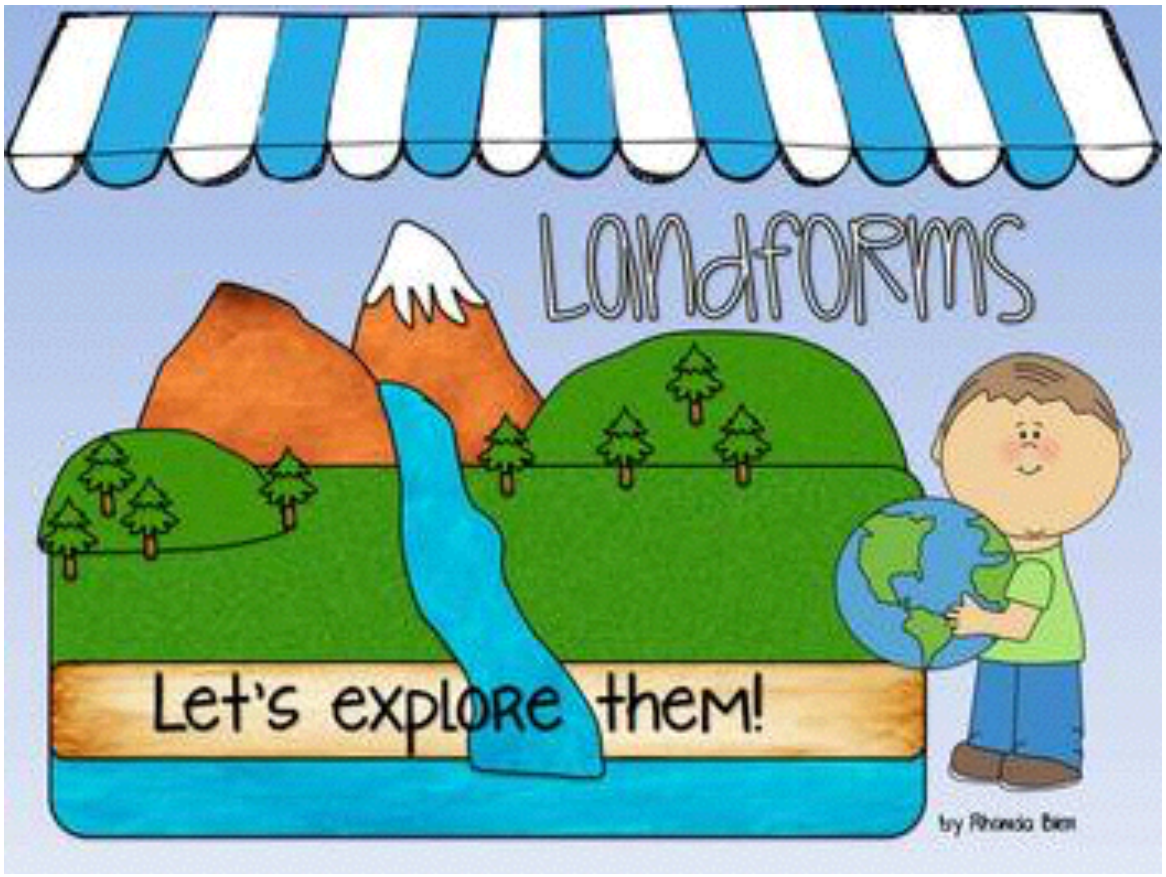
Introduction to Landforms and Erosion Unit



2nd Grade

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Rationale

Landforms are located everywhere the students are looking and going. It is important for the students to understand what these structures are called, their characteristics, and how they are created. Erosion is important in explaining the forming of these landforms. This content is also important because further science instruction will depend on their understanding of the vocabulary and erosion process. In this unit, we will be learning the basics to prepare them for the older grades. In fourth grade for example, the Next Generation Science Standards focus on patterns in rock formations and measurements and evidence of weathering and erosion. If the students are not prepared with the basic understanding of landforms and erosion they will not be ready to move on to the tougher unit. This unit will be interesting to them because it is relevant to their lives, will provide team collaboration and exploring, and all lessons are engaging. Landforms can be seen in their community, on family vacations, in pictures, and online. They are all familiar with landforms even if they do not know the names or characteristics of each. The material is easily connected to their lives. They will have group work in each lesson that provides them the opportunity to explore and develop their own thoughts, while learning from each other. Group work is important for students to work through their prior knowledge and gain knowledge from exploring with their peers. Lastly, the lessons will be engaging by connecting to their lives, using hands on activities, and using age appropriate lessons. Science is an interactive subject when taught correctly and this unit provides the materials to do just that. This unit will also include language arts activities to strengthen the students in their reading, writing, listening, speaking, viewing, and visually representing skills. This lesson also contains multiple assessment techniques that will allow adaptations and modifications to be made in order for students to reach

the expectations. In some of the activities, students will be given certain tasks that will reflect their abilities for the activities. All students will be involved in all the activities and learning. Overall, this unit on the introduction of landforms and erosion will be beneficial for all students to learn the content using a hands on, inquiry-based approach.

Mrs. Thibault's Introduction to Landforms and Erosion

Unit Lessons:

Lesson One:
Introduction to Landforms
-Forming landforms with rocks, sand, dirt, and grass
-Creating a foldable of newly learned landforms

Lesson 2:
Landforms: Clay and Dinosaurs
-Matching definition game
-Create clay landforms on plates
-Label landforms on dinosaur worksheet

Lesson 3:
-Explore results of water,ice, and wind on pile of dirt
-Discuss erosion
-Chocolate syrup erosion simulator

Lesson 4:
-Wind erosion
-Quick or slow?
-Constructing a solution to block wind erosion

Lesson 5:
-Discuss difference of quick and slow
-Reaction of baking soda and vinegar
-Volcano effects

Dear Families,

Next week our second grade class will begin a new unit on an introduction to landforms and erosion. We will begin with an introduction to landforms then move into an introduction of erosion. In this unit, we will even be creating a VOLCANO!! In this lesson, the students will learn the effects of quick erosion and there will be another lesson for slow erosion. Your student(s) will be getting their hands dirty in the next few weeks, but it will be worth it. The students will be exploring with their peers to gain their understanding of the content. By the end of the unit the students should be able to name surrounding landforms, explain erosion, and know the difference between quick and slow erosion. The following materials will be needed for this unit:

* Small Paper Plates
* Pie Pans
* Baking Soda
* Vinegar
* Cups

Please contact me if you are able to donate any of these items to our classroom. Also, please come join us for these fun activities we have planned for our upcoming unit. We love our family visits to observe the fun learning going on!

See You Soon!

Mrs. Thibault

Landform and Erosion Graphic Organizer

Listening	Lesson 5	Students will listen to a children's informative text about volcanoes to gain understanding of a volcanic eruption.
Speaking	Lesson 4	Through pair share and whole class discussion, students will take the opportunity to orally share the knowledge they have gained.
Reading	Lesson 1	Students will read the definitions of new vocabulary words in order to match them to the correct word when creating an interactive notebook.
Writing	Lesson 3	Students will write in their science journals their results, descriptions, and new learned material of the experiments conducted on erosion.
Viewing	Lesson 2	Students will match the vocabulary word and definition to the correct picture in a matching game in their table groups.
Visually Representing	Lesson 3	Students will record in their science journals using pictures and written words to explain the different erosion results.

Landform Foldable: Interactive Notebook

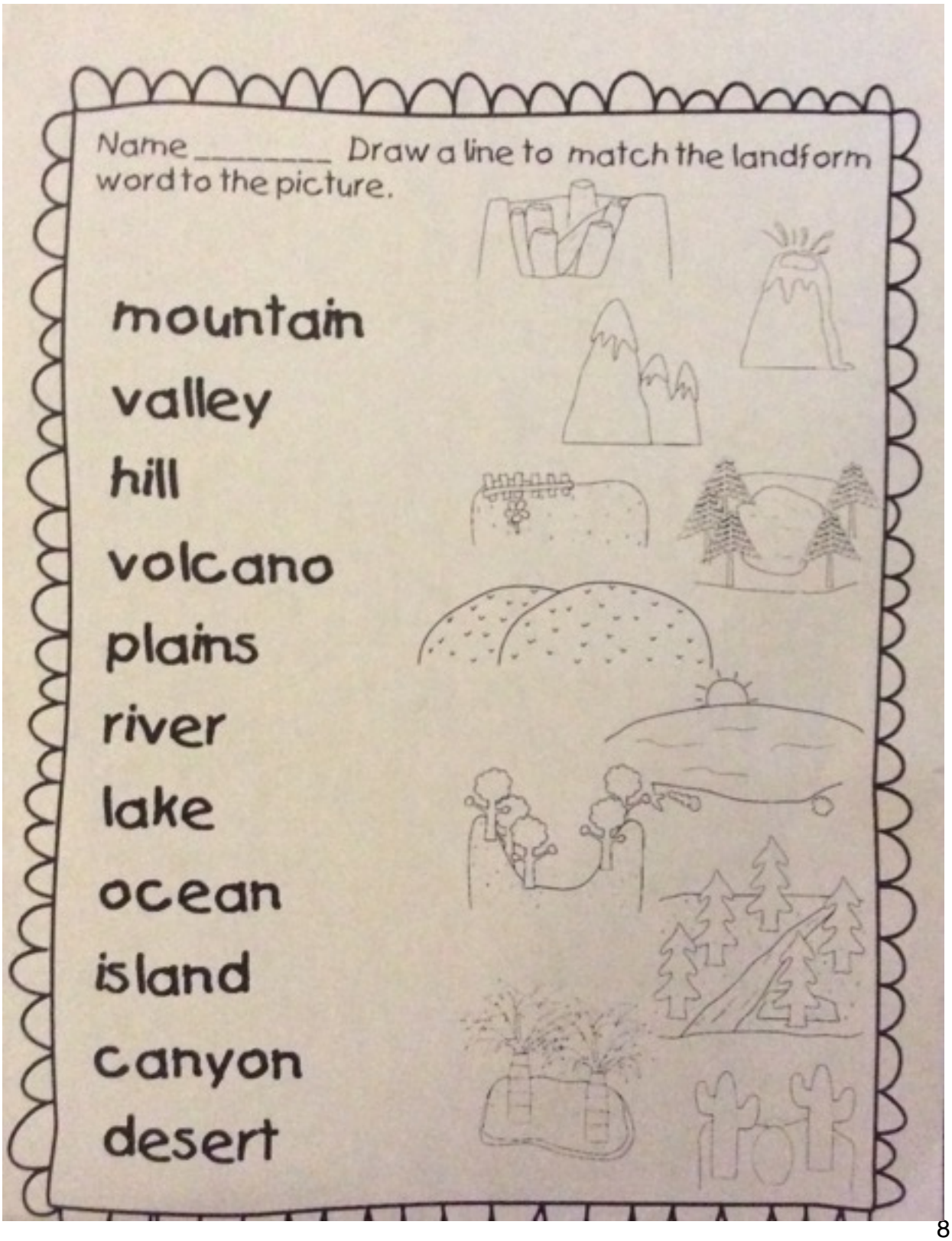
Materials:

- Large Construction Paper
- Landform Cutouts
- Landform Definitions
- Glue
- Scissors
- Crayons
- Blank Paper Headings
- Markers

Directions:

- Have students cut out the landforms on the dotted line
- Have students fold on the solid line with the picture facing out
- With picture facing up, have students glue down onto construction paper
- Have students cut out definitions
- Students need to match the correct definitions with the corresponding picture and glue on the inside of the fold
- Students can color and label the flaps
- Have them create a heading and glue on
- Students can now use their foldable to study and as a reference!

Pre-Assessment



5E Learning Cycle Lesson Plan
Lesson Plan Title: Introduction of Landforms

Student Teacher (Block B Student)
Mrs. Thibault

University Supervisor/ Cooperating Teacher

Grade Level/Subject
2nd Grade/Science

Unit Title
Introduction to Landforms and Erosion

Lesson Length (hours/days)	
Date(s)	
In-Class Time Period	50 Minutes
Out-of-Class Time (homework/ collaboration)	None

Area(s) of Science (From NGSS/DCI's) – Circle one

Earth Space Science

Life Science

Physical Science

NEXT GENERATION SCIENCE STANDARD(S)

Performance Expectation(s):
2-ESS2-2: Develop a model to represent the shapes and kinds of land and bodies of water in an area.

Science and Engineering Practices:	**Disciplinary Core Idea(s):**	**Crosscutting Concepts:**
Developing and Using Models Develop a model to represent patterns in the natural world	ESS2.B. Maps show where things things are located. One can map the shapes and kinds of land and water in an area.	**Patterns:** Patterns in the natural world can be observed.

Connections to CCSS Literacy in Science:
SL.2.5. Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thought, and feelings.
W.2.8. Recall information from experiences or gather information from provided sources to answer a question.
Literacy Objective:
Students will be able to match the correct definition to the new vocabulary words of landforms.

OBJECTIVES (Intended Learning Outcomes) **please write as list**.

Cognitive: Students will be able to identify different landforms by their characteristics.

Psychomotor: Students will be able to create a foldable matching the correct landform to the definition.

Affective: Students will be able to connect the landforms to their surrounding.

ACCOMMODATIONS/MODIFICATIONS FOR DIVERSE LEARNERS (based off of Contextual Factors):

- Have students arranged in a mixture of learning levels and diversity
- Have low level calm music playing to attempt to keep students focused on activity

MATERIALS **Attach <u>all</u> materials, i.e., handouts, worksheets, etc., needed to teach this lesson.**

- Aluminum pie pans
- Dirt
- Rocks
- Grass
- Sand
- Science Journals
- Picture slideshow with definitions
- Pictures of surrounding landforms
- List of definitions of landforms
- Variety of 12”x18” construction paper
- Foldable landform sheet
- Crayons
- Pencils
- Fine tip black markers
- Scissors

PREPARATION **Describe any advance preparations for the lesson.**

- Collect dirt, rocks, sand, and grass and place them in ziplock bags

Safety Rules:

- Do not put grass, dirt, rocks, or sand in mouths, eyes, ears, or mouth
- Do not throw any materials at your friends or on the floor
- Please let the teacher know if a spill happens
- Use your scissors responsibly and do not run with them in your hands

5E LEARNING CYCLE PROCEDURES:

Engagement:

- Bring the students to the carpet by table groups
- Tell the students that we are beginning a new unit about land
- Ask the students if they have seen any differences in the land around them
- Expand off their answers to access prior knowledge of landforms
- Show pictures of landforms that might be familiar to the students (hills near by, mountains with snow, an island, a peninsula, a valley, and a volcano)
- All students should not know all the landforms
- With each picture ask students if they know what they are, what makes them different than the land they see everyday, and where they may have seen them.
- Objective is to start to notice different characteristics
- Do not tell them the correct names

Exploration:

- Explain to students that they are going to receive some materials and they are to use the materials to create different types of land or something that might be a type of land. The materials are sand, rocks, dirt, and grass. They are not to throw the materials at any of their friends or on the floor. They are also required to keep the materials in the given pie pan and not to put any of it near their eyes, mouth, ears, or mouths.
- Inform them that after each item they create they are to draw it in their science journal and give it a name. Assure them that I am not looking for the correct answer that I just want them to use their thinking minds and their own brains to create a name for them.
- Using a document camera show the students an example
- Ask for any questions or clarifications. Review safety rules.
- Dismiss students individually designating them a seat to mix them in groups of performance level and behavior characteristics.
- Pass out materials informing them not to touch anything until given further directions.

- Review instructions letting them fill in blanks to assure understanding.
- Let them begin
- Walk around asking questions of what they are making, if stuck remind them to think of the pictures they saw on the projector, if students are getting off task give them a warning and redirect them back to the assignment, and remind them to make their drawings and titles in their science journals.
- If students continue to be off task or break the safety rules take their supplies and have them work with a partner by drawing what the partner makes and they can work together to create the title.
- Give the students 15 minutes to create and record. If they seem to become unengaged reduce the time and move on. Making sure each student has at least 3 landforms created and recorded.
- Let the students know it is time to clean up. Have them place the ziplock bags in the pie pans and have them walk to the carpet quietly bringing their science journals with them.
- While they transition pick up pie pans and place on back table

Explanation:

- Have students share one of the landforms they created with their carpet partner having them explain why they gave it to their name, what was special about it, what made it different than maybe their front yard or the park, where they might have seen it before.
- Have a few students share what their partner showed them, using the document camera while they explain so each students can see what they are describing.
- Reassure them that all their recordings are good, but now they are going to learn some new vocabulary words to be able to explain what we call landforms.
- Explain that the parts of the world that is not covered by water is covered in land that is incredibly different. Some of the land is tall, some is low, some are near water, and some are not. These types of land that are in all different shapes and sizes are called landforms.
- Using the projector pull up the previous picture of the mountain and using the whiteboard give the definition. Pointing out the characteristics from the definition in the picture. Ask students if any of them created and recorded a mountain.
- Repeat this process with hill, island, valley, peninsula, and volcano.
- Go through the definitions again. Asking for any questions or observations.

Elaboration:

- Showing an example, explain to students that they are going to create an interactive notebook to help them with the definitions they just learned.
- One by one show the materials they will receive. Use the document camera to get a closer look at the foldable landform sheet.
- Explain that they will cut on the dotted line (Demonstrate while explaining)
- On each strip they will have a picture and on the back of the strip there will be a box. They will also receive a sheet that has the definitions of the landforms. They are to match

the definition to the picture. After finding the definition they are to cut it out and glue it to the box on the back of that picture strip. After they have completed that they will fold on the solid line and glue it to the construction paper with the picture facing up.

- Show them at the end they should have all the pictures facing up and when you lift them up they should have the definition underneath.
- They are allowed to color the pictures after they are all glued down.
- Review the directions a little less in depth and ask for any questions
- Remind them that when cutting they need to keep the scissors facing away from them and their friends and they should not be walking or running with them.
- Call students up one by one to grab a piece of construction paper and the 2 sheets and quietly walk back to their desks.
- Hand out the scissors, glue, and crayons.
- Have them begin and walk around helping them with the definitions without giving them the answers, but reminding them of certain characteristics.
- When students have at least finished glueing announce time for clean up
- Collect scissors, glue, and crayons
- Have students write their names on their interactive notebooks and turn them in.
- They are not for a grade, but to assess understanding and check for any corrections

Evaluation: Describe two ways in which you will assess student understanding.
(Note: one should involve either "performance" or "authentic" assessment).

Assessment (1)

Student Learning Outcome **(Cognitive Learning Objective):**	**Description:** Describe the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.
Students will be able to identify different landforms by their characteristics.	Students create an interactive notebook matching pictures to definitions.	The amount of definitions correctly matched.	90% of work should be completed accurately.

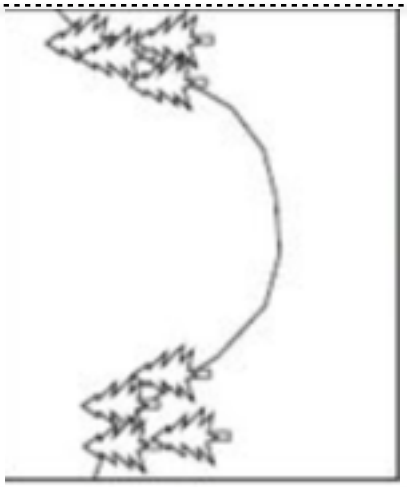
Assessment (2)

Student Learning Outcome **(Psychomotor or Affective Learning Objective):**	**Description:** Discuss the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.

Students will be able to connect the landforms to their surrounding.	Students will create landforms using sand, rock, grass, and dirt building from prior knowledge	They will be assessed by the characteristics, not necessarily the name of the landforms. This will be assessed during partner sharing.	90% of students will have created at least 1 real landform.

TEACHING MODELS and LEARNER ACTIVITIES:
Check all that apply.

	Teaching Model(s)		Activity Type(s)
X	5E	X	Individual
	Cooperative Learning	X	Small Group
X	Direct Instruction	X	Whole Class
	Presentation		Outside of Class
	Problem-Based Instruction		Other
X	Discussion		

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5E Learning Cycle Lesson Plan
Lesson Plan Title: Landforms-Clay and Dinosaurs

Student Teacher (Block B Student)	University Supervisor/ Cooperating Teacher
Mrs. Thibault	

Grade Level/Subject	Unit Title
2nd Grade/Science	Introduction of Landforms and Erosion

Lesson Length (hours/days)	
Date(s)	
In-Class Time Period	40 Minutes
Out-of-Class Time (homework/ collaboration)	5 Minutes

Area(s) of Science (From NGSS/DCI's) – Circle one

Earth Space Science

Life Science

Physical Science

NEXT GENERATION SCIENCE STANDARD(S)

Performance Expectation(s):
2.ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.

Science and Engineering Practices:	**Disciplinary Core Idea(s):**	**Crosscutting Concepts:**
Developing and Using Models * Develop a model to represent patterns in the natural world	ESS2.B: Plate Tectonics and Large-Scale System Interactions: Maps show where things are located. One can map the shapes and kinds of land and water in any area.	Pattern * Patterns in the natural world can be observed

Connections to CCSS Literacy in Science:
W.2.8. Recall information from experiences or gather information from provided sources to answer a question.
Literacy Objective:
Students will be able to list the correct vocabulary words when shown similar characteristics on a dinosaur worksheet.

OBJECTIVES (Intended Learning Outcomes) **please write as list**.

Cognitive: Identify the shape and characteristics of a set list of different landforms in an area.

Psychomotor: Design a model of landforms when given clay, markers, a paper plate, and a list of landforms.

Affective: Make connections to common sights they see in their familiar area and daily lives.

ACCOMMODATIONS /MODIFICATIONS FOR DIVERSE LEARNERS (based off of Contextual Factors):

* Allow students who struggle to keep their hands and bodies to themselves to sit at their desks or on a chair behind the rug during rug time.
* Provide low level students with word bank with simple definitions to use to label landforms after challenging them to complete on their own.

MATERIALS	**PREPARATION**
* Paper plates * Assortment of modeling clay * Assortment of markers * Landform Poster * Dinosaur landform template * Landform Matching Game * Tape	* Have matching game ready for each table in envelopes * Have assortment of markers, clay, and plates ready for each table.

Safety Rules:
1. When doing introductory movement activity explain to students to stay spread out and avoid hitting those around them.
2. Instruct students not to put the clay anywhere near their mouth, eyes, ears, or nose.
3. Instruct students not to put clay in their hair or their friends hair.

5E LEARNING CYCLE PROCEDURES:

Engagement:

1. Have students spread out on the carpet.
2. Explain "I am going to say 'Landform' three times" (demonstrate "Landform, Landform, Landform..) " I will then shout out a name of a landform and I want you to show me with your bodies what that landform looks like or what you think that landform looks like. It is okay if you do not know, but I would like you to try and give it your best try"

(Use mountain as an example and model for students with your body using arms above head creating a peak)

3. Use following landforms for body movement activity: Mountain, Hill, Valley, Peninsula, and Volcano.

Exploration:

1. "Today, we are going to continue our study of landforms"
2. "On your desks there is an envelope that inside is a matching game for you and your table group to complete. There are 7 picture cards and, 7 landform names, and a sheet of paper in each envelope. As a group, I would like you guys to match the name with the correct picture and lay them next to each other on the sheet of paper."
3. Explain that there might be some words and pictures they do not know and to do their best and we will discuss it afterwards.
4. Ask if they have any questions before dismissing to tables
5. Dismiss students by table group when sitting in "Active Listening" position
6. Walk around asking questions, assess prior knowledge, and encourage them to think of landforms they have talked about or seen before

Possible Questions: When on vacation or riding in a car what different things have you seen? What made you pick that picture to go with that name?

Explanation:

1. Call on tables to share where they placed certain landforms and have them explain why. (Possibly start with tables that seemed to struggled) Have other students agree or disagree using thumbs up and thumbs down. Have them explain why they feel that way.
2. Ask students if they noticed there were pictures that did not include pieces of land?
   - Explain that there are bodies of water that cover earth as well. They come in different shapes, sizes, and characteristics that make them important to know.
3. Present poster to students with correct pictures with the correct landform and bodies of water names. Discuss each word characteristics of each, and definition that accompanies each word.
4. Have students make changes on their desk if they need to

5. Walk around and observe changes being made, asking what they notice about the landforms, certain characteristics that stick out in the pictures to them.

Elaboration:

1. Explain clay activity: " I am going to pass out some materials to your table groups and each one of you is going to create a model using at least four of the landforms we talked about today."
2. "You will be using modeling clay to create the landforms that are not bodies of water and a blue marker to create the water. You may also use your markers to color parts of the land."

(Show an example using clay to create a mountain, place it on the plate, and add water in a river form with the marker)

3. Remind them that they need to show me four landforms, they can use the pictures they matched as a reference, and ask if they have any questions while passing out the materials.
4. Let them begin. Walking around asking questions, assessing understanding, help students who seem confused or stuck, repeat instructions, and attempt to keep them focused.

Questions: Asking what they are creating and why?

5. Provide feedback to students to help them succeed
6. Have students clean up and sit quietly at their desks

Related Web Site: https://www.teacherspayteachers.com/Product/Landform-Dinosaur-Review-in-English-or-Spanish-241967

Evaluation:

1. Pass out Dinosaur Landform worksheet while explaining directions
2. "On this sheet, there are shapes on the dinosaur that are similar to the shapes of the landforms we have learned. The red arrows point to a landform and the purple arrows point to bodies of water. You are to use all the words in the word bank to label them. You are to work on this on your own and when you are done I would like you to turn it in and sit quietly on the carpet. If you have any questions raise your hand."
3. Walk around and answer any questions.

Assessment (1)

Student Learning Outcome **(Cognitive Learning Objective):**	**Description:** Describe the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.

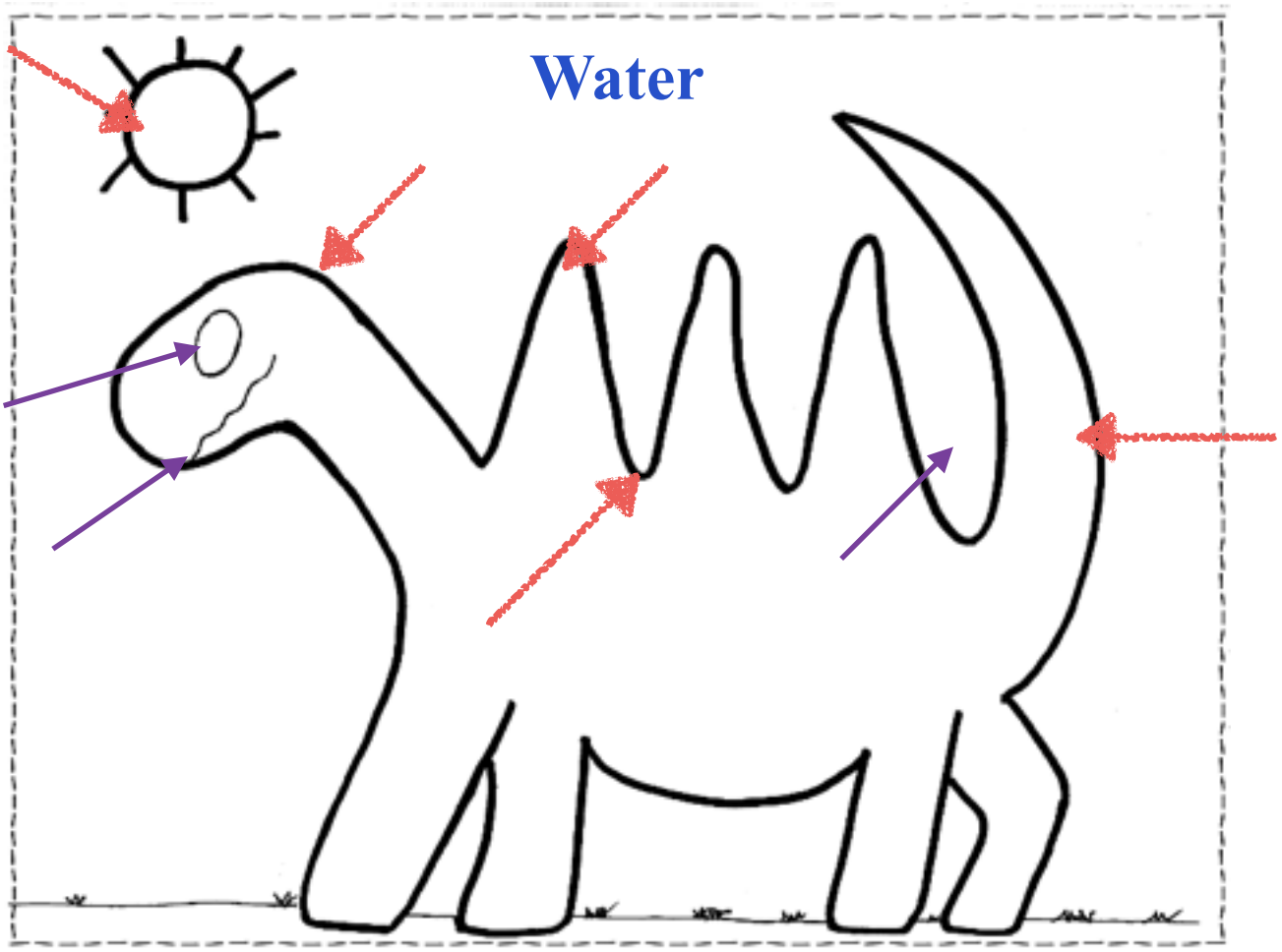
Identify the shape and characteristics of a set list of different landforms in an area	Students will complete a dinosaur landform worksheet by labeling landforms off the shape and characteristics.	What I am looking for is if students can accurately label the different landforms on the dinosaur worksheet using the different shapes and characteristics of the landforms.	85% of the students (17 Students) will be able to successfully label each landform correctly.

Assessment (2)

Student Learning Outcome **(Psychomotor or Affective Learning Objective):**	**Description:** Discuss the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.
Design a model of landforms when given clay, markers, a paper plate, and a list of landforms.	Distribute materials and observe students creating the landforms with clay and markers on a plate.	What I am looking for is that students can accurately create a model using their clay and markers that show landforms with common characteristics and similar shape to them in the environment.	90% of students (17 students) will be able to accurately create a model showing acceptable forms of the landforms.

TEACHING MODELS and LEARNER ACTIVITIES:
Check all that apply.

	Teaching Model(s)		**Activity Type(s)**
X	5E	X	Individual
X	Cooperative Learning	X	Small Group
	Direct Instruction		Whole Class
	Presentation		Outside of Class
	Problem-Based Instruction		Other
X	Discussion		

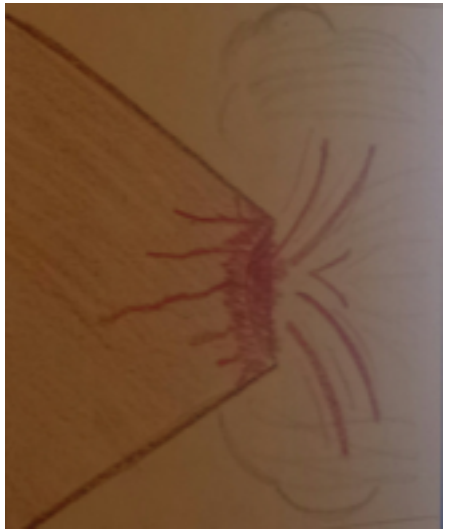
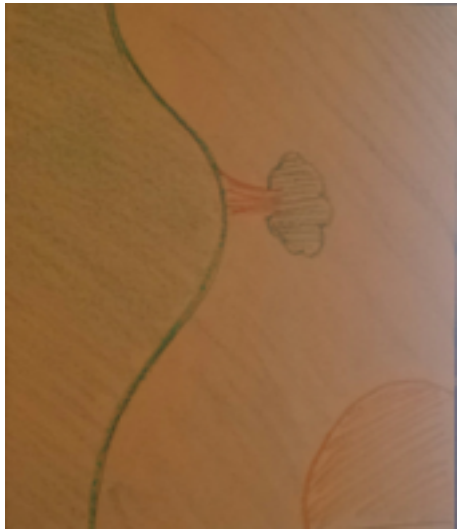


Directions: Label each area with an arrow. The red arrows show landforms and the purple arrows show bodies of water. Use the words below.

Find and Label

Island
Mountain
Valley
Peninsula
Bay
River
Lake
Hill

Landform and Bodies of Water Matching Activity




Peninsula-An area of land that is surrounded by water on three sides.

Valley- Low land that is surrounded or in between hills or mountains.

Mountain- A tall, rocky area that is much taller than the surroundings.

Hill- A raised area of land that is not as tall or rocky as a mountain.

Island- An area of land that is surrounded by water on all sides.

Bay- A body of water that has land on three sides.

Volcano-a mountain or hill that has or has had lava or gas erupt from the earth's core.

Lake- A large body of water surrounded by land on all sides.

River- A large flowing body of water that usually empties or leads to an ocean or sea.

5E Learning Cycle Lesson Plan
Lesson Plan Title: Introduction to Erosion

Student Teacher (Block B Student)
Mrs. Thibault

University Supervisor/ Cooperating Teacher

Grade Level/Subject
2nd/Science

Unit Title
Landforms and Erosion

Lesson Length (hours/days)	
Date(s)	
In-Class Time Period	50 Minutes
Out-of-Class Time (homework/ collaboration)	

Area(s) of Science (From NGSS/DCI's) – Circle one

Earth Space Science

Life Science

Physical Science

NEXT GENERATION SCIENCE STANDARD(S)

Performance Expectation(s):
2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

Science and Engineering Practices:	Disciplinary Core Idea(s):	Crosscutting Concepts:
Constructing Explanations and Designing Solutions *Make observations from several sources to construct an evidence-based account for natural phenomena.	Earth Materials and Systems *Wind and water can change the shape of the land	Patterns *Patterns in the natural world can be observed Stability and Change *Things may change slowly or rapidly

Connections to CCSS Literacy in Science:
W.2.8 Recall information from experiences or gather information from provided sources to answer questions.
SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
Literacy Objective:
Students will be able to accurately describe their results and new learned information in written words in their science journals.

OBJECTIVES (Intended Learning Outcomes) **please write as list**.

Cognitive: Students will understand what erosion is, what erosion does, and at least two different types of erosion.

Psychomotor: Students will construct a model of erosion using graham cracker crumbs, cake mix, half/half, and chocolate syrup.

Affective: Students will recognize the relevance of erosion.

ACCOMMODATIONS/MODIFICATIONS FOR DIVERSE LEARNERS (based off of Contextual Factors):

- Strategic grouping of students to reduce distractions and messes.

MATERIALS **Attach <u>all</u> materials, i.e., handouts, worksheets, etc., needed to teach this lesson.**

- Square shallow tubs
- Dirt
- Spray bottle
- Ice cubes
- Straws
- Graham cracker crumbs
- Chocolate cake mix
- Half/Half
- Chocolate Syrup
- Blue food coloring
- Squeeze bottles
- 2 in. PVC pipes
- YouTube video
  http://youtu.be/J-ULcVdeqgE
- Sets of numbered cards 1-4

PREPARATION **Describe any advance preparations for the lesson.**

- Have dirt in square shallow tubs
- Mix blue food coloring with half/half
- Graham cracker crumbs, cake mix, and half/half portioned out
- Chocolate syrup in squeeze bottles

Safety Rules:

- Leave the iPad on your lap
- Leave dirt in tubs. Do not put the dirt near your mouth, ears, eyes, or nose.
- Leave materials on desk do not walk across classroom with any of the materials.
- Do not put any of the materials near mouth, eyes, nose, or ears even though some of it is food.

5E LEARNING CYCLE PROCEDURES:

Engagement:

- With students on carpet review landforms.
- Ask students if they know how some of the landforms are created.
- Tell story about driving to the mountains and seeing the Caution: Falling Rock signs and being confused of how the rocks could fall off a mountain.
- Ask students if they have any ideas of how the rocks could fall

Exploration:

- Explain to students that we are going do some exploring with some dirt and some different materials to see if changes can be made to a hill.
- Tell students that the dirt is to stay in the bins that it is in and not to put it near their mouth, eyes, nose, or ears.
- They will need their science journals to record
- Group students strategically to mix performing levels and personalities.
- Have the groups move to a table group
- Explain that there is a bin of dirt that they will form into a hill.
- They will begin with the straw that they will blow through onto their hill and record what happens.
- Next, they will slide the ice cube down the hill and record what happens
- Finally, they will spray the water bottle on the hill and record what happens.
- Ask students to write in their journal what they think the straw, ice, and spray bottle represent.

Explanation:

- Bring students back to carpet and have them bring their science journals
- Using pair share have students share with their partner what happened to each hill. Switch partners after they share one hill result.
- With another partner have them share what they thought the materials represented

- In whole class instruction, explain that over time wind, water, and ice will wear away rock, move sand and dirt, and make changes to the landforms.
- Have students share out loud what the materials represented now that they know that wind, water, and ice can cause erosion or change in the land.
- Show the Bill Nye Erosion YouTube video
- Ask students to write down in one sentence one thing they learned from the video. Have a few students share.
- Ask students if they think erosion affects anything around it

Elaboration:

- Have students return to same table groups for the next activity
- Hand out number cards 1-4 for each group of 4 (if a group of 3 or 5 students will share jobs)
- Hand out bins, pvc pipe, glue,graham cracker crumbs, and cake mix.
- Ask student with card 1 to glue pvc to bottom of bin towards the edge.
- Have students draw and describe this phase in science journal.
- While it dries have students guess what it is going to be and why they think that
- Have student with card 2 to fill the bin up with the graham cracker crumbs and cake mix till it is flat and level with the pvc pipe.
- Have students draw and describe this phase in science journal
- Hand out half/half and have student 1 pour into the center of the pvc pipe.
- Ask the students what they think it is now.
- Have students draw and describe this phase in science journal
- Have student 3 build a mountain out of the graham cracker and cake mix
- Have students draw and describe this phase in science journal
- Ask students what will happen if it began to erode. Ask what will happen to the lake.Have them write a prediction in science journals.
- Have student 4 squeeze the chocolate syrup over the mountain.
- Give them directions to keep all the syrup in the bin and if they cannot handle the job behaving properly their job will be given to someone else.
- Have the students draw a picture and record what happened to the hill and the lake
- Wait 2 minutes and have them record changes overtime.
- Have student 3 bring bins to the back sink

Related Web Site: http://youel2grade.blogspot.com/2010/03/erosion-experiment.html

Evaluation:

- Handout worksheet and have students complete.
- When they are done have them turn it in.
- Have students come to the carpet
- Discussion:
    - What is erosion?

- What can cause erosion?
- Does erosion always look the same?
- What does erosion change?
- Why is this important?

Assessment (1)

Student Learning Outcome **(Cognitive Learning Objective):**	**Description:** Describe the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.
Students will understand what erosion is, what erosion does, and at least two different types of erosion.	Worksheet	The number of questions properly answered . Each question is worth 1 point for a total of 4 points. Only used to assess understanding, not given grade.	90% of students will accurately answer all questions.

Assessment (2)

Student Learning Outcome **(Psychomotor or Affective Learning Objective):**	**Description:** Discuss the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.
Psychomotor: Students will construct a model of erosion using graham cracker crumbs, cake mix, half/half, and chocolate syrup.	Pictures and results in science journal	Students pictures will look like the different phases of model with description underneath.	95% of students will have pictures and descriptions included and accurate.

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TEACHING MODELS and LEARNER ACTIVITIES:
Check all that apply.

	Teaching Model(s)		**Activity Type(s)**
X	5E		Individual
X	Cooperative Learning	X	Small Group

	Direct Instruction	X	Whole Class
	Presentation		Outside of Class
	Problem-Based Instruction		Other
X	Discussion		

Name:_____

What is erosion? _____

_____

What does erosion do? _____

_____

List two things that cause erosion:

1. _____

2. _____

5E Learning Cycle Lesson Plan
Lesson Plan Title: Slow Erosion-Wind

Student Teacher (Block B Student)
Mrs. Thibault

University Supervisor/ Cooperating Teacher

Grade Level/Subject
2nd Grade/Science

Unit Title
Introduction to Landforms and Erosion

Lesson Length (hours/days)	
Date(s)	
In-Class Time Period	55 minutes
Out-of-Class Time (homework/ collaboration)	

Area(s) of Science (From NGSS/DCI's) – Circle one

Earth Space Science

Life Science

Physical Science

NEXT GENERATION SCIENCE STANDARD(S)

Performance Expectation(s):
2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of land
2-ESS1-1 Use information from several sources to provide evidence that Earth's events can occur quickly or slowly.

Science and Engineering Practices:	Disciplinary Core Idea(s):	Crosscutting Concepts:
Constructing Explanations and Designing Solutions *Compare multiple solutions to a problem Developing and Using Models *Develop a model to represent patterns in the natural world	Earth Materials and Systems *Wind and water can change the shape of land Optimizing the Design Solution *Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	Patterns *Patterns in the natural world can be observed Stability and Change *Things may change slowly or rapidly
Connections to CCSS Literacy in Science: SL.2.1. Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. **Literacy Objective:** Students will be able to orally express what they have learned and their opinion in small group and whole class discussion.		

OBJECTIVES (Intended Learning Outcomes) **please write as list**.

Cognitive: Students will understand that there are multiple solutions to a problem.

Psychomotor: Students will construct a solution to prevent wind erosion on a smaller model using wet soil and sand.

Affective: Students will develop an understanding of the importance of testing several solutions to a problem

ACCOMMODATIONS/MODIFICATIONS FOR DIVERSE LEARNERS (based off of Contextual Factors):

- Pair students with high level learner paired with low level learner

MATERIALS **Attach <u>all</u> materials, i.e., handouts, worksheets, etc., needed to teach this lesson.**	**PREPARATION** **Describe any advance preparations for the lesson.**
• Fan • Large confetti • Pie pans/trays • Sand • Soil • Water • Large cups • Straws • Recycled material, cardboard, other building materials • String • Scissors • watering can	• Have building materials together

Safety Rules:

- Do not throw confetti at each other
- Do not put soil or sand near theirs or their partners eyes, nose, ears, or mouth
- Walk with scissors properly
- Do not run to get supplies
- Do not fight for supplies

5E LEARNING CYCLE PROCEDURES:

Engagement:

- Begin with students on the carpet
- Ask students if they remember what some of the things that cause eroding are.
  - Looking for water, wind, and ice. If more are said build on their answers
- Turn on fan in oscillating position in order for all students to feel it.
- Ask students what the fan feels like. Ask if it feels like water, ice or wind.
- Now turn the fan off and hand each student a handful of large confetti
- Ask the students to hold their hands out with the confetti and turn on the fan again.
- Have them observe what is happening to the confetti
- Turn off the fan and ask if they have ever seen wind move stuff around?
- Have a few share their answers.

Exploration:

- Arrange students in pairs with a higher level learner with a lower level learner. Have them go to a desk
- Pass out to each group:
  - Pie pan
  - Sand
  - Soil
  - Large cup
  - Straws
- Tell students to keep dirt and soil in the pie pan and away from their mouth, ears, eyes, and nose.
- Have students mix the sand and soil together. Using a watering can wet the mixture.
- Have the students mix the water in and pack into cup. Turn the cup over into the pie pan to make a hill like structure (kind of like a sand castle).
- Now that they have their structure have them take turns using a straw and blowing on their structure
- Have them change the strength of their blowing and the direction.
- Have them record in their science journals which way did the least damage and which way made the most

.

Related Web Site: http://www.education.com/science-fair/article/erosion-experiment/

Explanation:

- Have students transition to carpet.
- Using pair share have students share results with someone outside of their pair group.
- Have some groups share. Why do they think the results happened that way?
- Remind them that in the last lesson Bill Nye had said wind erosion occurs by sand and particles in the wind eroding pieces of rock off.
- Ask them if they think landforms can be ruined by wind? If it would be quick or take a long time? Have them refer to their sand mountain. Did any of their mountains fall down? Would it take a lot of blowing to ruin the whole thing? How many blows do they think it would take?
- Explain that wind is a slow erosion, but it can do damage to landforms overtime.

Elaboration:

- Explain to the students that they are going to work in their pairs to create a solution to prevent wind from changing their landform. They will be able to use the materials provided to build it in anyway they want.
- The guidelines:
    - Must stand on its own without being held onto
    - Must block their hill from eroding
    - Must withstand the fan on medium speed without falling over
- Ask for any questions or confusion
- Let them know to not run in the classroom, hold scissors properly, no fighting for materials, and be creative.
- Let the students begin
- Walk around and observe for ideas, progress, and safety
- Ask questions to guide them in the right direction
- When students believe they are done, bring fan over and test their solution
- If their solution did not meet the guidelines, have them rebuild their hill if needed and try again.
- Allow enough time for students to come up with a solution (if needed to, finish the next day)
- When all students have successfully created a solution have all the students do a classroom walk to examine their peers solutions
- Bring students to the carpet.
- Discussion:
    - Were there any solutions that were similar to the one you and your partner built?

- What do you think made yours successful?
- Are there more than one solution to the problem?
- Why is it important to test the solutions after making them?
- Why do you think preventing erosion is important?

Evaluation:

Assessment (1)

Student Learning Outcome **(Cognitive Learning Objective):**	**Description:** Describe the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.
Students will understand that there are multiple solutions to blocking wind erosion.	Whole group discussion after viewing peers inventions.	Students will present reasoning of why multiple solutions are possible and why they are important.	95% of the class will show full understanding

Assessment (2)

Student Learning Outcome **(Psychomotor or Affective Learning Objective):**	**Description:** Discuss the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.
Psychomotor: Students will construct a solution to prevent wind erosion on a smaller model using wet soil and sand.	Students will create a solution using materials with a partner that will block their hill from wind erosion.	Solution stands alone, prevents wind erosion, and can withstand the fan on medium speed.	100% of students will succeed in creating a barrier.

5E Learning Cycle Lesson Plan
Lesson Plan Title: Quick Erosion-Volcano

Student Teacher (Block B Student)	University Supervisor/ Cooperating Teacher
Mrs. Thibault	

Grade Level/Subject	Unit Title
2nd Grade/Science	Introduction of Landforms and Erosion

Lesson Length (hours/days)	
Date(s)	
In-Class Time Period	60 Minutes
Out-of-Class Time (homework/ collaboration)	

Area(s) of Science (From NGSS/DCI's) – Circle one

Earth Space Science

Life Science

Physical Science

NEXT GENERATION SCIENCE STANDARD(S)

Performance Expectation(s):
2-ESS1-1 Use information from several sources to provide evidence that Earth's events can occur quickly or slowly.

Science and Engineering Practices:	**Disciplinary Core Idea(s):**	**Crosscutting Concepts:**
Developing and Using Models *Develop a model to represent patterns in the natural world Constructing Explanations and Designing Solutions *Make observations from several sources to construct an evidence-based account for natural phenomena	The History of Planet Earth *Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe.	Patterns *Patterns in the natural world can be observed Stability and Change *Things may change slowly or rapidly

Connections to CCSS Literacy in Science:
SL.2.1. Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
Literacy Objective:
Students will recall information about volcanoes after listening to an informative children's text.

OBJECTIVES (Intended Learning Outcomes) **please write as list**.

Cognitive: Students will recognize the speed of erosion that can result from a volcanic eruption.

Psychomotor: Students will conduct experiments with baking soda and vinegar to investigate the reaction similar to volcanoes.

Affective: Students will determine how effective the quick erosion of a volcanic eruption is to the surrounding land.

ACCOMMODATIONS/MODIFICATIONS FOR DIVERSE LEARNERS (based off of Contextual Factors):

MATERIALS **Attach <u>all</u> materials, i.e., handouts, worksheets, etc., needed to teach this lesson.**

- Baking soda
- Vinegar
- Small cups
- Spoons
- Granulated cylinders
- Pie pans/trays
- Small and large marshmallows
- Toothpicks
- Volcano Model
- Science Journals
- Water
- Dish soap
- Red food coloring
- *Volcano!* Bauer, M
- YouTube video
  http://youtu.be/5hE2DZdl0IA

PREPARATION **Describe any advance preparations for the lesson.**

- Have marshmallows and toothpicks portioned out in zip lock bags
- Have baking soda and vinegar portioned out in small cups

Safety Rules:
Do not drink the vinegar
Leave the glass cylinders on the trays
Do not eat the baking soda
Do not poke friends with toothpicks
Do not put marshmallows in hair, mouth, ears, nose, or eyes.
Stand an arms distance from volcano

5E LEARNING CYCLE PROCEDURES:

Engagement:

- Have students start on the carpet
- Ask students what they think of when they hear the words natural disaster?
- Have discuss with partner
- Take two different ideas and have one student on one side of the room. Put the student with the different idea on the opposite side of the room.
- Have remaining students choose a side. The middle is an option if they think something completely different.
- Ask a few students why they chose the sides they did. If students are in the middle ask them why.
- Have students come back to the carpet.
- Ask students if they remember the types of erosion we have talked about in the past few days (wind, water, and ice)
- Ask them if they think a natural disaster would cause erosion? Why or why not? Would it be quick or slow? (They should still not be completely clear what a natural disaster is)

Exploration:

- Explain to students they are going to conduct some experiments in their table groups. At their tables there will be 3 glass granulated cylinders, some baking soda, and 3 cups of vinegar in a pie pan/tray.
- Have students go back to their desks
- Have one student be the baking soda pourer, another student will be the vinegar pourer, another student will be the recorder, and the last student will be the reporter.
- Have the baking soda pourer put one spoon full of baking soda in the first cylinder.
- Next, have the vinegar pourer pour the cup labeled #1 into the cylinder
- All students should observe the reaction and help the recorder draw a picture and record how high on the cylinder the reaction went. The reporter will then share how high up. Record it on the board by table.
- Then repeat with the other two. (#2: two spoons of baking soda and same amount of vinegar as #1, #3: two spoons of baking soda and more vinegar than the last one)

Explanation:

- Bring students to carpet.
- Collect trays and bring to sink (back of room or empty table if sink isn't present)
- Ask students if they know what a volcano is? What a volcano does? Where are there volcanoes?

- Explain that a volcanic eruption is one type of natural disaster. There are also earthquakes, floods, tsunamis, hurricanes, and landslides.
- Read *Volcano!* by Marion Bauer
    - While reading discuss pictures, important facts, important vocabulary words
- Show volcano erupting video
- Ask students if their experiment looked similar to the reaction? What was the same? What was different?
- Go over what was recorded on the board and discuss which was most like a volcano and which was the least like a volcano.
- Ask them if they think natural disasters, including a volcano, could erode landforms? How? What will happen?

Elaboration:

- Explain to the students that they are going to make a volcanic eruption as a class to determine if there is erosion and damage done by natural disasters.
- First, they need to create houses and objects that might be affected by an eruption.
- Have students go back to desks and pass out marshmallows and toothpicks.
- Ask students to create houses, buildings, and other objects that may be around a volcano with the materials they have
- When they are done, they will place them around the volcano.
- Put a layer of dirt around volcano
- Have students crowd around volcano an arms length away
- Explain that in the volcano is baking soda like they used in their experiments, water, dish soap, and vinegar that just has red food coloring to make it the color of lava.
- Before beginning, with a show of hands see who thinks erosion will happen. Will it happen fast or slow?
- Pour in desired amount of baking soda and then red vinegar
- Have students observe what happened. Point out any dirt, houses, or objects moved by the “lava”
- Discussion:
    - Was there erosion? How do you know?
    - Was it a quick or slow erosion?
    - What kind of erosion do you prefer? Why?
    - Do you think other natural disasters have a quick erosion as well? Why?
    - Do you think the slow or quick erosion is easier to see? Or easier to observe?
- Explain to students that erosion of landforms can be quick or slow depending on the cause.
- No matter what the earth is changing around us from erosion
- Ask students to remind you of the causes of erosion

Evaluation:

Assessment (1)

Student Learning Outcome **(Cognitive Learning Objective):**	**Description:** Describe the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.
Students will recognize the speed and results of erosion that can result from a volcanic eruption.	Entry in science journal Prompt: What is one way a volcanic eruption affects the surrounding land? Draw a picture and explain in a full sentence	Students will identify an effect and the picture corresponds	95% of students will succeed in the journal entry

Assessment (2)

Student Learning Outcome **(Psychomotor or Affective Learning Objective):**	**Description:** Discuss the assessment used to evaluate the student-learning outcome(s).	**Criteria:** Describe criteria used to grade/score the assessment (include point values)	**Level of Mastery:** Set the level of acceptable performance using a measurable quantity.
Affective: Students will determine how effective the quick erosion of a volcanic eruption is to the surrounding land.	Discussion after elaborate phase	Student replies and observations will determine their comprehension of the content.	90% of students will participate in discussion with accurate responses

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TEACHING MODELS and LEARNER ACTIVITIES:
Check all that apply.

	Teaching Model(s)		Activity Type(s)
X	5E		Individual
X	Cooperative Learning	X	Small Group
X	Direct Instruction	X	Whole Class
	Presentation		Outside of Class
	Problem-Based Instruction		Other
X	Discussion		

Post Assessment

Matching:

Mountain	a. A raised area of land that is not as tall or rocky as a mountain
Valley	b. A tall, rocky area that is much taller than the surroundings.
Hill	c. A large flowing body of water that usually empties or leads to an ocean or sea.
River	d. Low land that is surrounded or in between hills or mountains.

Draw the 3 landforms:

Volcano	Island	Peninsula

What are three things that cause erosion:

1. _____

2. _____

3. _____

Erosion can be:

a. Quick
b. Slow
c. Both

Assessment Criteria: The worksheet has a total of 13 total points. It is either full credit or none per question. Assessment used to determine if students are ready to move on or if they need more instruction.	Level of Mastery: Students should successfully complete 95% of worksheet

Resources

15 Fun and Educational Activities for Kids. (2014, July 16). Retrieved December 3, 2015, from http://lovebugsandpostcards.com/15-fun-and-educational-activities-for-kids/

-This blog post has 15 activities for kids and they were all beneficial and could be used in a classroom. The majority were science or engineering activities, but there were math and language arts included as well. I used this resource in the creation of the volcano simulation.

Bauer, M. (2008). Volcano! New York, New York: Aladdin.

-This children's informative text is great for educating students on how volcanoes are formed and what is really happening when it erupts. I used this text in one of my lessons to help clear up the intensity and relevance of a volcanic eruption.

Bill nye erosion. (2013, September 20). Retrieved December 3, 2015, from https:// www.youtube.com/watch?v=J-ULcVdeqgE

- This Bill Nye video goes over the basics of erosion and weathering while showing it visually with experiments. I used this video to introduce erosion.

CSAV Hawaii: Archival Kilauea Volcano Eruption. (2011, July 8). Retrieved December 3, 2015, from http://youtu.be/5hE2DZdl0IA

-This video had multiple examples of how a volcanic eruption occurs. It shows the different acts of the lava and how it can be so damaging to the land around it.

It will give students a good idea of how erosion is possible from a volcanic eruption.

Erosion and Weathering. (2015). Retrieved December 3, 2015, from http://www.pbslearningmedia.org/resource/ess05.sci.ess.earthsys.erosion/erosion-and-weathering/

-PBS learning media was a helpful website that was partnered with WGBH, which is a noncommercial educational PBS member. This resources provided beautiful pictures and descriptions that deepened my understanding of erosion.

Hosmer, C. (2013, September 10). Erosion Experiment. Retrieved December 3, 2015, from http://www.education.com/science-fair/article/erosion-experiment/

- An education website that provides many resources including worksheets, games, workbooks, activities, lesson plans, and science projects.

For this unit, I used the section of science fair ideas and there was an unlimited amount. It helped create the explore phase of my slow erosion lesson. Very good resource for any teacher.

Hughes, A. (2015, September 14). Landforms Interactive Notebook Pack. Retrieved December 3, 2015, from http://www.onlypassionatecuriosity.com/Landforms-interactive-notebook-pack/

-On this website, I found an example of an interactive notebook that could be adapted into a foldable that would work for my lessons. It does give directions

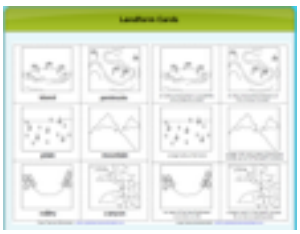
and ideas on how to use the pack they provide if you want to use the exact activity in your classroom.

Kamp, L. (2014, September 22). Learning About Landforms. Retrieved December 3, 2015, from http://www.aroundthekampfire.blogspot.com/2014/09/learning-about-landforms.html

- Around the Kampfire is a blog that is very up to date and provides plenty of ideas to use in the classroom. There are pictures of every step and links to her Tpt site where you can download the resources. This resource provided me with activities to do for landform instruction.

Kansas College and Career Ready ELA Standards Standards Documents. (2012). Retrieved December 3, 2015, from http://community.ksde.org/Default.aspx?tabid=5559

- This website was useful to connect my science lessons with the English Language Arts Common Core Standards. It is important to connect to as many subjects as possible throughout the day in order to give them a sense of relevance and more practice in the subjects in different situations.



Landform Cards. (2012). Retrieved December 3, 2015, from https://www.superteacherworksheets.com/pz-landform-cards.html

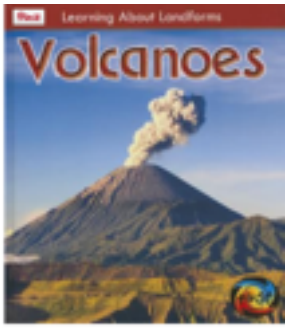
-This website provides a lot of good worksheets any teacher could use in their classroom. For me it was helpful to develop a matching game for my lesson on landforms. Although I did not use the exact worksheet it was easy to modify and make it my own.

Landform Dinosaur Review in English or Spanish. (n.d.). Retrieved December 3, 2015, from https://www.teacherspayteachers.com/Product/Landform-Dinosaur-Review-in-English-or-Spanish-241967

-Teachers Pay Teachers is a website where teachers can upload their lessons and resources for other teachers or anyone to buy for any price they choose. It is a great resource even if just looking for ideas. I used this resource to adapt and create my dinosaur worksheet for landforms.

Next Generation Science Standards. (n.d.). Retrieved December 3, 2015, from http:// www.nextgenscience.org

-This website is crucial when writing a science unit for your classroom. It has all the science and engineering standards for grades K-8 grades. It also has the connections to Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts. These are all important to include in the classroom to teach students about real world problems. I used this to write all five lessons.



Oxlade, C. (2014). *Volcanoes*. Chicago, Illinois: Heinemann Library.

-This children's educational book provides rich pictures and text to educate children on volcanoes. I used it to gain a children appropriate description of volcanoes.

Spilsbury, L. (2014). *What is a landform?* New York, New York: Rosen Publishing.

-Children's book that covers a number of landforms including mountains, hills, plateaus, canyons, and caves. Key terms are highlighted and gives definitions that are kid friendly. I used this text for definitions for instruction.

The Magic School Bus ™. (2015). Retrieved December 3, 2015, from http://www.scholastic.com/magicschoolbus/parentteacher/activities/rocks.htm

-This page was located on the scholastic website, which provided resources for parents, teachers, kids, administrators, and librarians. They have a large focus on books, but do provide activities on different areas. I did not use the activity found on this website, but I used one very similar to explore erosion.

Youel. (2010, March 23). Erosion Experiment. Retrieved December 3, 2015, from http://youel2grade.blogspot.com/2010/03/erosion-experiment.html

- Second grade teacher's blog that provides lesson ideas that she uses in her classroom. Provides a lot of pictures that are helpful to visualize what the results were. A number of her lessons can be adapted to work in other classrooms. I used this resource to improve my erosion lesson and make it engaging for the students.