>
<td>pliable</td>
<td>tepid</td>
<td>fat</td>
<td>sharp</td>
<td>blue/bluish</td>
<td></td>
</tr>
<tr>
<td>soft</td>
<td>warm</td>
<td>thick</td>
<td>soft</td>
<td>indigo</td>
<td></td>
</tr>
<tr>
<td>solid</td>
<td></td>
<td>squarish</td>
<td>smooth</td>
<td>violet</td>
<td></td>
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<tr>
<td>spongey</td>
<td></td>
<td>triangular</td>
<td>slippery</td>
<td>pink/pinkish</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>roundish</td>
<td></td>
<td>black/blackish</td>
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<tr>
<td></td>
<td></td>
<td>asymmetrical</td>
<td></td>
<td>white/whiteish</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>transparent</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>densidad</th>
<th>temperatura</th>
<th>forma</th>
<th>textura</th>
<th>color</th>
<th>tamaño</th>
</tr>
</thead>
<tbody>
<tr>
<td>fragile</td>
<td>frio</td>
<td>plano</td>
<td>desigual</td>
<td>rojo</td>
<td>grande</td>
</tr>
<tr>
<td>duro</td>
<td>cool</td>
<td>flexible</td>
<td>peludo</td>
<td>anaranjado</td>
<td>pequeño como un borador de lápiz</td>
</tr>
<tr>
<td>pesado</td>
<td>caliente</td>
<td>gordo</td>
<td>dentado</td>
<td>amarillo</td>
<td>tamaño de un frijol</td>
</tr>
<tr>
<td>ligero</td>
<td>lukewarm</td>
<td>grueso</td>
<td>aspero</td>
<td>verde</td>
<td>tamaño de la cabeza</td>
</tr>
<tr>
<td>pliable</td>
<td>tepid</td>
<td>cuadrado</td>
<td>filoso</td>
<td>azul</td>
<td>de una aguja</td>
</tr>
<tr>
<td>solido</td>
<td>tibio</td>
<td>triangular</td>
<td>suave</td>
<td>indigo</td>
<td></td>
</tr>
<tr>
<td>esponjoso</td>
<td></td>
<td>redondo</td>
<td>liso</td>
<td>violeta</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>asymétrico</td>
<td>resbaloso</td>
<td>rosado</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>negro</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>blanco</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td>transparent</td>
<td></td>
</tr>
</tbody>
</table>

DESCRIPCION WORDS

created by: christina velasco
Lesson 2: Land and Water

Sentence Frames

The color is ________.
It looks like ________.
It feels ________.
I observed ________.
I noticed ________.

It ________ to the bottom.
It ________ to the top.
It is ________ in the cup. The ________ is ________, so it floats to the top.
The ________ is ________ so it sinks to the bottom.
The ________ and the ________ are the same because they both ________.
In addition they, ________.
The ________ and the ________ are different because ________, and ________.
Also, ________, but ________.

One interesting thing I noticed ________.
I discovered ________.
I learned ________.
I wonder ________.
I was surprised that ________.
When I ________, it ________.
_______ changed after ________, and now it ________.
Lesson 2: Land and Water

I wonder if...
What did you understand about...?
I learned...
I discovered...

I think ___________ will happen to _______ when it rains because ____________.
Lesson 2: Land and Water

Word Bank

red, brown, white, speckled, tan, orange, dark brown
float, swim, sink, sank, stuck
light, heavy, gritty
gravel, sand, clay, humus

*word banks are developed by the class- this would be a sample. Other words could be added as needed
### Examining Earth Materials

<table>
<thead>
<tr>
<th></th>
<th>Gravel</th>
<th>Sand</th>
<th>Clay</th>
<th>Humus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>(how it looks: color, shine, clumping)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Texture</strong></td>
<td>(how it feels)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>What it does when you put it in water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>What it does when you stir the water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other observations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STC / *Land and Water*
<table>
<thead>
<tr>
<th>Signal Words</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>If you are asked to Compare</strong>, use these words:</td>
</tr>
<tr>
<td>both</td>
</tr>
<tr>
<td>alike</td>
</tr>
<tr>
<td>the same as</td>
</tr>
<tr>
<td>similar to</td>
</tr>
<tr>
<td>also</td>
</tr>
<tr>
<td>neither</td>
</tr>
<tr>
<td>in comparison</td>
</tr>
<tr>
<td><strong>If you are asked to Contrast</strong>, use these words:</td>
</tr>
<tr>
<td>one but not the other</td>
</tr>
<tr>
<td>different from</td>
</tr>
<tr>
<td>differs</td>
</tr>
<tr>
<td>unlike</td>
</tr>
<tr>
<td>in contrast</td>
</tr>
<tr>
<td>however</td>
</tr>
</tbody>
</table>
**Observations**

Think of the four senses (not taste).
Size, shape, color, lines, patterns, texture, weight, smell/odor, sound, behavior ...

I observed _____.
I noticed _____.

Connect it with what you know or have investigated.
It reminds me of _____ because _____.

Observe and record cause and effect.
When _____, it _____.

Note any changes.
At first, _____, but now _____.

Be curious, and ask questions you might investigate.
I am curious about ____, it surprised me that _____ because _____.
I wonder what would happen if _____.
How does _____ affect _____?
Compare and Contrast

Start with how things are the same or similar.

The _____ and the _____ are similar because they both _____ . In addition, they _____ .

Add more as needed.

... 

Explain how they are different. You can compare the same property or characteristic in the same sentence. Use and, but, or whereas to set up the contrast.

They are different because the _____ , but the _____ . Also, the _____ , whereas _____ .

Add more as needed.

... 

Remember to ask, “Will it be clear to the reader what I mean when I use pronouns such as they and it? If not, how can I edit the sentence to make it clearer?”

### Useful Words and Phrases in Scientific Writing

<table>
<thead>
<tr>
<th>Questions</th>
<th>Observations</th>
<th>Contrasts</th>
<th>Sequence of Time, Cause and Effect, Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>What would happen if __________?</td>
<td>I observed</td>
<td>but __________.</td>
<td>First, __________.</td>
</tr>
<tr>
<td>How does [the changed variable] affect [the measured, observed, responding variable]?</td>
<td>I noticed</td>
<td>__________.</td>
<td>Next, __________.</td>
</tr>
<tr>
<td>When __________,</td>
<td>whereas __________.</td>
<td>Then, __________.</td>
<td></td>
</tr>
<tr>
<td>After __________,</td>
<td>However,</td>
<td>Finally, __________.</td>
<td></td>
</tr>
<tr>
<td>In contrast,</td>
<td>If __________,</td>
<td>If __________,</td>
<td></td>
</tr>
<tr>
<td>At first, __________.</td>
<td>then __________. So,</td>
<td>then __________. So,</td>
<td></td>
</tr>
<tr>
<td>But now, __________.</td>
<td>This leads to</td>
<td>This leads to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>As a result,</td>
<td>As a result,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consequently,</td>
<td>Consequently,</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Reasoning</th>
<th>Adding Information, Evidence, Reasoning</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>__________ because __________.</td>
<td>__________ because __________.</td>
<td>Also,</td>
<td>Therefore, I think</td>
</tr>
<tr>
<td>For example,</td>
<td>I think this because __________.</td>
<td>In addition,</td>
<td>In conclusion, I think</td>
</tr>
<tr>
<td>For instance,</td>
<td>I think this means</td>
<td>Furthermore,</td>
<td>Therefore,</td>
</tr>
<tr>
<td>The evidence is</td>
<td></td>
<td></td>
<td>In conclusion,</td>
</tr>
<tr>
<td>The data show</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The data provide evidence that</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note to teachers**: Students can become too dependent on sentence starters and writing frames that teachers provide. To support students in becoming more independent writers, you can post a chart like this in the classroom, adding words and phrases as needed. Also teach students to use words from questions as appropriate in beginning their responses.

**Compare and Contrast**

Choose two different topics to compare and contrast.
Use the graphic organizer below to organize your information.

Topic 1: ____________________________  Topic 2: ____________________________

<table>
<thead>
<tr>
<th>How Are They Alike?</th>
<th>How Are They Different?</th>
</tr>
</thead>
</table>
Comparing Concepts

Directions: Use this compare/contrast organizer to explore analogous as well as non-analogous characteristics of two concepts related to a given topic.

Topic: ________________________________

Concept 1: ________________________________

Concept 2: ________________________________

How are they alike?

How are they different?
Lesson 3
<table>
<thead>
<tr>
<th>Domain</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaking</td>
<td>Students will discuss their observations of the water cycle components using process verbs and nouns in complete sentences.</td>
<td>Students will discuss their observations using process verbs and nouns from word bank in complete sentences.</td>
<td>Students will discuss their observations of the water cycle using prompts provided.</td>
<td>Students will share their observations of the water cycle by respond to yes/no, either/or, and short answer questions.</td>
<td>Students will point out their observations of the water cycle using pictures to compare and repeat words to describe them.</td>
</tr>
<tr>
<td>Writing</td>
<td>Students will write in complete sentences using process verbs and nouns, and vocabulary to describe their observations of the water cycle.</td>
<td>Students will write in complete sentences using process verbs and nouns vocabulary word bank to describe their observations of the water cycle.</td>
<td>Students will write in complete sentences using observation sentence starters and the process verbs and nouns vocabulary word bank.</td>
<td>Students will write in complete sentences by filling in the blanks with the help of the process verbs and nouns word bank.</td>
<td>Students will label a diagram of the observations of the water cycle and label them with a process verbs and nouns word bank.</td>
</tr>
</tbody>
</table>

*graphic organizers will be used to record key/additional information from the text.

*framed outlines will be used with a word bank to record key/additional information from the text.

*students will point to the key words in the text while it is being read, and repeat them.

| Reading    | Students will read text providing additional information on | Students will read text providing additional information on | Students will follow text read by teacher matching some words to | Students will point to photographs of the different components of the water cycle and |  |
|------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------| |
### Lesson 3: Land and Water

| the water cycle identifying key information. | the water cycle using a vocabulary list for assistance. | on the water cycle. Key information will be summarized in the margins in order to assist understanding. | pictures identifying key information about the water cycle. | repeat words that identify each. |
# Lesson 3: Land and Water

<table>
<thead>
<tr>
<th>Function</th>
<th>Situation</th>
<th>Expression</th>
<th>Word/Phrase</th>
<th>Grammar</th>
</tr>
</thead>
</table>
| Identify and Name | The water cycle| Water _____ and _____ to the _____ in the form of _____, _____, _____, or _____.
|                   |                | The _____ in the form of _____, _____, _____, and _____.
|                   |                | Water _____ into _____ when it _____.
|                   |                | When water from _____ plants, it is called _____.
|                   |                | Water _____ onto _____ to form _____.
|                   |                | *precipitates
|                   |                | *falls
|                   |                | *ground
|                   |                | *rain, snow, sleet, hail
|                   |                | *earth stores ground water
|                   |                | *lakes, rivers, aquifers, and oceans
|                   |                | *evaporates
|                   |                | *water vapor
|                   |                | *gains energy
|                   |                | *evaporates
|                   |                | *transpiration
|                   |                | *condenses
|                   |                | *dust particles
|                   |                | *clouds
|                   |                | * process verbs and nouns
|                   |                | * process verbs and nouns
|                   |                | * process verbs and nouns
|
| Discuss/Obs/Pre   | How water moves through the water cycle.  
Reading additional information on the water cycle.  
What happens when the ice pack sits on top of the stream table? |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>I think the _____ will/will not _____ when the ice pack is on top of the stream table.</td>
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<td>I think _____ because...</td>
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<td>What did you understand about...?</td>
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<td>I learned...</td>
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<td></td>
<td>I discovered...</td>
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<tr>
<td></td>
<td>Sentences will vary based on students observations—many will include those from above</td>
</tr>
<tr>
<td></td>
<td>*answers will vary based on observations</td>
</tr>
<tr>
<td></td>
<td>*water, will dry up, evaporate...</td>
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<tr>
<td></td>
<td>*ground, soil components, will not get wet...</td>
</tr>
<tr>
<td></td>
<td>*the stream table will be foggy, the air is warm...</td>
</tr>
<tr>
<td></td>
<td>*process verbs and nouns</td>
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Lesson 3: Land and Water

Lesson 3: The Water Cycle: Modeling Land and Water

4th Grade Science Unit-Land and Water

Content Objective(s):
1. Students will investigate how water changes as it moves through the water cycle.
2. Students will be able to read and identify facts in text about the water cycle.

Language Objectives:
1. Students will discuss and record in writing their observations about the stages of the water cycle.
2. Students will read to learn more about the water cycle.

Materials:
Stream tables with soil components, large and small absorbent pads, plastic plaster spreader, magnifying glasses, ice packs, science notebooks, water bottles, water, plastic wrap, large rubber bands, spoons, rinse buckets, chart paper, directions for modeling the water cycle, and reading materials.

Modifications for materials:
**Compare and contrast sentence starters, **observation sentence starters, **sentence frames/fill-ins, L1/L2 dictionary, picture cards for forms of precipitation, picture/word/definition cards, realia to compare/contrast different components of the water cycle, **word banks, signal words for comparing and contrasting, materials to play the “Incredible Journey” to simulate the water cycle including location cards and journey dice, and reading materials. ***All lessons will include the interactive glossary from http://player.discoveryeducation.com. This website provides a definition, animation, video, and an image explaining what each word/concept means. The definition can be heard/read in both English and Spanish. ***Also, this website provides more information on the water cycle in 60 different languages thus allowing students to read in their L1 and L2 http://ga.water.usgs.gov/edu/watercyclehi.html.

**Will be posted on the board.

Time:
2 day lesson

Initiation:
1) Ask students what do they think the word cycle means? Where have they heard this word before? Share with the students the word recycle and bicycle. Discuss that a cycle is a continuous movement: like riding a bike, or the steps to recycle something. Explain to students that water moves in different forms from one place on earth to another in a
Lesson 3: Land and Water

Continuous cycle. Tell students that in this lesson, they will find out how water changes as it moves through the water cycle. Introduce the content and language objectives for the lesson.

2) Students will get into their science groups: 3-4 in a group assigned in lesson 1.

Lesson Development:
1) Display the brainstorming list from lesson 1. “What We Know about Land and Water.” Ask students to identify statements on the list that reflect what they may already know about the water cycle. Students may add to the list if warranted.

2) Tell the students that we are going to conduct several experiments that will allow us to learn about the water cycle.

3) The teacher will use pictures showing the four different forms of precipitation. Students will be asked what these forms have in common. Level 1 and 2 could be asked: Are all of these forms wet? Which form is a liquid? Which form(s) are hard? How would you describe snow? Next, the word “water cycle” will be written on the board with a wet sponge to demonstrate evaporation. Students will be asked to talk to their science groups about their observations. After, students will be given a safety mirror and be asked to breathe on it to discover the differences between water vapor and steam. Finally, students will observe condensation on a glass of ice water as it is warmed in the air.

*Levels 1, 2, and 3—this would help the students by giving them a concrete visual in order to make a connection to the water cycle. I will also introduce, to all levels, 4-Corners vocabulary so that they will be able to provide a picture, and the word. Vocabulary words will include: aquifer, condensation, precipitation, evaporation, runoff, groundwater, water vapor, and transpiration. We would be able to build the definition as we go through the lesson. Students would be able to use it in a sentence/fill-in/with a sentence starter, or draw another object to represent the vocabulary word.

4) Share the following video with students. This will provide a visual representation of the water cycle and allow for the students to “see” what they will be looking for in their model. [http://teacher.scholastic.com/activities/studyjams/water_cycle/](http://teacher.scholastic.com/activities/studyjams/water_cycle/)

5) Tell students we are going to be able to use our stream tables to model the water cycle on earth.

6) Students will collect their supplies at this time.

7) Students will complete the following steps for modeling the water cycle.*All levels-pictures will be included to help students understand the steps.
   - Cover your work space with the large absorbent pad. Make sure the absorbent side faces up and the plastic side is down.
   - Place the small absorbent pad on the floor with the absorbent side facing up.
   - Place the clear plastic box of soil on the large absorbent pad and remove the lid.
   - Make sure the rubber stopper is pushed tightly into the drain hole from the inside.
   - Mix the soil in the box with the plastic spreader.
   - With the spreader, bulldoze the soil. Push the soil away from the drain hole toward the opposite end of the box, as shown in picture.
   - Now create a lake in your model. Pour the warm water into the box. Do not pour the water on the soil.
Lesson 3: Land and Water

- Cover your land and water model with plastic wrap. Fasten the plastic with a large rubber band, as shown in the picture.
- Ask your teacher for a frozen ice pack.
- Place the frozen ice pack on the plastic so it is above the land, as shown in the picture. Do not touch the ice pack during the next five minutes.
- What do you think will happen in the model? Tell students while they are waiting to discuss their predictions within their group. Write your predictions in your science notebook. *Level 1-will draw their predictions, level 2 will be able to use sentence fill-ins, I think the _____ will/will not _____ when the ice pack is on top of the stream table. Level 3 will use sentence starters-I think _____ because....
- When the five minutes are up, students will remove the ice pack from the plastic. Students will then look at the plastic and discuss their observations within their group. Students will then write their observations in their notebook. * Level 1-will draw their observations, level 2 will be able to use sentence fill-ins, I noticed the _____ did/did not _____ when the ice pack is on top of the stream table. Level 3 will use sentence starters-I noticed...., I observed..., It looks like...

- Next, the students will gently tap on the plastic where the ice pack was and discuss/write their observations. *students can use the observation strategies listed above.
- After, students will take the plastic wrap off of their stream table and discuss/write any further observations.

8) Students will be asked to share their observations of the water cycle. They will be asked to use their model to support their observations. *Students may write using fill-ins/sentence starters/draw any additional information about “the share” in their science notebooks.

9) Students will clean up their areas and put their materials away

10) Students will be given text to read further about the water cycle. *Students will be given framed outlines or graphic organizers to share key information about the water cycle.

11) Text can then be discussed and learning shared as a whole class.

12) As a follow up activity to help all students understand the concepts introduced in lesson 3 we will play the “Incredible Journey” that simulates the water cycle using our bodies. *This would be appropriate for all levels.

Closure:

1) Take out chart paper about predictions from lesson 1 and 2. Ask students about their predictions regarding what happens to the soil components when it rains. Were their predictions correct? Why or why not? Have students share their thoughts.

2) *Groups will be asked to share what they have learned about the water cycle by using Pass the Note card. The steps include:
   - Each student will be given an index card. Students will be asked to use at least one sentence starter and one vocabulary word to write down something they learned from the lesson.
Lesson 3: Land and Water

- Buddy systems will be used to match readers with non-readers. They will discuss the facts and choose a fill-in or a sentence starter. Water _____ and _____ to the _____ in the form of _____, _____, _____, or _____, The _____ in the form of _____, _____, and _____, and _____, Water _____ into _____ when it ___. Water _____ onto _____ to form ____. I noticed..., I discovered..., I learned...
- The writer will share the information and have the non-reader repeat it.
- Students may also draw a picture if a match-up is not available.
- Then students will share their information musical chairs style. This will be shared whole group. Chairs will be placed in the middle of the room (with one less chair than students) and as the music plays students will walk around the chairs. When the music stops, the student not in the chair would share their information. Then they would sit on the floor as the group continues until everyone has had an opportunity to share.

Assessment:

1) Were the students able to discuss and record in writing their observations about how water moves through the water cycle?
2) Were the students able to discuss and share information about the water cycle from the readings?
3) Were students able to demonstrate successfully the movements of the water cycle through the “Incredible Journey” game?

*indicates modifications
Lesson 3: Land and Water

Sentence Frames

Water _____ and _____ to the _____ in the form of _____, _____, or _____.
The _____ in the form of _____, _____, and _____.
Water _____ into _____ when it _____.
When water from _____ plants, it is called _____.
Water _____ onto _____ to form _____.
I think the _____ will/will not _____ when the ice pack is on top of the stream table.
I think _____ because....

I wonder if...
What did you understand about...?
I learned...
I discovered...
Lesson 3: Land and Water

Word Bank

precipitates, evaporates, transpiration, water vapor, condenses, dust particles
clouds
rain, snow, sleet, hail
earth stores ground water
lakes, rivers, aquifers, and oceans

*word banks are developed by the class- this would be a sample. Other words could be added as needed
Lesson 3: Land and Water

4-Corners Vocabulary

<table>
<thead>
<tr>
<th>1. Illustration</th>
<th>3. Sentence</th>
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<tr>
<th>2. Definition</th>
<th>4. Vocabulary Word</th>
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</tbody>
</table>
Water

precipitation

Water

rain

Water

snow
irrigation

liquid

polar caps
glacier

hail

ice
errosion

evaporation

gas
Water

cloud

Water
dam

Water
delta
Water

Cut or Fold

Water

solid

Water

temperature

Water

water cycle
polar caps (noun)

areas of permanent ice that cover the north and south poles of Earth

dirt, waste, or debris in the air, in water, or on the ground

water that falls from clouds in the form of rain, snow, sleet, or hail
sleet
*(noun)*

partly frozen rain

snow
*(noun)*

water vapor in the atmosphere that has frozen into ice crystals and falls to the ground in the form of flakes

soil
*(noun)*

the top layer of earth in which plants grow
absorb
(verb)

to soak up or take in

aquifer
(noun)
an underground layer of rock, sand, or other material through which groundwater flows

cloud
(noun)
a visible group of water or ice particles in the atmosphere from which rain and other precipitation can fall
condensation
(noun)

the process by which water changes from a gas to a liquid state

conservation
(noun)

the preservation, protection, and restoration of natural resources

cycle
(noun)

a regular series of events that keeps repeating
**erosion**
*(noun)*

The gradual wearing away of rock or soil by water, wind, or ice.

**evaporation**
*(noun)*

The change of water from a liquid state to a gas state, due to an increase in temperature.

**flow**
*(verb)*

To move freely in one continuous mass.
glacier
(noun)
a large body of accumulated ice and compacted snow that is found year-round and slowly moves downhill

groundwater
(noun)
water held underground in soil or rock, often feeding springs and wells

hail
(noun)
frozen rain that falls from clouds
rain
(noun)
liquid water that falls from clouds to the earth

river
(noun)
a large stream of flowing water

runoff
(noun)
excess water, not absorbed by the soil, that flows downhill
water (noun)
a clear liquid that forms oceans, lakes, rivers, and rain

water cycle (noun)
the path water takes, and the changes it goes through, as it cycles through the environment

water molecule (noun)
a small particle of water, made up of hydrogen and oxygen
watershed (noun)

the area of land that catches rain and snowmelt when it flows as runoff

water vapor (noun)

the gaseous state of water

weather (noun)

a description of the temperature, cloudiness, rainfall, wind, and other conditions in the atmosphere
Water Cycle Diagram

Label the diagram with the appropriate water cycle terminology: condensation, evaporation, and precipitation.
# Observations

Think of the four senses (not taste).

- Size, shape, color, lines, patterns, texture, weight, smell/odor, sound, behavior...

  I observed _____.

  I noticed _____.

Connect it with what you know or have investigated.

- It reminds me of _____ because _____.

Observe and record cause and effect.

- When _____, it _____.

Note any changes.

- At first, _____ But now _____.

Be curious, and ask questions you might investigate.

- I am curious about _____.
- It surprised me that _____ because _____.
- I wonder what would happen if _____.
- How does _____ affect _____?
### Signal Words

If you are asked to **Compare**, use these words:

- both
- alike
- the same as
- similar to
- also
- neither
- in comparison

If you are asked to **Contrast**, use these words:

- one but not the other
- different from
- differs
- unlike
- in contrast
- however
Compare and Contrast

Start with how things are the same or similar. The _____ and the _____ are similar because they both _____ . In addition, they _____ .

Add more as needed. ... 

Explain how they are different. You can compare the same property or characteristic in the same sentence. Use and, but, or whereas to set up the contrast.

They are different because the _____ , but the _____ . Also, the _____ , whereas _____ .

Add more as needed. ... 

Remember to ask, “Will it be clear to the reader what I mean when I use pronouns such as they and it? If not, how can I edit the sentence to make it clearer?”

## Useful Words and Phrases in Scientific Writing

<table>
<thead>
<tr>
<th>Questions</th>
<th>Observations</th>
<th>Contrasts</th>
<th>Sequence of Time, Cause and Effect, Reasoning</th>
</tr>
</thead>
</table>
| What would happen if ________?  
How does [the changed variable] affect [the measured, observed, responding variable]? | I observed  
I noticed  
When ________,  
After ________, | ________,  
but ________.  
______,  
whereas ________.  
However,  
In contrast,  
At first, ________.  
But now, ________. | First, ________.  
Next, ________.  
Then, ________.  
Finally, ________.  
If ________,  
then ________.  So,  
This leads to  
As a result,  
Consequently, |

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Reasoning</th>
<th>Adding Information, Evidence, Reasoning</th>
<th>Conclusions</th>
</tr>
</thead>
</table>
| ________ because ________  
For example,  
For instance,  
The evidence is  
The data show  
The data provide evidence that | ________ because ________.  
I think this because ________.  
I think this means | Also,  
In addition,  
Furthermore, | Therefore, I think  
In conclusion, I think  
Therefore,  
In conclusion, |

**Note to teachers**: Students can become too dependent on sentence starters and writing frames that teachers provide. To support students in becoming more independent writers, you can post a chart like this in the classroom, adding words and phrases as needed. Also teach students to use words from questions as appropriate in beginning their responses.

**Student Instructions for Modeling the Water Cycle**

1. Cover your work space with the large absorbent pad. Make sure the absorbent side faces up and the plastic side is down.

2. Place the small absorbent pad on the floor so the absorbent side faces up.

3. Place the clear plastic box of soil on the large absorbent pad. Remove the lid.

4. Make certain the rubber stopper is pushed tightly into the drain hole from inside the box.

5. Mix the soil in the box with the plastic spreader.

6. With the spreader, "bulldoze" the soil. Push the soil away from the drain hole toward the opposite end of the box, as shown in the picture.

7. Now create a lake in your model. Pour the warm water into the box. *Do not pour the water on the soil.*
8. Cover your land and water model (the plastic box) with plastic wrap. Fasten the plastic with a large rubber band, as shown in the picture.

9. Get a frozen ice pack from your teacher.

10. Place the ice pack on the plastic so it is above the land, as shown in the picture. Do not touch the ice pack during the next five minutes.

11. What do you think will happen in the model? While you are waiting, discuss your predictions within your group. Record your predictions in your notebook.

12. After five or more minutes, remove the ice pack from the plastic. Look at the plastic. Discuss your observations within your group. Record your observations in your notebook.

13. Tap gently on the plastic where you placed the ice pack. Record your observations.
THE WATER CYCLE

Water covers most of our planet. It can be found in oceans, lakes, and ponds, and in the ground itself. The cycle of water from liquid to vapor to solid is called the water cycle. The water cycle is an exciting and continuous process with no beginning or end. The water cycle is the movement of water in the environment by evaporation, condensation, and precipitation.

The warm sun causes liquid water to evaporate (to change from a liquid into a gas or vapor) and rise up into the sky. The water vapors that are formed cool during evaporation. These cooled water vapors form clouds in the sky. The transformation of the vapor into clouds (that is, from a gas into a liquid) is condensation. Clouds can be a mass of water droplets and/or ice particles. When the clouds get heavy enough, the water falls back to the ground in the form of rain, snow, or hail. This is precipitation.

The sun makes water dry (evaporation) and goes to the sky to make clouds (condensation). The clouds get heavy and water (precipitation) falls to the ground.

Plants in our environment contain water in a liquid form. They release water. When plants do this, it is called transpiration. Transpiration is a kind of evaporation.

Plants hold water too. They let the water go into the sky (transpiration). It is like evaporation.
THE WATER CYCLE

Water covers most of our planet. It can be found in oceans, lakes, and ponds, and in the ground itself. The cycle of water from liquid (water) to vapor (like your breath) to solid (like ice) is called the water cycle. The water cycle has no beginning or end. It shows how water moves around our planet by evaporation (water turns into vapor), condensation (when the water vapor cools in the sky), and precipitation (rain, sleet, snow, or hail).

The warm sun causes liquid water to evaporate (to change from a liquid into a gas or vapor) and rise up into the sky. The water vapors that are formed cool during evaporation. These cooled water vapors form clouds in the sky. The change of the vapor into clouds (that is, from a gas into a liquid) is condensation. Clouds can be a group of water droplets and/or ice bits. When the clouds get heavy enough, the water falls back to the ground in the form of rain, snow, or hail. This is precipitation.

Plants hold water in a liquid form. They let go water vapor into the air. When plants do this it is called transpiration. Transpiration is a kind of evaporation.
THE WATER CYCLE

Water covers most of our planet. It can be found in oceans, lakes, and ponds, and in the ground itself. The cycle of water from liquid to vapor to solid is called the water cycle. The water cycle is an exciting and continuous process, with no beginning or end. The water cycle is the movement of water in the environment by evaporation, condensation, and precipitation.

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Plants in our environment contain water in a liquid form. They release water vapor into the atmosphere. When plants do this it is called transpiration. Transpiration is a kind of evaporation.
The Incredible Journey

Where will the water you drink this morning be tomorrow?

### Summary

With a roll of the die, students simulate the movement of water within the water cycle.

### Objectives

Students will:
- describe the movement of water within the water cycle.
- identify the states of water as it moves through the water cycle.

### Materials

- 9 large pieces of paper
- Copies of Water Cycle Table (optional)
- Marking pens
- 9 boxes, about 6 inches (15 cm) on a side (Boxes are used to make dice for the game. Gift boxes used for coffee mugs are a good size or inquire at your local mailing outlet. There will be one die [or box] per station of the water cycle. [To increase the pace of the game, use more boxes at each station, especially at the clouds and ocean stations.] The labels for the sides of the die are located in the Water Cycle Table. These labels represent the options for pathways that water can follow. Explanations for the labels are provided. For younger students, use pictures. Another option is to use a spinner—see the activity “A Drop in the Bucket” for spinner design. It is necessary to design a spinner for each station.)
- A bell, whistle, buzzer, or some sound maker

### Making Connections

When children think of the water cycle, they often imagine a circle of water, flowing from a stream to an ocean, evaporating to the clouds, raining down on a mountaintop, and flowing back into a stream. Role-playing a water molecule helps students to conceptualize the water cycle as more than a predictable two-dimensional path.

### Background

While water does circulate from one point or state to another in the water cycle, the paths it can take are variable.

Heat energy directly influences the rate of motion of water molecules (refer to the activity “Molecules in Motion”). When the motion of the molecule increases because of an increase in heat energy, water will change from solid to liquid to gas. With each change in state, physical movement from one location to another usually follows. Glaciers melt to pools which overflow to streams, where water may evaporate into the atmosphere.

Gravity further influences the ability of water to travel over, under, and above Earth’s surface. Water as a solid, liquid, or gas has mass and is subject to gravitational force. Snow on mountaintops melts and descends through watersheds to the oceans of the world.

One of the most visible states in which water moves is the liquid form. Water is seen flowing in streams and rivers and tumbling in ocean waves. Water travels slowly underground, seeping and filtering through particles of soil and pores within rocks.

Although unseen, water’s most dramatic movements take place during its gaseous phase. Water is constantly evaporating, changing from a liquid to a gas. As a vapor, it can travel through the atmosphere over Earth’s surface. In fact, water vapor surrounds us all the time. Where it condenses and returns to Earth depends upon loss of heat energy, gravity, and the structure of Earth’s surface.
Water condensation can be seen as dew on plants or water droplets on the outside of a glass of cold water. In clouds, water molecules collect on tiny dust particles. Eventually, the water droplets become too heavy and gravity pulls the water to Earth.

Living organisms also help move water. Humans and other animals carry water within their bodies, transporting it from one location to another. Water is either directly consumed by animals or is removed from foods during digestion. Water is excreted as a liquid or leaves as a gas, usually through respiration. When water is present on the skin of an animal (for example, as perspiration), evaporation may occur.

The greatest movers of water among living organisms are plants. The roots of plants absorb water. Some of this water is used within the body of the plant, but most of it travels up through the plant to the leaf surface.

When water reaches the leaves, it is exposed to the air and the sun's energy and is easily evaporated. This process is called transpiration.

All these processes work together to move water around, through, and over Earth.

**Procedure**

**Warm Up**

Ask students to identify the different places water can go as it moves through and around Earth. Write their responses on the board.

**The Activity**

1. Tell students that they are going to become water molecules moving through the water cycle.

2. Categorize the places water can move through into nine stations: Clouds, Plants, Animals, Rivers, Oceans, Lakes, Ground Water, Soil, and Glaciers. Write these names on large pieces of paper and put them in locations around the room or yard. (Students may illustrate station labels.)

3. Assign an even number of students to each station. (The cloud station can have an uneven number.) Have students identify the different places water can go from their station in the water cycle. Discuss the conditions that cause the water to move. Explain that water movement depends on energy from the sun, electromagnetic energy, and gravity. Sometimes water will not go anywhere. After students have come up with lists, have each group share their work. The die for each station can be handed to that group and they can check to see if they covered all the places water can go. The Water Cycle Table provides an explanation of water movements from each station.

4. Students should discuss the form in which water moves from one location to another. Most of the movement from one station to another will take place when water is in its liquid form. However, any time water moves to the clouds, it is in the form of water vapor, with molecules moving rapidly and apart from each other.

5. Tell students they will be demonstrating water's movement from one location to another. When they move as liquid water, they will move in pairs, representing many water molecules together in a water drop. When they move to the clouds (evaporate), they will separate from their partners and move alone as individual water molecules. When water rains from the clouds (condenses), the students will grab a partner and move to the next location.

6. In this game, a roll of the die determines where water will go. Students line up behind the die at
their station. At the cloud station they will line up in single file; at the rest of the stations they should line up in pairs. Students roll the die and go to the location indicated by the label facing up. If they roll stay, they move to the back of the line.

When students arrive at the next station, they get in line. When they reach the front of the line, they roll the die and move to the next station (or proceed to the back of the line if they roll stay).

In the clouds, students roll the die individually, but if they leave the clouds they grab a partner (the person immediately behind them) and move to the next station; the partner does not roll the die.

7. Students should keep track of their movements. This can be done by having them keep a journal or notepad to record each move they make, including stays. Students may record their journeys by leaving behind personalized stickers at each station. Another approach has half the class play the game while the other half watches. Onlookers can be assigned to track the movements of their classmates. In the next round the onlookers will play the game, and the other half of the class can record their movements.

8. Tell students the game will begin and end with the sound of a bell (or buzzer or whistle). Begin the game!

Wrap Up and Action

Have students use their travel records to write stories about the places water has been. They should include a description of what conditions were necessary for water to move to each location and the state water was in as it moved. Discuss any cycling that took place (that is, if any students returned to the same station).

Provide students with a location (e.g., parking lot, stream, glacier, or one from the human body—bladder) and have them identify ways water can move to and from that site. Have them identify the states of the water.

Have older students teach “The Incredible Journey” to younger students.

Assessment

Have students:
- role-play water as it moves through the water cycle (step 8).
- identify the states water is in while moving through the water cycle (step 4 and Wrap Up).
- write a story describing the movement of water (Wrap Up).

Extensions

Have students compare the movement of water during different seasons and at different locations around the globe. They can adapt the game (change the faces of the die, add alternative stations, etc.) to represent these different conditions or locations.

Have students investigate how water becomes polluted and is cleaned as it moves through the water cycle. For instance, it might pick up contaminants as it travels through the soil, which are then left behind as water evaporates at the surface. Challenge students to adapt “The Incredible Journey” to include these processes. For example, rolled-up pieces of masking tape can represent pollutants and be stuck to students as they travel to the soil station. Some materials will be filtered out as the water moves to the lake. Show this by having students rub their arms to slough off some tape. If they roll clouds, they remove all the tape; when water evaporates it leaves pollutants behind.

Resources


Where will this student go next on water’s incredible journey?
## Water Cycle Table

<table>
<thead>
<tr>
<th>STATION</th>
<th>DIE SIDE LABELS</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>one side plant</td>
<td>Water is absorbed by plant roots.</td>
</tr>
<tr>
<td></td>
<td>one side river</td>
<td>The soil is saturated, so water runs off into a river.</td>
</tr>
<tr>
<td></td>
<td>one side ground water</td>
<td>Water is pulled by gravity; it filters into the soil.</td>
</tr>
<tr>
<td></td>
<td>two sides clouds</td>
<td>Heat energy is added to the water, so the water evaporates and goes to the clouds.</td>
</tr>
<tr>
<td></td>
<td>one side stay</td>
<td>Water remains on the surface (perhaps in a puddle, or adhering to a soil particle).</td>
</tr>
<tr>
<td>Plant</td>
<td>four sides clouds</td>
<td>Water leaves the plant through the process of transpiration.</td>
</tr>
<tr>
<td></td>
<td>two sides stay</td>
<td>Water is used by the plant and stays in the cells.</td>
</tr>
<tr>
<td>River</td>
<td>one side lake</td>
<td>Water flows into a lake.</td>
</tr>
<tr>
<td></td>
<td>one side ground water</td>
<td>Water is pulled by gravity; it filters into the soil.</td>
</tr>
<tr>
<td></td>
<td>one side ocean</td>
<td>Water flows into the ocean.</td>
</tr>
<tr>
<td></td>
<td>one side animal</td>
<td>An animal drinks water.</td>
</tr>
<tr>
<td></td>
<td>one side clouds</td>
<td>Heat energy is added to the water, so the water evaporates and goes to the clouds.</td>
</tr>
<tr>
<td></td>
<td>one side stay</td>
<td>Water remains in the current of the river.</td>
</tr>
<tr>
<td>Clouds</td>
<td>one side soil</td>
<td>Water condenses and falls on soil.</td>
</tr>
<tr>
<td></td>
<td>one side glacier</td>
<td>Water condenses and falls as snow onto a glacier.</td>
</tr>
<tr>
<td></td>
<td>one side lake</td>
<td>Water condenses and falls into a lake.</td>
</tr>
<tr>
<td></td>
<td>two sides ocean</td>
<td>Water condenses and falls into the ocean.</td>
</tr>
<tr>
<td></td>
<td>one side stay</td>
<td>Water remains as a water droplet clinging to a dust particle.</td>
</tr>
</tbody>
</table>
### Water Cycle Table, continued

<table>
<thead>
<tr>
<th>STATION</th>
<th>DIE SIDE LABELS</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocean</td>
<td>two sides <em>clouds</em></td>
<td>Heat energy is added to the water, so the water evaporates and goes to the clouds.</td>
</tr>
<tr>
<td></td>
<td>four sides <em>stay</em></td>
<td>Water remains in the ocean.</td>
</tr>
<tr>
<td>Lake</td>
<td>one side <em>ground water</em></td>
<td>Water is pulled by gravity; it filters into the soil.</td>
</tr>
<tr>
<td></td>
<td>one side <em>animal</em></td>
<td>An animal drinks water.</td>
</tr>
<tr>
<td></td>
<td>one side <em>river</em></td>
<td>Water flows into a river.</td>
</tr>
<tr>
<td></td>
<td>one side <em>clouds</em></td>
<td>Heat energy is added to the water, so the water evaporates and goes to the clouds.</td>
</tr>
<tr>
<td></td>
<td>two sides <em>stay</em></td>
<td>Water remains within the lake or estuary.</td>
</tr>
<tr>
<td>Animal</td>
<td>two sides <em>soil</em></td>
<td>Water is excreted through feces and urine.</td>
</tr>
<tr>
<td></td>
<td>three sides <em>clouds</em></td>
<td>Water is respired or evaporated from the body.</td>
</tr>
<tr>
<td></td>
<td>one side <em>stay</em></td>
<td>Water is incorporated into the body.</td>
</tr>
<tr>
<td>Ground Water</td>
<td>one side <em>river</em></td>
<td>Water filters into a river.</td>
</tr>
<tr>
<td></td>
<td>two sides <em>lake</em></td>
<td>Water filters into a lake.</td>
</tr>
<tr>
<td></td>
<td>three sides <em>stay</em></td>
<td>Water stays underground.</td>
</tr>
<tr>
<td>Glacier</td>
<td>one side <em>ground water</em></td>
<td>Ice melts and water filters into the ground.</td>
</tr>
<tr>
<td></td>
<td>one side <em>clouds</em></td>
<td>Ice evaporates and water goes to the clouds (sublimation).</td>
</tr>
<tr>
<td></td>
<td>one side <em>river</em></td>
<td>Ice melts and water flows into a river.</td>
</tr>
<tr>
<td></td>
<td>three sides <em>stay</em></td>
<td>Ice stays frozen in the glacier.</td>
</tr>
<tr>
<td>Number of station</td>
<td>Location of water (ocean, glacier, animal, etc.) (make a tally each time you roll “stay/collection”)</td>
<td>Movement of water to get to next location (evaporation, precipitation, condensation, etc.)</td>
</tr>
<tr>
<td>------------------</td>
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<td>-----------------------------------------------------------------------------------------</td>
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<tr>
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<td>16</td>
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</tr>
</tbody>
</table>
Clouds
**Cloud Station Die. Label each face as follows:**
- Precipitate onto glacier
- Precipitate into ocean (2 faces)
- Precipitate into soil
- Precipitate into rivers or lakes (your choice!)
- Stay condensed in clouds
Animals
Animal Station Die. Label each face as follows:
Perspire out of animal and evaporate to clouds
Leave animal through respiration and evaporate to clouds
Pass out of animal and go into soil (2 faces)
Pass out of animal and into lake
Stay in the body of the animal
Vegetation
Vegetation Station Die. Label each face as follows:
Be eaten by animal (2 faces)
Transpire and evaporate to clouds (3 faces)
Stay inside of the plant or tree
Rivers
River Station Die. Label each face as follows:
Evaporate into clouds
Flow into lake
Flow into ocean
Seep into groundwater
Be drunk by an animal
Stay, collect, flow in the river
Ocean Station Die. Label each face as follows:
Stay and collect in the ocean (3 faces)
Evaporate into the clouds (3 faces)
Lakes
Lake Station Die. Label each face as follows:
Stay and collect in the lake (2 faces)
Be drunk by an animal
Seep/sink into groundwater
Evaporate to clouds
Flow into rivers
Glaciers
Glacier Station Die. Label each face as follows:
Stay/collect in the glacier (3 faces)
Melt and flow to rivers
Melt and sink to groundwater
Evaporate to clouds
Soil
Soil Station Die. Label each face as follows:
Stay/collect in soil
Be absorbed by vegetation (trees/plants)
Evaporate to clouds (2 faces)
Sink into groundwater
Seep into river
Groundwater
Groundwater Station Die. Label each face as follows:
Stay/collection in groundwater (3 faces)
Seep into lake
Seep into river
Travel through well, be drunk by animal
Checklists
Write the page numbers and any other identifying features to identify those parts of your lessons that employ the following strategies.

<table>
<thead>
<tr>
<th>SHELTERED STRATEGIES</th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
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</thead>
<tbody>
<tr>
<td>I. Contextualize Lesson</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. A. Build and Activate Background Knowledge</td>
<td>5/6</td>
<td>38,39</td>
<td>69,70</td>
</tr>
<tr>
<td>I.B. Develop Vocabulary</td>
<td>6</td>
<td>39,52</td>
<td>55</td>
</tr>
<tr>
<td>I.C. Use extensive Visuals, Realia, Manipulatives, &amp; Gestures</td>
<td>7/8</td>
<td>39,50,</td>
<td>69,71</td>
</tr>
<tr>
<td>I.D. Model (Instructions, Processes)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I.E. Create Opps. To Negotiate Meaning/ Check Understanding</td>
<td>6/7</td>
<td>39,41</td>
<td></td>
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<tr>
<td>II. Make Text Comprehensible</td>
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<tr>
<td>II.A. Intentional Use of Graphic Organizers</td>
<td>21,22,</td>
<td>56,61,</td>
<td>79,90</td>
</tr>
<tr>
<td>II.B. Modify Written Text</td>
<td>23</td>
<td>62</td>
<td>97</td>
</tr>
<tr>
<td>III. Make Talk Comprehensible</td>
<td></td>
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<tr>
<td>III.A. Pace Teacher’s Speech</td>
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<tr>
<td>III.B. Use of Listening Guides</td>
<td></td>
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<tr>
<td>III.C. Use of Word Walls</td>
<td>12-20</td>
<td>52-55</td>
<td>78,80</td>
</tr>
<tr>
<td>III.D. Frame Main Ideas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III.E. Check for Understanding</td>
<td>7,29</td>
<td>39-41</td>
<td>107-130</td>
</tr>
<tr>
<td>IV. Engage: Opportunities for Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV.A. Use Teacher Questioning and Response Strategies</td>
<td>6/7</td>
<td>39-41</td>
<td>69-72</td>
</tr>
<tr>
<td>IV.B. Practice Instructional Conversations</td>
<td></td>
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<tr>
<td>V. Engage at Appropriate Language Proficiency Levels</td>
<td></td>
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</tr>
<tr>
<td>V.A. Use questions appropriate for language proficiency levels in conversations, activities, and assessments</td>
<td>6,7</td>
<td>39-41</td>
<td>69-72</td>
</tr>
<tr>
<td>VI. Give Students Voice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI.A. Challenge students to produce extended talk</td>
<td>7</td>
<td>39-41</td>
<td>69-72</td>
</tr>
<tr>
<td>VI.B. Model Language for Oral and Written Production</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI.C. Use Group/Pr. Work to Elicit Student Talk; Students as Researchers</td>
<td>4,7</td>
<td>39-41</td>
<td>107-130</td>
</tr>
</tbody>
</table>
Original Lessons
# Hamden Public Schools

**Designer Name(s):** Charlotte Brombacker, Bonnie Miller  
**Subject:** Science  
**Unit Title:** Land and Water  
**Grade Level:** 4  
**# of Weeks:** 6

## Stage 1: Identify Desired Results

### Established Goal(s)

Generalization from Connecticut frameworks about what students should know and be able to do.

### State Science Curriculum Framework

#### Content Standard

**4.3 Water has a major role in shaping the Earth's surface.**
- Water circulates through the Earth's crust, oceans and atmosphere.

#### Underlying Concepts

Students should understand that . . .

1. Water is continuously moving between Earth's surface and the atmosphere in a process called the water cycle. The energy that causes the water cycle comes from the sun.
2. Most precipitation that falls to Earth goes directly into oceans. Some precipitation falls on land and accumulates in lakes and ponds or moves across the land.
3. Rain or snowmelt in high elevations flows downhill in many streams which collect in lower elevations to form a river that flows downhill to an ocean.
4. Water moving across the earth pushes along soil and breaks down pieces of rock in a process called erosion. Moving water carries away rock and soil from some areas and deposits them in other areas, creating new landforms or changing the course of a stream or river.
5. The amount of erosion in an area, and the type of earth material that is moved, are affected by the amount of moving water, the speed of the moving water, and by how much vegetation covers the area.
6. Rivers carve out valleys as they move between mountains or hills. The speed of the river's flow depends on the slope of the land. The speed of the river's flow affects the shape of the river's course (straight or meandering), the shape of the valleys it carves (U-shaped or V-shaped) and the amount of earth material that is pushed along or left behind in floodplains and deltas.
7. Water moving in ocean waves carries sand, shells and debris away from some coastal areas and deposits them in new areas, changing the shape of the coastline.
8. Erosion is constantly reshaping the earth's land surface. Sometimes the effects of erosion are immediate (for example, a flash flood or a hurricane) and sometimes the effects of erosion take a long time (for example, the changing course of a river or the carving of the Grand Canyon).

#### Grade Level Expectations

Students should be able to . . .

1. Describe the role of the sun's energy (i.e., heating and cooling) in the continuous cycling of water between the earth and the atmosphere through evaporation, condensation and precipitation.
2. Use models to demonstrate that topography causes precipitation landing on Earth to move in streams and rivers from higher to lower elevations.
3. Design and conduct simple investigations to determine how moving water (flowing downhill or in ocean waves) causes changes to the land, the coastline or the course of a stream or river.
4. Pose testable questions and employ simple equipment and measuring tools to collect data about factors that affect erosion (e.g., type of earth material in an area, volume of moving water, slope of land, vegetation coverage).
5. Present evidence to support a scientific claim about the relationship between the amount and speed of moving water and the size of earth materials moved (e.g. silt, pebbles, boulders).

#### CMT Expected Performances

B12. Describe how the sun's energy impacts the water cycle.  
B13. Describe the role of water in erosion and river formation.

### Scientific Literacy Terminology:

- water cycle, evaporate, condense, precipitation, erosion, valley, floodplain, delta

### How is scientific knowledge created and communicated?

#### Content Standards

**SCIENTIFIC INQUIRY**
- Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena.

**SCIENTIFIC LITERACY**
- Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science.

**SCIENTIFIC NUMERACY**
Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas.

#### Expected Performances

B INQ 1 Make observations and ask questions about objects, organisms and the environment.

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**August 20, 2010**  
**Final Draft**  
**Land and Water**  
**Grade 4**
Enduring Understandings
Insights earned from exploring generalizations via the essential questions (Students will understand THAT...)

- The energy from the sun causes the continuous cycle of water between the earth and the atmosphere.
- The type of earth material in an area, volume of moving water, slope of the land, and vegetation coverage are factors that affect the amount of earth material moved.
- Precipitation forms streams in upper elevations which flow downhill and join together to form rivers.
- Erosion is constantly changing the shape of the earth's surface.

Essential Questions
Inquiry used to explore generalizations

- What causes precipitation?
- What makes a great place to build a town?
- How can our lives be changed by water?

Knowledge and Skills
What students are expected to know and be able to do

Students will know:
- water has a major role in shaping the earth's surface.
- the energy that causes the water cycle is from the sun.
- erosion is the wearing away of the earth's surface by wind, water, and ice.
- moving water can create new landforms and reshape existing rivers and streams.
- the slope of the land, the speed of the water, and vegetation coverage affects the amount of erosion.
- the effects of erosion can occur instantaneously or over a long period of time.

Students will be able to:
- describe the role of the sun's energy (i.e., heating and cooling) in the continuous cycling of water between the earth and the atmosphere through evaporation, condensation and precipitation.
- use models to demonstrate that topography causes precipitation landing on Earth to move in streams and rivers from higher to lower elevations.
- design and conduct simple investigations to determine how moving water (flowing downhill or in ocean waves) causes changes to the land, the coastline or the course of a stream or river.
- pose testable questions and employ simple equipment and measuring tools to collect data about factors that affect erosion (e.g., type of earth material in an area, volume of moving water, slope of land, vegetation coverage).
- present evidence to support a scientific claim about the relationship between the amount and speed of moving water and the size of earth materials moved (e.g. silt, pebbles, boulders).

Stage 2: Determine Acceptable Evidence

Performance Task(s)
Authentic application in new context to evaluate student achievement of desired results designed according to GRASPS (Goal, Role, Audience, Setting, Performance, Standards)

Goal: Students will design and plan the location for a new town using their understandings of the relationships between land and water.

Role: Students will work in groups to create a demonstration showing what they learned about land and water.

Audience: Peers and teacher

Setting: Classroom

Other Evidence
Application that is functional in a classroom context Only to evaluate student achievement of desired results

Students' science notebooks will serve as ongoing formative assessment. Student entries should provide evidence of new learning about each lesson's focus question.

Labeled drawings or sketches

Observation checklists

Assessment Probes #20 "What are Clouds Made Of?" and/or #22 "Rainfall"
Performance: Students will:
- plan demonstration
- control variables - increase or decrease the slope of the land, or vary the speed of the water or change the amount of vegetation coverage

Materials: stream table, plants, pebbles, sand, humus, clay, soda bottle, cups, rocks, sticks, straws, toy houses

Lesson 8 in Learning Plan

Stage 3: Develop Learning Plan

The STC kit, “Land and Water,” is used as a resource for this unit. The sequence of the lessons is not used as written and has been modified to the following learning plan based on the experience of success with students and the Connecticut State Standards.

1. Focus Question: How does water shape the land? Lesson 1
   - Students' knowledge of the relationship between land and water will be pre-assessed with a CFA (resource section).
   - Students will observe and record how water shapes the land around the school and/or in pictures from the STC Land and Water kit.
   - Students will take a mini field trip to observe and sketch the land surrounding their school. Students will observe photo cards and record their observations.
   - Extension activity - Students will create clay representation of the photo cards. Students will write a short paragraph explaining how they think the landforms were made.

Science Notebook entries:
- Focus Question and date
- I notice/I wonder about land surrounding school
- Labeled drawings of land around school or land as observed in photo cards
- Suggested prompt: An area where I noticed that water shaped the land was... I think this happened because the water...

2. Focus Question: What are the components of soil? Lesson 2
   - The teacher will show a mixture of soil. The students will discuss what they think is in the soil. Using their senses (omitting taste) students will observe samples of humus, rock, sand, and clay. They will chart their observations in their notebooks and use their observation vocabulary to describe each of the components.

Science Notebook entries:
- Focus Question and date
- Observations of soil
- Suggested prompt: Referring to various soil types - I noticed that the... and... are alike because they both... I noticed that the... and... are different because...

3. Focus Question: How does water change as it moves through the water cycle? Lesson 3
   - Pre Assessment Probe #20 “What Are Clouds Made Of?” or #22 “Rainfall”

Part 1:
- The teacher will use pictures in books or from internet sites showing the four different forms of PRECIPITATION.
- Teacher will write “water cycle” on board with a wet sponge and discuss EVAPORATION.
- Students will breathe on a mirror to discover the differences between WATER VAPOR and steam.
- Students will observe CONDENSATION on a glass of ice water as it is warmed in the air.
- Students will use a Ziploc bag and a wet paper towel to make a model of the WATER CYCLE. Put the wet folded paper towel in the bag, seal it and place it in the sun. The teacher will explain that they will be able to observe a small water cycle in their bags and explore the sun’s energy in action.
- As students begin to use vocabulary words specific to the objectives, teacher will ask students to post vocabulary words on a word wall.

Science Notebook entries:
- Focus Question and date
- Labeled drawings of the observations of the demonstrations
- Suggested prompt: Knowing about the water cycle is important because I...

Part 2:
- Students will build a model of land and water (Lesson 2 STC Land and Water kit) to investigate the water cycle.

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Students will draw and label a sketch of their model using learned vocabulary.
Students will draw and label a diagram of the water cycle. Students can label the Science A-Z Water Cycle Stages page included.
Students will read to learn more about the water cycle. See attached "A Cycle without Wheels."

Suggested activities
- Students will play "The Incredible Journey." Adapted from Project Wet. (resource section)
- Prompt: Pretend you are a drop of water in a lake or ocean. Think about the changes that would happen to you as you move through the water cycle. Think about all the places you would see. Write an adventure story about your trip through the whole water cycle.
- Read Molly O's Adventure from Science A - Z. (resource section)
- Read The Water Cycle from A-Z. (resource section)
- Read The Case of the Disappearing Water; questions and activities are also included. (resource section)
- Read Excuse Me, Is This The Way To The Drainpipe? (resource section)

Science Notebook entries:
- Focus Question and date
- Labeled drawings
- Suggested prompt: Today I learned that water ...

4. Focus Question: What can water do?
- Investigate how water flows.
- Investigate slope.

Part 1:
- Prior to engaging in the activity, review prior lesson's learning using the stream table from the previous lesson. Discuss ways to chart data using I notice/I wonder chart. Ask what data can we chart? i.e. rate of flow, height of slope, depth of erosion, amount of runoff, etc.
- Divide students into groups. (You probably should have several stations for each investigation.)
- Half of the students will work on the "flow" exploration while the other half works on the "slope." A task card is provided for each investigation for the students to follow. After 20 minutes, students switch stations. As they are investigating, they record their ideas in their I Notice/I Wonder chart.
- I Wonder questions are posted on strips on the wall (green for one station, yellow for the other station) between station changes and at the end.
- During a break, teacher categorizes questions according to content: slope, flow, particle size, other ideas, QFL questions for later.
- Teacher circulates to groups and poses the question "How does water affect the soil?" and "How does the soil affect the water?"

Formative Assessment: Scan I Wonder questions to see if they are investigable. Chart "I Notices" to gauge content awareness of the group.

Part 2:
- Mini lesson on writing an investigable question:
  - may not be a yes or no question
  - is able to be investigated within the time frame provided
  - is able to be investigated using the available materials
  - investigating the question will provide opportunities to collect data

- As a whole group, students will look at their I Wonders and change one to an investigable question. Encourage students to identify variables and measurability as they review the questions. Rewrite questions as needed to be more investigable.
- Students are introduced to materials available to plan and conduct their investigation. Materials are those provided in the kit.
- Questions are posted and students do a gallery walk to review and select a question. (2 different sticky notes for first and second choice of question can be used)
- The teacher will form groups based on individual criteria.
- Students plan their investigations, teacher checks in with groups as they plan. The teacher approves the plan.
- The following day students are given 60 minutes to set up their investigations, conduct their investigations and clean up their materials.

Formative Assessment: During the investigation, teacher circulates to groups asking clarifying questions, listening to discoveries and "rounding up" a sense of the content that will be shared out by each group.

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Grade 4
Part 3:
- Students plan for share out. Chart paper, markers, rulers, etc. are made available. Students are provided about 30 minutes to plan their share out and practice.
- The following day investigation groups share out their findings, teacher records concepts discovered. Teacher is watchful to chart facts about slope of land, amount of water flow, size of particles.
- Teacher conducts a synthesis at the end of the share out. The synthesis gives students an opportunity to confirm what they know in light of each other’s presentations. It is also a chance to refine their conceptual understanding of the intended concepts. The Underlying Concepts on p. 1 provide a guide for the teacher synthesis. If there are concepts that were not addressed in the student investigations, the teacher should address those concepts at this time.

Science Notebook entries:
- Focus Question and date
- Notes from share outs
- Notes from teacher synthesis or teacher can make copies of notes that students can glue into their notebooks
- Suggested prompt: I used to think...; but now I know...

5. Focus Question: What role does precipitation play in creating a river? How does the topography affect the formation of the river?
- Show video of a river
- Students will record what they noticed/wondered
- Students will design and conduct an investigation to determine how precipitation creates a river. Provide stream table, sprinkle tops, bottles, crushed ice (Teacher Manual Lessons 10 and 11)

Science Notebook entries:
- Focus Question and date
- Notices and wonders about river video
- Investigation plan
- Suggested prompt: I wonder if rivers...

6. Focus Question: What effects does plant growth have on erosion?
- Use STC Lesson 14, "Plants: Protecting Sloped Land from Erosion"
  ****Plant seeds 4 days prior to lesson.****

Science Notebook entries:
- Focus Question and date
- Suggested prompt: Response to focus question

7. Focus Question: How do humans change the direction and flow of water?
- Teacher will lead a discussion “How do humans change the direction and flow of water?” and complete a KWL chart.
- Divide class into small groups.
- Students are introduced to materials available to plan and conduct their investigation. Materials can include: rocks, twigs, straws, popsicle sticks, mini-sandbags, etc.
- Students plan and take 45 minutes to conduct their investigation.
- Students could then walk around the room and look at the other stream tables.
- Students plan for share out.
- Groups should then complete the KWL chart.
- Teacher leads a synthesis of ideas that evolved from the share outs. It is important to stress that humans have a great impact on the flow of water, ex. building projects, dams. A discussion of water pollution due to the behavior of humans would be an extension.

Science Notebook entries:
- Focus Question and date
- I notice/I wonder
- Suggested prompt: How might what you observed with the stream tables today, help you when designing your own town?

8. Performance Task
Focus Question: What makes a great place to build a town?

Part 1: Planning the topography of the town
- Introduce the task to the whole class.
- Explain they will be building a stream table to demonstrate their understandings of the affects of land and water on a town.

August 20, 2010
Final Draft
Land and Water
Grade 4
• Brainstorm ideas for creating a landscape.
• Students plan and design their stream table. Use STC pages 186 - 188 in Teacher Manual.

Part 2: Build the landscape and select a town site.
• Students will predict how water will affect their landscape. Use STC Teacher Manual page 188.
• Select a home site and build the town.
• Add to drawing on Record Sheet 15-A.

Extension:
• Ask students to imagine they are living in the house they placed in their landscape. A sudden storm moves through the area. Will they be protected? Where will the water from the storm flow around the house? Students will write a story about the storm and their house.

• Students will test the success of their design.

Science Notebook entries:
- Suggested Prompts:
- Considering your results, would you still locate your town in the location you originally selected? Why?
- If you were to build your landscape again, what would you do differently?
- What have you seen outside of school that reminds you of something we studied in this unit? Explain your answer.
  You may use labeled drawings.

### Materials and Technology

**Materials**
Land and Water Science Kit
STC Teacher’s Manual
Geologic Landforms Discovery Pack
Task cards focusing on Bloom’s Taxonomy

**Literature**
Science Alive Water (class set)
Amazing Water - Daniel Greenberg
Earth’s Water - Science Explorer
Water - Science Alive
Molly Q’s Adventure
The Water Cycle, A Cycle without Wheels
The Case of the Disappearing Water
Excuse Me: Is this the Way to the Drain Pipe?
Science A-Z; word cards are included to introduce vocabulary as needed.

**Technology**
www.yahoo.com/watch/794382/5933084 (erosion)
www.epa.gov/safewater/kids (water cycle
www.field-trips.org (water cycle)
www.discovery.com = “Wonders of Weather” and “Raging Waters” videos

August 20, 2010
Final Draft
Lesson 1: Land and Water

Content Objective: Students will observe and describe how water shapes land.

Language Objective: Students will write their observations in their science notebook. Students will discuss their observations in small groups.

<table>
<thead>
<tr>
<th>Domain</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing</td>
<td>Students will write in complete (3 per observation) sentences using vocabulary learned in social studies (regarding landforms) to describe their observations of land.</td>
<td>Students will write in complete (2 per observation) sentences using a social studies vocabulary word bank to describe their observations of land.</td>
<td>Students will write in complete (2 per observation) sentences using observation sentence starters and the social studies vocabulary word bank.</td>
<td>Students will write in complete (1 per observation) sentences by filling in the blanks with the help of the word bank.</td>
<td>Students will draw diagrams of their observations and label them with a word bank.</td>
</tr>
<tr>
<td>Speaking</td>
<td>Students, in small groups, will discuss their observations in complete sentences using vocabulary words.</td>
<td>Students, in small groups, will discuss their observations in complete sentences using vocabulary from word bank.</td>
<td>Students, in small groups, will discuss their observations using prompts provided.</td>
<td>Students, in small groups, will respond to teacher yes/no, either/or, short answer, questions about their observations.</td>
<td>Students, in small groups, will point out their observations with their diagrams and repeat words to describe them.</td>
</tr>
</tbody>
</table>
## Lesson 1: Land and Water

<table>
<thead>
<tr>
<th>Function</th>
<th>Situation</th>
<th>Expression</th>
<th>Word/Phrase</th>
<th>Grammar</th>
</tr>
</thead>
</table>
| Observe  | How water shapes the land | I observed___________.  
I noticed___________.  
It reminds me of _________ because the _________.  
An area where I noticed the water shaped the land was _________. I think this because___________. | *rain, snow, sleet, hail precipitation, erosion, flooding...  
*water flowing, slowly, quickly  
*size, shape, color, texture words  
*southwest, land, dry, looks like the Grand Canyon, desert | *verbs, process verbs nouns, adjectives, adverbs |
| Describe | How water shapes the land | The land in the picture is _________.  
The water has _________ the land.  
The water has changed the land by _________.  
The land changed after it _________ and now the land is _________. | *eroding, wet, dry, dark, light, rocky, grainy, green, brown, tan, reddish...  
flooded, eroded, worn away, reshaped...  
*forming a river, lake, ocean, stream, creating a valley, moved soil | *verbs, process verbs nouns, adjectives, adverbs |

* Incorporate all this material into your lesson plan!
Lesson 1: Land and Water

<table>
<thead>
<tr>
<th>Discuss</th>
<th>How water shapes the land</th>
<th>Sentences will vary based on students observations—many will include those from above</th>
<th>from one place to another... *rained, hailed, snowed, sleeted, wet, white, pitted, eroded...</th>
<th>*sentence structure</th>
</tr>
</thead>
</table>

*It is hard to determine what words/sentences the students will use when writing, describing, and discussing their observations because this is the introduction to a new science unit. The students have had some prior experience with some of the concepts through our social studies curriculum, but nothing has been taught in depth.

Yes, but for your ELLs, a sentence frame will be their point of reference for oral/written expression.
Lesson 1: Land and Water

Modifications

- Students who are beginning English speakers will be grouped with fluent/native English speakers, and/or if able also with another student fluent in the English learner’s native language.

- Students will be able to use an academic picture/word dictionary to assist them in drawing/labeling/writing about their observations in both their L1 and L2.

- An anticipation/reaction guide can be used to review information from our previous social studies unit that will pertain to the science unit, and also to preview information that will be studied.

- After the anticipation/reaction guide it may be necessary to review the social studies vocabulary words and concepts related to the science unit.

- Progressive maps will allow students to visualize both old and new information. When the topic of land and water is introduced, students can draw what the terms mean to them. As the unit progresses students may alter or change their map to show new learning.

- By having students participate in “You are the teacher” they will be able to make a pictorial representation of their observations and teach each other about what they have learned.

- Provide students with a word bank and L1/L2 dictionary.
Lesson 2: Examining Earth Materials  
4th Grade Science Unit-Land and Water  

Content Objective(s):  
1. Students will observe and compare and contrast the four soil components.  
2. Students will be able to read and identify facts in the text about soil.  

Language Objectives:  
1. Students will use adjectives to discuss the similarities and differences of the soil components.  
2. Students will record in writing their observations of the properties of each soil component.  
3. Students will be able to discuss and ask questions about soil from the readings.  

Materials:  
Stream tables with soil components, magnifying glasses, science notebooks, small graduated cups, water bottles, spoons, rinse buckets, newspaper, chart paper, directions for examining components, question and answer sheets, observation recording sheet, and reading materials.  

Modifications for materials:  
Compare and contrast sentence starters, observation sentence starters, fill-ins, L1/L2 dictionary, picture cards for senses and verbs, realia to compare/contrast to soil materials, adjective and verb word banks, sentence frames, signal words for comparing and contrasting, reading materials.  

Time:  
1 hour  

Initiation:  
1) Ask students to review what was learned in lesson 1.* Students will use the, “Oh, Yesterday” SIOP activity for building background. Students will be chosen at random by means of a stick jar to share using one of the following sentence starters, “Oh yesterday I learned that...”, “Oh yesterday we studied...”, “Oh yesterday I discovered that...”, “Oh yesterday our class...”  

2) Tell students that in this lesson, they will examine more closely the four soil components that make up their stream tables in order to better understand how each component interacts with water. Introduce the content and language objectives for the lesson.  
3) Students will get into their science groups: 3-4 in a group assigned in lesson 1.
Lesson Development:

1) Brainstorm a list of possible adjectives students may use when describing their soil components (i.e. size, shape, color, texture)* A word bank will be given to levels 1-4 prior to brainstorming with the class.

2) Brainstorm a list of possible verbs students may use when describing their soil components actions in the water* A word bank will be given to levels 1-4 prior to brainstorming with the class.

3) Distribute the observation recording sheet to each student. Students will be encouraged to use adjectives when recording their observations.

4) Students will collect their supplies at this time.

5) Students will complete the following steps for each soil component:
   - Pour the component (gravel) on a sheet of paper
   - Use a magnifying glass to look closely at the component (gravel)
   - What do you notice about the appearance?* adjective word bank can be used to list characteristics of each component. Picture cards for adjectives will be used and realia (i.e. sandpaper, safety mirror, crayons, blocks, to allow the level 1 students something that feels or looks the same to compare it to)
   - How does it look?
   - Discuss your observations with your group* (level 2) fill-ins (level 3) sentence starters, “The color is _______, It looks like________, I observed... I noticed...”
   - Record your observations on your recording sheet*, level 1 students will be able to use a crayon to draw the color
   - Use your fingers to feel the texture of the component (gravel)
   - Discuss and record your observations * level 1 students will be able to draw the object that the component feels like, (level 2) fill-ins/sentence starters, “It feels________, I observed..., I noticed...”
   - Gently fold your sheet of paper like a funnel and drop your soil component (gravel) into the cup of water and watch it fall * Teacher will model for students
   - Discuss and record your observations on your recording sheet* (level 1) picture cards will be used to show items floating/sinking, level 2/3 verb word bank, fill-ins and sentence starters will be used, “It ________ to the bottom, It _________ to the top, It is ________ in the cup, The ________ is ________ so it floats to the top, The ________ is ________ so it sinks to the bottom, I noticed..., I observed...”
   - Stir the water gently with a spoon and record your observations
   - Repeat the above steps using sand, clay, and then humus using the same cup each time
   - Record your observations on the record sheet each time* level 1 students can draw diagrams and use the word banks, more fill-ins and sentence starters and can be added when students begin to compare/contrast the components. “The ________ and the ________ are the same because they both _________, In addition they, _________, The ________ and the ________ are different because _________, and _________. Also, _________, but _________, One interesting thing I noticed..., I discovered..., I learned..., I wonder..., I was surprised that...”
Lesson 2: Land and Water

- after testing all four components stir the mixture of soil again and record any additional observations on the record sheet*fill-ins/sentence starters*-“When I __________, it __________, __________ changed after __________, and now it __________. (see sentence starters above)

6) Students will then clean up their areas and put their materials away
7) Students will be given text to read further about soil. They will work independently or with a partner using the Insert Method. *Students will add codes to the text as they read.
   - A check mark indicates a concept or fact that is already known by the students.
   - ? A question mark indicates a concept or a fact that is confusing or not understood.
   - ! An exclamation mark indicates something that is new, unusual, or surprising.
   - + A plus sign indicates an idea or concept that is new to the reader.
   - * An asterisk indicates a question has been answered.
8) When students have finished marking the text they will form groups of four to share their questions and new learning.
   - Sentence starters will include: I wonder if..., What did you understand about...?, I learned..., I discovered...
9) As questions are answered/misconceptions cleared up, the question marks will be replaced by the asterisk.
10(Text can then be discussed and learning shared as a whole class.

Closure:
1) Groups will be asked to share what they have learned about the properties of each of the four soil components. * Students can use outcome sentences such as: I learned, I noticed, I wonder...
2) Their observations will be recorded on a class chart labeled, “Soil and their Properties”. A check mark will be placed next to any duplicate responses thus acknowledging all answers.
3) Ask students based on what we observed in lesson 1 and 2, what predictions do you think you can make about what happens to the soil components when it rains? Their answers will be written on chart paper to use in a future lesson.* students will be given prompts as noted the Functional Notional chart. “I think __________ will happen to ______ when it rains because ____________.”

Assessment:
1) Were the students able to use adjectives to discuss the similarities and differences of the soil components?
2) Did the students record in writing their observations of the properties of each soil component?
3) Were the students able to discuss and ask questions about soil from the readings?

*indicates modifications
## Lesson 2: Land and Water

### Performance Indicators

<table>
<thead>
<tr>
<th>Domain</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speaking</strong></td>
<td>Students will discuss their observations of the soil components using adjectives and/or verbs in complete sentences.</td>
<td>Students will discuss their observations using adjectives and verbs from word bank in complete sentences.</td>
<td>Students will discuss their observations of the soil components using prompts provided.</td>
<td>Students will share their observations of the soil components by respond to yes/no, either/or, and short answer questions.</td>
<td>Students will point out their observations of the soil components using real objects to compare look and touch, point to what the components did in water, and repeat words to describe them.</td>
</tr>
<tr>
<td><strong>Writing</strong></td>
<td>Students will write in complete sentences using adjectives and/or verbs, and vocabulary to describe their observations of the soil components.</td>
<td>Students will write in complete sentences using an adjective/verb vocabulary word bank to describe their observations of the soil components.</td>
<td>Students will write in complete sentences using observation sentence starters and the adjective/verb vocabulary word bank.</td>
<td>Students will write in complete sentences by filling in the blanks with the help of the adjective/verb word bank.</td>
<td>Students will draw diagrams of their observations of the soil components and label them with an adjective/verb word bank.</td>
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<tr>
<td><strong>Reading</strong></td>
<td>Students will read text providing additional information on soil identifying key information.</td>
<td>Students will read text providing additional information on soil using a vocabulary list for assistance.</td>
<td>Students will read text providing additional information on soil. Key information will be highlighted in order to assist them.</td>
<td>Students will follow text read by teacher matching some words to pictures identifying soil components.</td>
<td>Students will point to photographs of the different components of soil and repeat words that identify each.</td>
</tr>
<tr>
<td>Function</td>
<td>Situation</td>
<td>Expression</td>
<td>Word/Phrase</td>
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<tr>
<td>Discuss/Observe/Describe</td>
<td>The four components of soil</td>
<td>The color is ______.</td>
<td>*red, brown, white, speckled, tan, orange, dark brown, any color that would apply</td>
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<td></td>
<td>It looks like_______</td>
<td>*size, shape, color, texture words</td>
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<td></td>
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<td>It feels ________</td>
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<td></td>
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<td>I observed__________</td>
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<td></td>
<td></td>
<td>I noticed_______________</td>
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<td></td>
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<td>It ______ to the bottom.</td>
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<td>It _______ to the top.</td>
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<td>It is ______ in the cup.</td>
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<td></td>
<td>The ______ is ______ so it floats to the top.</td>
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<tr>
<td></td>
<td></td>
<td>The ________ is _______ so it sinks to the bottom.</td>
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<td>The _______ and the _______ are the same because they both</td>
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<td>_________. In addition</td>
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</table>

*verbs, process verbs, nouns, adjectives, adverbs
*sentence structure
| they, __________. | The __________ and the __________ are different because __________ and __________. Also, __________, but __________. One interesting thing I noticed __________. I discovered __________. I learned __________. I wonder __________. I was surprised that __________. When I __________, it __________. __________ changed after __________, and now it __________. |
|                  | *gravel, sand, clay, sink, are heavy, small, chunky... |
|                  | *humus, clay, sand, gravel, one sinks, the other floats... color, size, shape, texture is different... |
|                  | *answers will vary based on observations |
### Lesson 2: Land and Water

<table>
<thead>
<tr>
<th>Discuss</th>
<th>Reading additional information on soil.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I wonder if...</td>
</tr>
<tr>
<td></td>
<td>What did you understand about...?</td>
</tr>
<tr>
<td></td>
<td>I learned...</td>
</tr>
<tr>
<td></td>
<td>I discovered...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predict</th>
<th>What happens to the soil components when it rains?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I think _______ will happen to _______ when it rains because _______.</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions/answers</td>
<td><em>questions/answers will vary based on understanding of text (i.e. what they feel is important, interesting to them...</em>)</td>
</tr>
<tr>
<td></td>
<td>*nothing, gravel, it is very heavy...</td>
</tr>
<tr>
<td></td>
<td>*something, humus, it is very light...</td>
</tr>
</tbody>
</table>

Sentences will vary based on students observations—many will include those from above.
Lesson 3: The Water Cycle: Modeling Land and Water

4th Grade Science Unit-Land and Water

Content Objective(s):
1. Students will investigate how water changes as it moves through the water cycle.
2. Students will be able to read and identify facts in text about the water cycle.

Language Objectives:
1. Students will discuss and record in writing their observations about the stages of the water cycle.
2. Students will read to learn more about the water cycle.

Materials:
Stream tables with soil components, large and small absorbent pads, plastic plaster spreader, magnifying glasses, ice packs, science notebooks, water bottles, water, plastic wrap, large rubber bands, spoons, rinse buckets, chart paper, directions for modeling the water cycle, and reading materials.

Modifications for materials:
Compare and contrast sentence starters, observation sentence starters, fill-ins, L1/L2 dictionary, picture cards for forms of precipitation, realia to compare/contrast different components of the water cycle, word banks, sentence frames, signal words for comparing and contrasting, materials to play the "Incredible Journey" to simulate the water cycle including location cards and journey dice, and reading materials.

Time:
2 day lesson

Initiation:
1) Ask students what do they think the word cycle means? Explain to students that water moves in different forms from one place on earth to another in a continuous cycle. Tell students that in this lesson, they will find out how water changes as it moves through the water cycle. Introduce the content and language objectives for the lesson.
2) Students will get into their science groups: 3-4 in a group assigned in lesson 1.

Lesson Development:
1) Display the brainstorming list from lesson 1. "What We Know about Land and Water." Ask students to identify statements on the list that reflect what they may already know about the water cycle. Students may add to the list if warranted.
2) Tell the students that we are going to conduct several experiments that will allow us to learn about the water cycle.
3) The teacher will use pictures showing the four different forms of precipitation. Students will be asked what these forms have in common. Next, the word "water cycle" will be written on the board with a wet sponge to demonstrate evaporation. Students will be asked to talk to their science groups about their observations. After, students will be given a safety mirror and be asked to breathe on it to discover the differences between water vapor and steam. Finally, students will observe condensation on a glass of ice water as it is warmed in the air. Levels 1, 2, and 3 will help the students by giving them a concrete visual in order to make a connection to the water cycle. I will also introduce, to all levels, 4-Corners vocabulary so that they will be able to provide a picture, and the word. We would be able to build the definition as we go through the lesson. Students would be able to use it in a sentence/fill-in/ with a sentence starter, or draw another object to represent the vocabulary word.

4) Tell students we are going to be able to use our stream tables to model the water cycle on earth.

5) Students will collect their supplies at this time.

6) Students will complete the following steps for modeling the water cycle. *All levels pictures will be included to help students understand the steps.
   - Cover your workspace with the large absorbent pad. Make sure the absorbent side faces up and the plastic side is down.
   - Place the small absorbent pad on the floor with the absorbent side facing up.
   - Place the clear plastic box of soil on the large absorbent pad and remove the lid.
   - Make sure the rubber stopper is pushed tightly into the drain hole from the inside.
   - Mix the soil in the box with the plastic spreader.
   - With the spreader, bulldoze the soil. Push the soil away from the drain hole toward the opposite end of the box, as shown in the picture.
   - Now create a lake in your model. Pour the warm water into the box. Do not pour the water on the soil.
   - Cover your land and water model with plastic wrap. Fasten the plastic with a large rubber band, as shown in the picture.
   - Ask your teacher for a frozen ice pack.
   - Place the frozen ice pack on the plastic so it is above the land, as shown in the picture. Do not touch the ice pack during the next five minutes.
   - What do you think will happen in the model? Tell students while they are waiting to discuss their predictions within their group. Write your predictions in your science notebook. Level 1 will draw their predictions, level 2 will be able to use sentence fill-ins, I think the ______ will/will not ______ when the ice pack is on top of the stream table. Level 3 will use sentence starters-I think ______ because ______.
   - When the five minutes are up, students will remove the ice pack from the plastic. Students will then look at the plastic and discuss their observations within their group. Students will then write their observations in their notebook. * Level 1 will draw their observations, level 2 will be able to use sentence fill-ins, I noticed the ______ did/did not ______ when the ice pack is on top of the stream table. Level 3 will use sentence starters-I noticed ______, I observed ______, It looks like ______.
Lesson 3: Land and Water

- Next, the students will gently tap on the plastic where the ice pack was and discuss/write their observations. *Students can use the observation strategies listed above.
- After, students will take the plastic wrap off of their stream table and discuss/write any further observations.

7) Students will be asked to share their observations of the water cycle. They will be asked to use their model to support their observations. *Students may write using fill-ins/sentence starters/draw any additional information about "the share" in their science notebooks.

8) Students will clean up their areas and put their materials away.

9) Students will be given text to read further about the water cycle. *Students will be given framed outlines or graphic organizers to share key information about the water cycle.

10) Text can then be discussed and learning shared as a whole class.

11) As a follow up activity to help all students understand the concepts introduced in lesson 3 we will play the "Incredible Journey" that simulates the water cycle using our bodies. *This would appropriate for all levels.

Closure:

1) Take out chart paper about predictions from lesson 1 and 2. Ask students about their predictions regarding what happens to the soil components when it rains. Were their predictions correct? Why or why not? Have students share their thoughts.

2) *Groups will be asked to share what they have learned about the water cycle by using Pass the Note card. The steps include:
   - Each student will be given an index card. Students will be asked to use at least one sentence starter and one vocabulary word to write down something they learned from the lesson.
   - Buddy systems will be used to match readers with non-readers. They will discuss the facts and choose a fill-in or a sentence starter. Water _____ and _____ to the _____ in the form of _____, _____, or _____.
   - The _____ in the form of _____, _____, and ____. Water _____ into _____ when it _____.
   - Water _____ onto _____ to form ___. I noticed... I discovered... I learned...
   - The writer will share the information and have the non-reader repeat it.
   - Students may also draw a picture if a match-up is not available.
   - Then students will share their information musical chairs style.

Assessment:

1) Were the students able to discuss and record in writing their observations about how water moves through the water cycle?

2) Were the students able to discuss and share information about the water cycle from the readings?

3) Were students able to demonstrate successfully the movements of the water cycle through the "Incredible Journey" game?

*indicates modifications
### Performance Indicators

<table>
<thead>
<tr>
<th>Domain</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaking</td>
<td>Students will discuss their observations of the water cycle components using process verbs and nouns in complete sentences.</td>
<td>Students will discuss their observations using process verbs and nouns from word bank in complete sentences.</td>
<td>Students will share their observations of the water cycle by respond to yes/no, either/or, and short answer questions.</td>
<td>Students will point out their observations of the water cycle using pictures to compare and repeat words to describe them.</td>
<td></td>
</tr>
<tr>
<td>Writing</td>
<td>Students will write in complete sentences using process verbs and nouns, and vocabulary to describe their observations of the water cycle. *graphic organizers will be used to record key/additional information from the text.</td>
<td>Students will write in complete sentences using process verbs and nouns vocabulary word bank to describe their observations of the water cycle. *graphic organizers and a vocabulary will be used to record key/additional information from the text.</td>
<td>Students will write in complete sentences using observation sentence starters and the process verbs and nouns vocabulary word bank. *framed outlines will be used with a word bank to record key/additional information from the text.</td>
<td>Students will label a diagram of the observations of the water cycle and label them with a process verbs and nouns word bank. *students will point to the key words in the text while it is being read, and repeat them.</td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td>Students will read text providing additional information on the water cycle identifying key</td>
<td>Students will read text providing additional information on the water cycle using a</td>
<td>Students will read text providing additional information on the water cycle. Key</td>
<td>Students will follow text read by teacher matching some words to pictures identifying key</td>
<td>Students will point to photographs of the different components of the water cycle and repeat words that</td>
</tr>
</tbody>
</table>
| information. | vocabulary list for assistance. | information will be summarized in the margins in order to assist understanding. | information about the water cycle. | identify each.

Comment [LM13]: Good! Don't forget to provide the modified text with your materials!
<table>
<thead>
<tr>
<th>Function</th>
<th>Situation</th>
<th>Expression</th>
<th>Word/Phrase</th>
<th>Grammar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify and Name</td>
<td>The water cycle</td>
<td>Water _____ and _____ to the _____ in the form of _____, _____, or _____</td>
<td>*precipitates *falls *ground *rain, snow, sleet, hail</td>
<td>* process verbs and nouns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The _____ in the form of _____, _____, and _____</td>
<td>*earth stores ground water *lakes, rivers, aquifers, and oceans</td>
<td>* process verbs and nouns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water _____ into _____ when it _____</td>
<td>*evaporates *water vapor *gains energy</td>
<td>* process verbs and nouns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water _____ onto _____ to form _____</td>
<td>*condenses *dust particles *clouds</td>
<td>* process verbs and nouns</td>
</tr>
<tr>
<td>Discuss/Observed/Predict</td>
<td>How water moves through the water cycle.</td>
<td>I think the _____ will/will not ____ when the ice pack is on top of the stream table.</td>
<td>*water, will dry up, evaporate... *ground, soil components, will not get wet...</td>
<td>*process verbs and nouns</td>
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<tr>
<td></td>
<td>Reading additional information on the water cycle.</td>
<td></td>
<td>*the stream table will be foggy, the air is warm...</td>
<td>*sentence structure</td>
</tr>
<tr>
<td></td>
<td>What happens when the ice pack sits on top of the stream table?</td>
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<td>I think _____ because...</td>
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<td></td>
<td>I wonder if...</td>
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<td></td>
<td>What did you understand about...?</td>
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<td></td>
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<tr>
<td></td>
<td>I learned...</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>I discovered...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sentences will vary based on students observations—many will include those from above</td>
<td></td>
<td></td>
<td>*answers will vary based on observations</td>
</tr>
</tbody>
</table>