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**Title Page**

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Land of Colorado

4th Grade
10-26-09 through 11-12-09
Cooperating Teacher: Paulette Phillips
UNC Supervisor: Sharon Panik

[redacted]

**RATIONALE STATEMENT**

## Section 1: Introduction

Learning about the land of Colorado is important for fourth graders because, according to Colorado Model Content Standards, the focus of Standard 4 is Earth and Space Science. Standard 4 reads "Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: geology, meteorology, astronomy, oceanography)". In grades 3-5, students are responsible for learning about fossils, how natural processes change Earth' s surface (my unit will focus a lot on this benchmark), how Earth's resources can be conserved/recycled/depleted, how weather differs, how most of the Earth's surface is covered by water (another topic addressed in my unit), water exists in different states, etc. Students need to have an understanding of the Earth around them in order to understand why things occur in the real world. In my unit, students will be learning about the following: the portion of the Earth that is covered in water versus the portion of Earth that is covered in land, how much habitable land there is in our world, different landforms found all over the globe as well as landforms found in Colorado, plate tectonics and how it changes the Earth's surface, Pangaea and continental drift, the difference between rocks and minerals, the three different rock types: sedimentary, igneous, and metamorphic, examples of each rock type, and the rock cycle (how it works).

FEEDBACK [+]

As a result of my unit, students will learn about different landforms in Colorado, but will be able to apply that knowledge to different landforms found all across the country and/or world. Anywhere they may travel, they will be able to identify any landform because they will have learned about it in my unit. Students will also learn about continental drift and how the continents came to be in the position they are in today. Students will be able to understand then why similar landforms, rocks, fossils, etc. are found in places where the continents used to be connected. Students will be able to walk away from my unit understanding the different types of rocks (metamorphic, sedimentary, igneous) as well as the difference between a mineral and a rock. This will easily be applied to the real world because they will be able to observe rocks outside on the playground as well as around their community. Students will be able to easily apply their knowledge learned in my unit to other areas of our country or our world because it is real; they can touch it, observe it, and experience it. They could use what they know to help explain the concept to family members or friends that do not understand.

## Section 2: Community, School, and Classroom Setting

The community in which I am student teaching is middle to low class community in Northern Colorado. The school where I am student teaching is a Title 1 school, so there are many low-income families who have students who receive free and reduced lunch. There is a high Hispanic population and many ESL students. Within my fourth grade classroom, there are two ESL students, several students who are on Individual Literacy Plans, and several students who have behavior issues. We have nine boys and ten girls in our class as well.

There are several students with behavior issues that I will have to take into consideration when planning and teaching my unit. These students have trouble focusing for long periods of time and because of this, tend to distract the students around them frequently. There are also several students who are very smart and complete their work faster than most. When this happens, they tend to distract those around them since they have finished their work. These two things will provide a challenge for classroom management because I will have to monitor them to make sure they are on task and not distracting others, while also making sure the needs of the rest of the students are met.

The student's desks are arranged in three groups in three or four rows. The teacher's desk is on

the right side of the room, and the computer and interactive board are located at the front of the room, on the same wall as the door. Students desks are arranged in pairs, which allows each group to have either six or eight students.

A Promethean Board (smart/interactive board) is available as well as an overhead projector. I plan on using the interactive board to show visuals as I talk about it, as well as show animations for continental drift and the rock cycle. Students can also come up to the board to move things around if need be. Important terms and definitions I want students to know will also be put on the interactive board so students can write them down in their individual notebooks.

## Section 3: Meeting the Colorado Model Content Standards

**Science Standard 4:** Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography)

- Students in Grades 3-5 will understand the natural processes that change Earth's surface, how many of Earth's resources can be conserved/depleted, how most of Earth's surface is covered by water.

Objectives:

- - Students will learn how much of the Earth's surface is covered with water and how much of the Earth's surface is covered with land
- - Students will understand how the Earth's plates move
- - Students will demonstrate an understanding of these terms: anticline, syncline, vertical fault, lateral fault
- - Students will be able to explain what is happening in different steps of the rock cycle
- - Students will be able to identify the major continental plates
- - Students will be able to explain how the continents have moved over time
- - Students will be able to describe the difference between a rock and a mineral
- - Students will understand that different minerals make up rocks
- - Students will be able to tell me (the teacher) the three rock types
- - Students will be able to explain how each rock type is formed
- - Students will understand there are three different rock types
- - Students will understand the difference between the three rock types

**Science Standard 5:** Students understand that the nature of science involves a particular knowledge and making.

Students in Grades 3-5 will be able to use models to represent events and objects.

Objectives:

- - Students will be able to understand and explain how the Earth can be related to an apple
- - Students will be able to make a model of a piece of granite
- - Students will create their own visual simulation of continental drift
- - Students will demonstrate the different ways the earth's plates move using manipulatives

**Mathematics Standard 1:** Students develop number sense and use numbers and number relationships in problem solving situations and communicate the reasoning used in solving these problems.

- Students in Grades K-5 will demonstrate meanings for whole numbers and commonly -used fractions and decimals, read and write whole numbers and know place-value concepts, use numbers to count, measure, and label, and use number sense to estimate and justify the reasonableness of solutions to problems involving whole numbers and commonly-used fractions.

Objective:

- - Students will learn how to represent the Earth in fractions

**Mathematics Standard 6:** Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers in problem-solving situations and communicate the reasoning used in solving these problems.

- - In Grades K-4 students will demonstrate conceptual meanings of the four basic arithmetic operations and be able to demonstrate fluency with these four basic operations (addition, subtraction, multiplications, division), and construct, use, and explain procedures to compute and estimate with whole numbers, and select and use appropriate algorithms for computing with whole numbers in problem-solving situations.

Objective:

- - Students will be able to compute (using a calculator) how much the continental plates have moved over time
- - Students will understand the distance = rate X time equation

**Geography Standard 1:** Students know how to use and construct maps, globes, and other geographic tools to locate and derive information about people, places, and environments. 1.1: Students know how to use maps, globes and other geographic tools to acquire, process, and report information from a spatial perspective.

- Students in Grades K-4 will identify the characteristics of maps and globes, read and interpret information from maps, models, and display information on maps and geographic models.

Objective:

- - Students will be able to label a blank map of Colorado with plains, mountains, and rivers correctly

**Geography Standard 2:** Students know the physical and human characteristics of places, and use this knowledge to define and study regions and their patterns of change.2.1: Students know the physical and human characteristics of places.

- - Students in Grades K-4 are able to identify and clarify the characteristics of places as human or physical and describe how human and physical processes together shape places.

Objective:

- - Students will learn what inhabitable land vs. uninhabitable land is

**Geography Standard 3:** Students understand how physical processes shape Earth's surface patterns and systems. 3.1: Students know the physical processes that shape Earth's surface patterns.

- - Students in Grades K-4 will be able to identify the components of Earth's systems and their characteristics, explain how Earth-Sun relationships shape climate and vegetation patterns, and describe how features on Earth's surface are shaped by physical processes.

Objectives:

- - Students will understand how different thing happen to the earth's surface depending on how the plates collide or separate
- - Students will be able to describe in detail the three landforms found in Colorado

**Geography Standard 5:** Students understand the effects of interactions between human and physical systems and the changes in meaning, use, distribution, cooperation, and conflict. 5.3: Students know the changes that occur in the meaning, use, location, distribution, and importance of resources.

- - Students in grades K-4 will describe the role of resources in daily life, identify the characteristics of renewable and nonrenewable resources, and identify spatial distribution of resources.

Objectives:

- - Students will know the three landforms found in Colorado
- - Students will understand how the rock cycle works

**Geography Standard 6**: Students apply knowledge of people, places, and environments to understand the past and present and to plan for the future. 6.2: Students know how to apply geography to understand the present and plan for the future.

- - Students in grades K-4 will describe issues in communities from a spatial perspective.

Objectives:

- - Students will understand how the rock cycle works
- - Students will understand how different thing happen to the earth's surface depending on how the plates collide or separate

## Section 4: Assessing Student Learning

Throughout my entire unit, I will use several different strategies to pre-assess my students as well as assess them during the lesson, and formally assess them after the conclusion of the lesson. This will take place for not only the Science standards 4 and 5, but the Mathematics standards 1 and 6, and Geography standards 1, 2, 3, 5, and 6 as well.

**Pre-assessment:** To pre-assess my students in all of my lessons, these are the techniques I will use: Pre-test- at the beginning of my unit, students will take a pre-test that covers all the material I plan on teaching in my unit. Questioning- I will ask students to tell me what they already know about the subject. Discussion- students will discuss with me, as the teacher, as well as their classmates what they already know about each science subject, as well as their prior knowledge about the social studies (specifically geography) and math that is integrated into my lessons, before the beginning of the day's activity or demonstration. Using models to make predictions- In a few of my lessons, the first thing students are engaged in is coming up with an explanation for a question I pose; they can come up with this explanation by looking at an atlas, globe, or scientific model.

**Formative assessment:** To assess my students as they are learning, there are a couple strategies I will use: Discussion- while students are completing the activity, I will ask guiding questions as well as deeper level questions to keep students thinking. This will also help me informally determine if students have an understanding of the new material and if they are able to build on this new knowledge. Asking questions- as I am teaching, I will allow students to ask me questions. This will allow me to see if there is a concept I need to explain more thoroughly or if I can introduce more new material to increase their knowledge of that particular day's lesson. Activities- students will be involved in several different activities during my unit that will allow me informally assess them during the lesson. I will be able to see, based on how they are completing the activity, if they understand the concept being taught or if they are struggling. Most of my formative assessment will be informal during the lessons.

**Summative assessment:** To assess my students formally at the end of the lesson, I will usually collect something to grade. Worksheets/activities- in several of my lessons in my unit, students will work on completing worksheets during the lesson and turn them in at the end. I will develop a rubric to grade the activities that are not worksheets, such as a map activity or an activity in which students were creating a representation of a piece of granite. Discussion- at the end of every lesson, I will allow time for wrap-up of the day's lesson as well as discussion and review of what students learned. I will not provide any new information during this time but will have students tell the class and me what they know now as a result of my lesson. At the end of my unit, students will complete the pre-test that they completed at the beginning of my unit. It will be the same, only they will receive a grade for it. This will truly allow me to see how much growth my students have made during my unit.

## UNIT GOAL

Students will learn and understand how the Earth's processes (such as plate tectonics and continental drift) occur, as well as how Earth's processes are interrelated. Students will understand the geography of the Earth and the state of Colorado, including the landforms found in Colorado. Through this, students will learn about the different rock types and the rock cycle. Starting about 500 million years ago to present day, I want my fourth graders to understand how continental drift and plate tectonics caused the Earth to look as it does today, as well as understand how far the continents had to travel and how much of the Earth is covered in water compared to how much is covered in land.

## LESSON PLANS

**Day 1: Land of Colorado: If the Earth Were an Apple**

Name: [redacted] Date Taught: 10/26/09 Cooperating Teacher: Phillips

Grade: 4th Subject: Science, Math (Colorado landforms, fractions)

**Big Understanding:** This is a brand new science unit for my students, so my hope through this activity is that students will gain an understanding of the Earth itself and the Earth's natural resources. In learning this, then students will be more ready to learn about Colorado specifically, and the landforms found in Colorado. This activity will also give students a real life perspective on the size of the land we live on compared to the size of the whole world, and my hope is they will gain an understanding of the size of the Earth itself also. I want students to start thinking about the land around them and gain a curiosity about how the Earth was formed and how that affected where they live today. This will prepare them for the upcoming lessons that are more narrow in scope and focus more on Colorado and it's landforms.

**Materials Needed:**

- - 19 copies of Colorado Landforms pre-assessment
- - 19 paper plates

- - Assorted markers, colored pencils, etc.
- - Apple
- - Cutting Board
- - Paring knife
- - Atlases
- - Globe

**Resources Used:**

- - Land of Colorado unit, FOSS Science Kits

**Colorado Model Content Standards:**

**Science:**

Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography)

- o Students in Grades 3-5 will understand the natural processes that change Earth's surface, how many of Earth's resources can be conserved/depleted, how most of Earth's surface is covered by water.

Standard 5: Students understand that the nature of science involves a particular knowledge and making.

- o Students in Grades 3-5 will be able to use models to represent events and objects.

**Mathematics:**

Standard 1: Students develop number sense and use numbers and number relationships in problem solving situations and communicate the reasoning used in solving these problems.

- o Students in Grades K-5 will demonstrate meanings for whole numbers and commonly - used fractions and decimals, read and write whole numbers and know place-value concepts, use numbers to count, measure, and label, and use number sense to estimate and justify the reasonableness of solutions to problems involving whole numbers and commonly-used fractions.

**Geography:**

Standard 5: Students understand the effects of interactions between human and physical systems and the changes in meaning, use, distribution, cooperation, and conflict. 5.3: Students know the changes that occur in the meaning, use, location, distribution, and importance of resources.

- o Students in grades K-4 will describe the role of resources in daily life, identify the characteristics of renewable and nonrenewable resources, and identify spatial distribution of resources.

Standard 6: Students apply knowledge of people, places, and environments to understand the past and present and to plan for the future. 6.2: Students know how to apply geography to understand the present and plan for the future.

- o Students in graded K-4 will describe issues in communities from a spatial perspective.

**Lesson Objectives:**

- - Students will be able to understand and explain how the Earth can be related to an apple
- - Students will learn how much of the Earth's surface is covered with water and how much of the Earth's surface is covered with land
- - Students will learn what inhabitable land vs. uninhabitable land is
- - Students will learn how to represent the Earth in fractions
- - Students will complete a pretest about their knowledge of Colorado, it's landforms, and the rock cycle

**Engagement:**

Students will become engaged in the lesson by completing a pretest about Colorado landforms, the rock cycle, and how the Earth was formed. This is the formal pre-assessment. I will tell them this test will help me understand what they already know and what they don't know so I can teach them the right things. After the pretest in completed, I will introduce students to our new unit on Colorado Landforms and tell them we will be learning some interesting things about how the Earth was formed. I will focus their attention on today's activity by asking them to think about how an apple can be used to help us learn more about the Earth itself. I will open up this lesson by allowing them to look at a globe

and atlases and think about how an apple can be used to help us understand the Earth. After a few minutes, I will take comments and ideas. I will use this as an informal pre-assessment as well. Then I will tell them that they will be learning how much of the Earth is covered with water and how much is covered by land as I cut up my apple in front of them.

**Investigation:**

The lesson will begin by students looking at atlases and globes and discussing how both can be better understood by using an apple. Then I will divide up an apple in a demonstration while the students watch. Along the way, I will be discussing with the class how each division of the apple represents a portion of the Earth, whether it is land or water. I will encourage students to share their thoughts as they observe what I am doing. After the entire apple is divided up, I will set it up on the ground so all the students can see. I will have students show me, by moving the pieces of the apple around, how much of the apple represents water on the Earth and how much represents land. This will serve as an informal formative assessment so I can see what students learned from the apple demonstration. After the apple slices have been correctly arranged, I will tell students they are now going to draw fraction representations on paper plates to show me what they know about the Earth's land and water. I will relate this to our pie graph discussion from a previous math lesson. Before allowing them to work individually, I will show on our Promethean board (smart board) the apple representation so students can view it as the work on the paper plate activity.

**Explain/Clarify:**

After students have watched the apple demonstration and discussed how each fraction of the apple represents a part of the Earth, they will each be given a paper plate to draw their fraction representations on. They will have to label each section of their paper plate as land, water, inhabitable land, and uninhabitable land. This will serve as formal summative assessment as I will collect these and be able to see if students understood how to transfer the apple information to a fractional representation, but also if they learned what portion of the Earth is water and land. Before collecting paper plates, I will ask students to share with me what these paper plate representations show us and how it can help us understand the Earth and it's natural resources. Here I will define new vocabulary such as natural resources, habitable, and uninhabitable. I will ask students what is the proportion of actual drinking water, habitable land, and productive areas on Earth, how the Earth's natural resources are diminishing, and how does the proportion of land to water on Earth become more significant to us?

**Lesson Closure:**

To bring the lesson to a close, I will tell students that what we learned today will help us understand Colorado itself and Colorado landforms. It will also help us understand the importance of taking care of where we live and recycling, as a real life example, because so little of the Earth is able to support all the life that lives on it currently. I will tell students we can use this information in our lives now. Lastly, I will tell students that we will be learning about the Earth's landforms and Colorado's landforms tomorrow.

**Teacher Notes:**

Check that Promethean board is working properly to show a visual representation. Students will be working with fractions so I will walk around and make sure they have a solid understanding of what they are doing before getting to far into their representations. I will also make sure all new vocabulary is defined so no students are confused.

**Days 2 & 3: Land of Colorado: Our Landforms**

Name: [redacted] Date Taught: 10/27/09-11/2/09

Cooperating Teacher: Phillips

Grade: 4th Subject: Science, Geography (Colorado landforms, fractions)

**Big Understanding:** Students may be somewhat familiar with different landforms, especially if they have lived in different places (not only in Colorado but other states as well). Through this lesson and activity, students will gain a better understanding of the different types of landforms found around the country/world as well as understand the three major landforms that are found in Colorado specifically. Through a jigsaw activity, students will become experts on one of the three landforms (mountains, plains, or plateaus) and report to the class what they learned about that landform. Students will also learn about the other two landforms from their classmates as each group has a chance to share. This should get the students thinking about the land around them and how it is similar or different than land in other states or other places around the world. They will also learn which landforms exist outside Colorado (such as desserts, barrier islands, etc.).

**Materials Needed:**

- Article from Anchor book about different landforms
- 6 “Our Landform” posters (1 for each group)
- Colored markers, pencils, crayons
- 19 blank Colorado outlines
- Supplemental information about mountains, plateaus, and plains

**Resources Used:**

- Land of Colorado unit, FOSS Science Kits

**Colorado Model Content Standards:**

**Science:**

Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth’s systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography

- Students in Grades 3-5 will understand the natural processes that change Earth’s surface, how many of Earth’s resources can be conserved/depleted, how most of Earth’s surface is covered by water.

**Geography:**

Standard 1: Students know how to use and construct maps, globes, and other geographic tools to locate and derive information about people, places, and environments. 1.1: Students know how to use maps, globes and other geographic tools to acquire, process, and report information from a spatial perspective.

- Students in Grades K-4 will identify the characteristics of maps and globes, read and interpret information from maps, models, and display information on maps and geographic models.

Standard 2: Students know the physical and human characteristics of places, and use this knowledge to define and study regions and their patterns of change.2.1: Students know the physical and human characteristics of places.

- Students in Grades K-4 are able to identify and clarify the characteristics of places as human or physical and describe how human and physical processes together shape places.

**Lesson Objectives:**

- Students will be able to describe the different landforms found around the world.
- Students will know the three landforms found in Colorado
- Students will be able to describe in detail the three landforms found in Colorado
- Students will be able to label a blank map of Colorado with plains, mountains, and rivers correctly

**Time Required: 2 days (1 hour 30 minutes)**

**Engagement:**

In order to engage students in the lesson, I will ask them what types of landforms they know about and I will have them tell me what they know about those different types of landforms. This will serve as informal pre-assessment as I gauge whether or not students understand what a landform is, which landforms they are familiar with, and if they know what landforms are found in Colorado. I will read an article from the Anchor book about the different landforms. After reading the article, I will tell students that today they will become an expert about a particular landform and they will be responsible for teaching the rest of the class about their landform. This will take place during the first day.

**Investigation:**

To begin the lesson during the first day, students will have a discussion about familiar landforms and how they are different. All different landforms will be discussed as I read a short blurb about each. I will have students focus their attention on the three landforms specific to Colorado- plains, plateaus, and mountains. I will have students listen to an article about different landforms. After reading the article, students will be divided into groups of three. I will assign each group a landform specific to Colorado. There will be two groups for each landform since there are only three major landforms in Colorado- plains, mountains, and plateaus. Groups will work together to come up with an accurate description to teach the class, as well as an example of that landform found in Colorado, and draw an accurate picture. This will likely not be finished fully during the first day, so during the second day I will open my lesson by having students reiterate what we were learning about the last time we were together. Then I will have students gather in their groups and finish their posters. After the groups have completed their posters, each group will teach the class about their landform. This method of learning about one specific subject and sharing that knowledge with everyone else is called jigsawing. As students are sharing their posters, this will serve as informal formative assessment as I listen to them to see whether each partner is able to participate in the discussion of their topic. When I collect the posters I will be able to formally

**Explain/Clarify:**

After all posters have been shared during the second day, each group will be required to state one thing they learned from each of the other groups. They will report it to me. This will serve as informal summative assessment as I will be able to tell if students were paying attention to their classmates and whether their answers are superficial or meaningful. If time allows after sharing, I will have students work in pairs to begin completing a map of Colorado, labeling the plains, rivers, and mountains. They will be given three maps, on each map a different landform will be labeled. I will explain which each map tells them and how to use it. Students will be responsible for filling their blank map out by correctly looking at the maps I have given them. This activity will be finished at the beginning of the next lesson if there is not enough time to complete it. This will serve as formative assessment for the next day's lesson because I will be able to see what students remembered from this lesson.

**Lesson Closure:**

In order to measure what they learned, I will send a worksheet home for homework. Students will need to write a brief description of each landform on their own. This will go home with them after the second day of instruction since students will have more time to review the different landforms. I will tell them it is important for them to learn the different landforms, especially the ones found in Colorado, because this will help them understand what we will continue talking about in future lessons and it will help them better understand how we use the resources we have. It will also serve as a starting point for our next lesson, which deals with continental drift and how the continents were formed. This definitely includes how the different landforms formed.

**Teacher Notes:**

I really want students to understand the different landforms, especially the ones in Colorado so I will have to place more emphasis on those three specifically. I will also have to make sure students are grouped appropriately so they work well with their teammates in the time given to them.

## Day 4: Land of Colorado: Continental Drift & Tune into Geology

Name: [redacted] Date Taught: 11/3/09 Cooperating Teacher: Phillips

Grade: 4th Subject: Science, Math, Social Studies

**Big Understanding:** When beginning to understand the formation of the Earth and the continents, it is very important to learn about continental drift and how the Earth once looked compared to how it looks now. In this lesson, students will be learning about how the continents have moved over millions of years since the Earth wa formed, and how at one time the continents were all connected in one big "super continent". Students will be looking at maps of the different continental plates as well as creating a "television strip" that will serve as a visual simulation of how the continents have moved and changed over time. Students will also be learning the equation for distance = rate X time to figure out how much each continent moves per year. As in previous lessons in this unit, students will also be learning about the social studies portion of Colorado landforms by studying how the movement of continents affects the geography of not only each individual continent but the world as a whole.

**Materials Needed:**

- - Earth Movement Anchor Book from FOSS kit
- - 19 copies of Tune into Geology activity
- - Earth's Major Plates poster/visual representation
- - Scissors
- - Tape

**Resources Used:**

- - Land of Colorado unit, FOSS Science Kits

**Colorado Model Content Standards:**

**Science:**

Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography)

- o Students in Grades 3-5 will understand the natural processes that change Earth's surface, how many of Earth's resources can be conserved/depleted, how most of Earth's surface is covered by

water.

Standard 5: Students understand that the nature of science involves a particular knowledge and making.

- Students in Grades 3-5 will be able to use models to represent events and objects.

**Geography:**

Standard 3: Students understand how physical processes shape Earth's surface patterns and systems. 3.1: Students know the physical processes that shape Earth's surface patterns.

- Students in Grades K-4 will be able to identify the components of Earth's systems and their characteristics, explain how Earth-Sun relationships shape climate and vegetation patterns, and describe how features on Earth's surface are shaped by physical processes.

Standard 6: Students apply knowledge of people, places, and environments to understand the past and present and to plan for the future. 6.1: Students know how to apply geography to understand the past.

- Students in Grades K-4 will be able to describe how places change over time and describe how places and environments have influenced events over time.

- 6.2: Students know how to apply geography to understand the present and plan for the future. In Grades K-4 students will be able to describe issues in communities from a spatial perspective.

**Mathematics:**

Standard 6: Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers in problem-solving situations and communicate the reasoning used in solving these problems.

- In Grades K-4 students will demonstrate conceptual meanings of the four basic arithmetic operations and be able to demonstrate fluency with these four basic operations (addition, subtraction, multiplications, division), and construct, use, and explain procedures to compute and estimate with whole numbers, and select and use appropriate algorithms for computing with whole numbers in problem-solving situations.

**Lesson Objectives:**

- - Students will be able to identify the major continental plates
- - Students will be able to explain how the continents have moved over time
- - Students will be able to compute (using a calculator) how much the continental plates have moved ove time
- - Students will understand the distance = rate X time equation
- - Students will create their own visual simulation of continental drift

**Engagement:**

To begin my lesson I will ask students if they have ever looked closely at the continents and noticed how they look like they could fit together. I will tell students that a long time ago, based on what scientists have studies about continental drift, all the continents in the world used to be one large supercontinent. This supercontinent was called Pangaea. I will show students a flipchart on our Promethean board (smart board) that has a picture of Pangaea and the continents as they are today. I will ask students to think about and come up with an explanation about what they think happened and why that happened.

**Investigation:**

After students are allowed to think about what they think happened to explain how the continents moved, I will introduce the idea of continental drift. Students will be shown a picture of the Earth's major plates as I read the article "What Forces Shape the Earth's Surface". After reading the article, we will discuss as a class what the Earth looked like at different points in the past. I will supply the information that it is estimated the slowest plate moves about 1 cm a year and the fastest plate moves about 10 cm a year. I will ask students to think about if we know what the continents looked like during Pangaea, and we know what the continents look like now, and we know how much time passed between these two stages, can we figure out how far the continents moved? I will take some ideas and then introduce the equation for distance, distance = rate X time. As a class, we will figure out the distance the slowest moving plate moved as well as the distance the fastest moving plate moved. There will be no informal or formal pre-assessment for this lesson.

**Explain/Clarify:**

After explaining continental drift, students will be able to see it in action through the activity "Tune into Geology". They will cut out strips that show the continents in different stages beginning 500 million years ago. Each student will cut out their strips and attach them together using tape or glue. I will help students cut slits in the "television screens" they cut out so they can slide their paper strip into the slits once they are completely finished. The last step is to predict what the continents will look like in the future, in the next 500. Students will

draw three representations of what they think the continents will look like. I will have students use the equation d= r X t to figure out how much the continental plates might move in the next 500 million years. Lastly, students will insert their paper strip into their "tv" and move it so they can see how the continental plates and continents have moved over time. As I walk around and monitor what students are doing, I will ask them questions about what they are learning as they complete this activity. This will serve as an informal formative-assessment.

**Lesson Closure:**

To close the lesson, I will have students explain how they know that the continents were not always in the place they are now on the Earth's surface. This will serve as informal summative-assessment as I gauge whether students need more practice with this idea or if they understand the theory of continental drift. I will tell student we will be learning about the different ways these continental plates move in the next lesson and this will help them understand the different land formations on the Earth's surface, including those found in Colorado.

**Teacher Notes:**

I will need to spend some time explaining continental drift because it is a trick y idea to understand and I don't want students walking away from the lesson with the wrong idea or misinformation. A hands on activity would be ideal so I might look for one.

**Day 5: Land of Colorado: Peanut Butter and Jelly Geology**

**Name:** [redacted] **Date Taught: 11/5/09** **Cooperating Teacher: Phillips**

**Grade: 4th** **Subject: Science, Geography (Colorado landforms)**

**Big Understanding:**

**Students have been learning about the different landforms in Colorado, so now it's time to learn how they are formed and the big processes behind the formation of them. Students should already have an understanding about the different plates on the Earth's surface and have an understanding of how they move, so they will be able to explore what happens when plates move. Students will explore how mountains and other landforms are formed by a hands-on activity. This should help them understand how a different landforms is created when two plates collide versus move apart, or when one sub ducts beneath another versus when they move alongside one another.**

**Materials Needed**

- **- 19 slices of white bread**
- **- 19 slices of wheat bread**
- **- 19 slices of darker wheat bread/rye**
- **- Crunchy peanut butter**
- **- Jelly**
- **- Plastic knife**
- **- Paper plates**
- **- Paper towels**
- **- 19 PBJ Geology worksheets**

**Resources Used**

- **Land of Colorado unit, FOSS Science Kits**
- **Geology Rocks! 50 Hands on Activities To Explore the Earth by Cindy Blobaum**

**Colorado Model Content Standards**

**Science:**

**Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography)**

- **Students in Grades 3-5 will understand the natural processes that change Earth's surface, how many of Earth's resources can be conserved/depleted, how most of Earth's surface is covered by water.**

**Standard 5: Students understand that the nature of science involves a particular knowledge and making.**

- **Students in Grades 3-5 will be able to use models to represent events and objects.**

**Geography:**

**Standard 3: Students understand how physical processes shape Earth's surface patterns and systems. 3.1: Students know the physical processes that shape Earth's surface patterns.**

- **Students in Grades K-4 will be able to identify the components of Earth's systems and their characteristics, explain how Earth-Sun relationships shape climate and vegetation patterns, and describe how features on Earth's surface are shaped by physical processes.**

**Standard 6: Students apply knowledge of people, places, and environments to understand the past and present and to plan for the future. 6.1: Students know how to apply geography to understand the past.**

- **Students in Grades K-4 will be able to describe how places change over time and describe how places and environments have influenced events over time.**
- **6.2: Students know how to apply geography to understand the present and plan for the future. In Grades K-4 students will be able to describe issues in communities from a spatial perspective.**

**Lesson Objectives**

- **- Students will understand how the Earth's plates move**
- **- Students will understand how different thing happen to the earth's surface depending on how the plates collide or separate**
- **- Students will demonstrate the different ways the earth's plates move using manipulatives**
- **- Students will demonstrate an understanding of these terms: anticline, syncline, vertical fault, lateral fault**

**Engagement**

**To engage students in this lesson, I will begin by asking them to recall what we talked about in the previous lesson about how the continents have moved over time. After we have refreshed our memories, I will tell students that we can simulate the moving of the Earth's plates by using peanut butter and jelly sandwiches. I will give each student a sandwich and begin the lesson by instructing them how to bend their sandwiches gently to simulate an anticline and a syncline, and eventually getting to the point where students will cut their sandwiches to simulate different types of faults and plate collisions.**

**Investigation**

**To begin the lesson, I will ask students what they learned about continental drift and how it helped the continents "move" to their current locations on the Earth's surface. Then I will ask students some guiding questions, such as do they think different things happen on the Earth's surface when two plates collide or move apart? I will let students discuss this with their classmates as well as me. This will serve as informal pre-assessment. By doing this, I will be able to see which students might have an idea of what happens when plates move in different ways and which students have no idea. After this discussion, I will show students my peanut butter and jelly sandwich and explain that there are three layers of bread separated by a layer of peanut butter or jelly. I will explain that today each layer of bread (which will be one piece of each type of bread) represents a different rock layer of the Earth's surface. Students will then take guesses as to which layer is the oldest and which layer is the youngest. I will also have students take guesses as to how long they think it took the Earth to form these layers. I will introduce the four terms I want students to walk away from the lesson knowing- anticline, syncline, lateral fault, and vertical fault. I will show a picture of each on the Promethean (smart) board while students copy the terms and definitions in their notebook. This will serve as part of my informal formative assessment. I will be able to get a sense of what students know from what we have talked about and what**

**Explain/Clarify**

**After students finish copying the terms and definitions into their notebooks, I will hand out a three layer peanut butter and jelly sandwich to each student. I will then instruct them to bend it up, to form a hill. I will explain that this is called an anticline. Then I will tell students to bend it into a trough, and that this is called a syncline. Students will understand that mountains and valleys are formed this way. Then I will have students split their sandwich in half and move one half up and down against the other. This is a vertical fault and I will explain that if this happened, if you walked outside things might look a little different (everything would be shifted in one direction). Then I will have students move both pieces in opposite directions while touching one side. I will explain that this is a lateral fault and this type of fault causes earthquakes. Students will demonstrate all four of these movements. After we have completed thes four demonstrations, will have students slide their sandwich halves together so one slides over the top of the other. This type of plate movement causes volcanoes because the plate on the bottom is melted and forms magma that flows to the surface. Then students will move their pieces apart from each other so there is space between the two halves. I will explain that this type of movement causes rifts and eventually magma flows up and forms new seafloor or it can build mountain ranges. This type of movement only happens in the ocean, hence why we only have rifts in the ocean floor. Lastly, I will have students smash**

**their two slices together so uplift occurs. I will have students guess what landform is formed from this typ of movement. It should be pretty apparent that mountains form when two plates collide and uplift occurs. As students complete these demonstrations, I will informally assess them to see if they have done it correctly and appropriately. This will serve as formative assessment as well.**

**Lesson Closure**

**To close the lesson, I will have students tell me what they learned by doing this activity. They will be allowed to eat their sandwiches if they like. This will form as informal summative assessment as I gauge whether students can relate what we were doing with the sandwiches to how the Earth's plates move and collide, causing different things to happen on the Earth's surface. For formal summative assessment, students will complete a worksheet where they match a sketch of anticline, syncline, vertical fault, and lateral fault to the correct term and description.**

**Teacher Notes**

**Since there is a limited time, I will most likely prepare the "sandwiches" ahead of time so students do not have to spend too much time constructing, but rather they can spend more time exploring. I will make sure students have copied down definitions for anticline, syncline, vertical fault, and lateral fault.**

**Day 6: Land of Colorado: Formation of Rock**

Name: [redacted] Date Taught: 11/9/09 Cooperating Teacher: Phillips

Grade: 4th Subject: Science, Math

**Big Understanding:**

In order for students to understand how rocks are formed, and how these different types of rocks are found in different landforms around Colorado, it is important to first learn the difference between rocks and minerals. Once students understand what minerals are and how different rocks are composed of different minerals, they can begin to understand the difference between sedimentary, metamorphic, and igneous rocks. Students can also begin to understand how different combinations of minerals form different types of rocks.

**Materials Needed:**

- - 6 granite No. 6 samples
- - 6 feldspar No. 3 samples
- - 6 quartz No. 17 samples
- - 6 mica No. 15 samples
- - 17 hand lenses
- - 30 pink construction paper strips
- - 30 grey construction paper strips
- - 30 black construction paper strips
- - glue
- - scissors
- - 17 Mineral Mosaic worksheets

**Resources Used:**

- - Land of Colorado unit, FOSS Science Kits

**Colorado Model Content Standards:**

**Science:**

Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography)

- o Students in Grades 3-5 will understand the natural processes that change Earth's surface, how many of Earth's resources can be conserved/depleted

Standard 5: Students understand that the nature of science involves a particular knowledge and making.

- o Students in Grades 3-5 will be able to use models to represent events and objects.

**Mathematics:**

Standard 1: Students develop number sense and use numbers and number relationships in problem solving situations and communicate the reasoning used in solving these problems.

- o Students in Grades K-5 will demonstrate meanings for whole numbers and commonly -used fractions and decimals, read and write whole numbers and know place-value concepts, use

numbers to count, measure, and label, and use number sense to estimate and justify the reasonableness of solutions to problems involving whole numbers and commonly-used fractions.

Standard 6: Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers in problem-solving situations and communicate the reasoning used in solving these problems.

- In Grades K-4 students will demonstrate conceptual meanings of the four basic arithmetic operations and be able to demonstrate fluency with these four basic operations (addition, subtraction, multiplications, division), and construct, use, and explain procedures to compute and estimate with whole numbers, and select and use appropriate algorithms for computing with whole numbers in problem-solving situations.

**Lesson Objectives:**

- Students will be able to describe the difference between a rock and a mineral
- Students will be able to make a model of a piece of granite
- Students will understand that different minerals make up rocks

**Engagement:**

To engage students in this lesson, I will informally pre-assess them by asking them what they know about rocks and minerals. I will take some ideas suggested from students. Once students have made some guesses about what rocks and minerals are, I will ask students where they have seen granite around town. I will try not to give any examples because I want to see what students know about rocks and minerals. After some discussion, students will be looking at samples of granite and examining them closely with hand lenses. This should interest students because we will be applying something we've been talking about to real life and they will be able actually examine a rock sample.

**Investigation**

To begin this lesson, students will be engaged in a conversation about rocks and minerals, as well as sharing their knowledge about granite. This will serve as an informal pre-assessment. Following a class discussion, students will be handed a sample of granite and a hand lens. I will ask them if they think they are observing a rock or a mineral. Students will have to support their answers with reasons other than "just because". Then I will hand out mineral samples of mica, feldspar, and quartz to students and have them examine these with the hand lens. I will have them report to the class what they notice about the minerals and the rock samples. Hopefully a few students will notice that there are small parts of the minerals in the rock sample. After students have a chance to examine all four samples, I will read them some information about rocks and minerals from the kit.

**Explain/Clarify:**

After reading some information about rocks and minerals, I will ask students how rocks are different from minerals. This will serve as informal formative assessment because I will be able to see how students have put together the information I have provided them in order to make conclusions about what a rock is and what a mineral is. Following our second major discussion, I will tell students they will make their own piece of granite using colored bits of paper. I will tell them that their samples of granite will all look different because not every sample of granite has the same amount of feldspar, mica, and quartz in it. What I expect them to do though, is write fractional representations of how much of their sample is mica, quartz, and feldspar. I will explain this to them and model how to figure it out incase there is any confusion or misunderstanding. Each student will be given a Mineral Mosaic worksheet, a bag of small pink construction paper rectangles, a bag of small grey construction paper triangles, and a bag of small black construction paper triangles. I will tell them to glue as many pieces onto their worksheet to make their own sample of granite as they would like. The only guidelines I will give them is to make a key on the side of their paper (indicating which color represents which mineral) and write the fractional representations for each mineral represented at the bottom of their paper.

**Lesson Closure:**

To close the lesson, students will turn in their mineral mosaic's. This will be my formal summative assessment as I assess whether students understand how minerals compose a rock as well as if they understand how to make fractions from their "data". I will have students share with me what they learned from this activity as well. I will tell students that knowing this will help them understand the three different rock types and how the different rock types are formed.

**Teacher Notes:**

I will have to make sure I clarify the difference between rocks and minerals. Students might be instructed to write the definitions of these two terms in their notebooks.

**Day 7: Land of Colorado: Formation of Rock**

Name: [redacted] Date Taught: 11/10/09 Cooperating Teacher: Phillips

Grade: 4th Subject: Science (Rock Cycle)

**Big Understanding**

Rocks are all around us and students should be familiar with the different rock types in order to understand why there are so many different kinds of rocks here on earth. Students became familiar with a few different minerals in a previous lesson and how those minerals cause rocks to be different colors. Now, it is important for students to realize that different things underneath as well above the earth's surface cause different types of rocks to form (such as heating and pressing or crystallization). Once they know this, they can understand more about individual rocks themselves (sandstone versus granite, etc).

**Materials Needed**

- Computer
- Promethean board
- 17 What is a Rock books from FOSS kit
- 17 student worksheets

**Resources Used**

- Land of Colorado unit, FOSS Science Kits
- What is a Rock by Fred and Jeanne Biddulph
- http://www.classzone.com/books/earth_science/terc/content/investigations/es0602/es0602page02.cfm Interactive Rock Cycle Animation

**Colorado Model Content Standards**

**Science:**

Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography)

- Students in Grades 3-5 will understand the natural processes that change Earth's surface, how many of Earth's resources can be conserved/depleted, how most of Earth's surface is covered by water.

Standard 5: Students understand that the nature of science involves a particular knowledge and making.

- Students in Grades 3-5 will be able to use models to represent events and objects.

**Lesson Objectives**

- Students will understand there are three different rock types
- Students will understand the difference between the three rock types
- Students will understand how the rock cycle works

**Engagement**

In order to get students excited about rocks, I will tell them that despite all the different rocks we are all familiar with, all of them formed in just one of three different ways. I will have students provide suggestions as to how they think any of these rocks formed. Following this discussion, I will tell students there are three different rock types, and each rock in the world can fit into one of those three rocky types. I will tell them that today they will be exploring these different rock types and learning how these different rock types are formed in the rock cycle. They will read about it and explore an interactive website on the rock cycle. This discussion will serve as informal pre-assessment.

**Investigation**

After our opening discussion about the three rock types- sedimentary, igneous, and metamorphic rocks and how these rock types are formed, I will read part of the book What is a Rock to the class. During the reading, the three rock types are introduces as well as how the different rock types are formed. After the reading, students will be involved with an interactive website that animates the rock cycle. This will be a whole group activity since we only have one computer and one smart board to work with. As we tap on different steps of the rock cycle, I will explain to students what is happening to the rocks, such as how they are changing, what processes are aiding these changes, etc. Students will be allowed to discuss what they see happening as we move through this lesson. As we discuss different rock types, I will provide some examples and ask students if they know of any others. This will be an informal formative assessment as I gauge whether students are learning and/or are able to put together the information they are provided with from the information.

**Explain/Clarify**

Once we complete the whole rock cycle in detail, students will be allowed to ask any questions they have about the rock cycle and/or sedimentary, igneous, or metamorphic rocks. If time allows, students will complete a worksheet where they will write about each rock type. I will collect this worksheet for a formal summative assessment. This way I will be able to see whether students understand the difference between sedimentary, igneous, and metamorphic rocks and how they are formed. I will also be able to see if students understand how the rock cycle works.

**Lesson Closure**

This is a lot of information for students at once, especially in our limited time frame. I will close the lesson for students by having them tell me what they learned today. I will make sure students understand that even though there are lots of different rocks, there are three rock types and the rocks within each type have certain similar characteristics. I want students to really be familiar with sedimentary, metamorphic, and igneous rocks. Students will walk away from this lesson with a basic understanding of the rock cycle, including how a rock progresses through it and what happens in each step. We will be continuing our exploration about the rock cycle and rock types in the next lesson, which will increase our understanding.

**Teacher Notes**

This concept may be difficult for students to wrap their heads around based on what I know about their prior and previous knowledge of rocks. I will have to spend a lot of time describing how the rock cycle works. After this then, describing the different rock types will hopefully come more naturally and easily.

**Day 8: Land of Colorado: Formation of Rock Types and the Rock Cycle**

Name: [redacted] Date Taught: 11/12/09 Cooperating Teacher: Phillips

Grade: 4th Subject: Science (Rock Cycle)

**Big Understanding**

Students have a basic, broad understanding of the rock cycle and a good understanding of the different rock types from the previous lesson. In order to understand how the rocks surrounding them (in our city/etc.) were formed students need to understand how the rock cycle works. Students will also need to understand that the rock cycle does not happen overnight, it is a process that takes very long periods of time to get through; the rock cycle is also never-ending and it's important to know this because it helps students understand that the earth is dynamic. Understanding this helps students recall what they have learned in previous lessons- that different landforms form due to the moving of continental plates, and these plates keep moving and causing landform changes because the earth is constantly changing.

**Materials Needed**

- Computer
- Promethean board
- Earth Movement Book from FOSS kit
- 17 student worksheets – labeling rock types
- 17 student worksheets- draw rock cycle and writing about one rock type
- Rock samples of metamorphic, igneous, and sedimentary rocks

**Resources Used**

- Land of Colorado unit, FOSS Science Kits
- What is a Rock by Fred and Jeanne Biddulph
- http://www.classzone.com/books/earth_science/terc/content/investigations/es0602/es0602page02.cfm Interactive Rock Cycle Animation
- http://mitchell.needham.k12.ma.us/technology/lessons/rocks/rockcyc.htm
- Earth Movements by Delta Science Readers

**Colorado Model Content Standards**

**Science:**

Standard 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography)

- Students in Grades 3-5 will understand the natural processes that change Earth's surface, how many of Earth's resources can be conserved/depleted, how most of Earth's surface is covered by water.

Standard 5: Students understand that the nature of science involves a particular knowledge and making.

- Students in Grades 3-5 will be able to use models to represent events and objects.

**Lesson Objectives**

- Students will be able to tell me (the teacher) the three rock types
- Students will be able to explain how each rock type is formed
- Students will understand how the rock cycle works
- Students will be able to explain what is happening in different steps of the rock cycle

**Engagement**

In order to engage students in this lesson, I will review what we talked about in our previous lesson, where the rock types and the rock cycle were introduced. Instead of telling students what the rock types are, I will have a quiz in which students will write each rock type and how it is formed. This is my formal pre-assessment, and I hope students will be able to recall the information previously learned. Upon completion of the quiz, I will tell students we will be continuing our work with the rock cycle and different rock types today. Students will be involved in labeling parts of the rock cycle as well as drawing the rock cycle. If rock sample are available, students will be allowed to handle these samples to increase their understanding of different rock types.

**Investigation**

After students finish their quiz on the rock types, we may spend a few minutes reviewing the online animation o the rock cycle. I will hand out worksheets to students of the rock cycle, with the rock names blanked out. I will instruct students to label the blank spaces with the rock type they believe belongs there, based on whether it was formed by crystallization, heat and pressure, or compaction and cementation. Once they finish this, we will discuss what we think goes in each blank space. When a student provides an answer, they will need to give a reason as to why they chose that answer as well. The worksheet will serve as formal formative assessment and our discussion will serve as informal formative assessment. After this, students will be given rock samples (if available) and will be able to choose which rock they would like to write a description about. They will write about a rock type but they will be allowed to choose their rock. The class will be instructed to write a description of their rock type of the back of their worksheet.

**Explain/Clarify**

While students are writing their rock descriptions, I will walk around and ask questions, such as what the rock cycle shows us, how long does it take a rock to complete the rock cycle, etc. I will also be able to answer any questions students may still have about what we are learning about. Students will turn in their worksheet with rock types labeled and rock descriptions written. This will serve as one of my formal summative assessments.

**Lesson Closure**

To close the lesson, students will take a post-test on Colorado landforms and the rock cycle. This post-test is the same pre-test they took at the beginning of the unit. My expectation is students will show an increase in what they know about Colorado landforms and the rock cycle. This is my final, formal summative assessment.

**Teacher Notes**

**EXTENSION ACTIVITIES**

If we had the opportunity to take a field trip, I would take my fourth graders to different places around Loveland where the three different rock types can be found in nature. I would have students examine each rock and use what they know about igneous, sedimentary, and metamorphic rocks to classify the rock type. I would not tell them what it is right away, but let them discuss what they know and can observe first to come up with an answer and explanation. Students could also take a digital picture, and upon returning to class, compare it to samples of the three rock types. This would help them in making a final decision about which rock type the rock sample we traveled to belongs to.

As a second extension activity, I would have students bring in a rock of their choosing. It could be one they found on the playground or at home, as long as it is large enough to examine and handle easily. In class, each student would share their rock and give a short explanation about why it is their favorite rock. Then, as a class, we would examine each student's rock and decide whether it is an igneous, metamorphic, or sedimentary rock. Students would record on a worksheet who's rock it is, what it looks like with and without a hand lens, and why they believe it is a particular rock type.

As a third extension activity, in order to help students gain a firm understanding of the three different landforms found in Colorado, I would bring in magazines and newspapers that have pictures of the three landforms. Students could cut out pictures of each landform to glue on a Venn diagram. After students glue their pictures on to their Venn diagram, they would write the similarities between the three landforms, comparing all three, then two at a time. While writing the similarities, students will need to think about not only what the landform looks like, but what types of plants grown there, the animals that live there, etc. After students finish the similarities, they would fill in the differences for each landform that makes each one unique.

**INSTRUCTING STUDENTS AND SUPPORTING LEARNING**

1. Other than what is stated in the lesson plan, what occurred immediately prior to and after the video clip that is important to know in order to understand and interpret the interactions between and among you and your students?

The portion of my video clip that I am writing about highlights the students doing the activity and following my cues as to how to complete the activity. Before this portion of my lesson, students were engaged in a several discussions with the class as a whole, including me as the instructor. At the beginning of the lesson, I asked students what they remembered about continental drift. This was a concept we discussed in a previous lesson and students learned how the continents move due to continental drift and plate tectonics. At the beginning of this lesson then, we briefly overviewed continental drift and I posed the question, "What do you think happens when two plates either collide or separate?" Students were allowed to provide possible answers. Some students suggested earthquakes, tornadoes, and storms. Other student's suggested mountains and/or volcanoes form. Some students suggested that plateaus form when two plates separate along a mountain range.

Following this discussion, I introduced new terms that I want students to be familiar with. We would be demonstrating these terms later in the lesson and I wanted them to be familiar with what they mean. I introduced each term one at a time, and included a picture on the smart board. Students copied the terms and definitions into their notebooks to reinforce their knowledge and awareness of it.

After all four new terms (anticline, syncline, lateral fault, and vertical fault) were introduced, I told students we could simulate these earth/plate movements using a three-layer peanut butter and jelly sandwich. Before each student got their own sandwich to use for the activity, I showed them what mine looked like and told them how I wanted them to use it in order to use it in the most effective way. Each student received a sandwich, and this is where my video clip begins. In my clip, students are following my lead and using their three layer sandwiches to demonstrate anticline, syncline, lateral fault, vertical fault, seafloor spreading, how volcanoes form by subduction, and how mountains form due to uplift.

Following my clip, students were instructed to complete a worksheet that involved matching a sketch of one of the new terms/ideas they learned with a description of that term. I told them that everything on the worksheet were things we discussed, observed, and demonstrated using our three layer sandwiches. If they had problems, they could refer to the definitions in their notebook to help them out.

Throughout the whole lesson I was interacting with the students, whether it was through discussion or demonstration. It is important for someone viewing my video clip to know that immediately before and after my video clip students were engaged in discussion. It will help them understand why we are interacting in the way we are during the clip. Knowing that there was an engagement of prior knowledge as well as introduction of new knowledge and terms before we practiced what we learned would also help the viewer interpret our interactions better. That is why students did not ask many questions about what they were supposed to be doing but rather their questions were investigative about what we were doing.

2. In the instruction seen in the clip, how did you further the student's knowledge and skills an engage them intellectually in understanding the subject matter? Provide examples from the clip to show that you addressed the needs of all students.

Throughout my lesson, as seen in my video clip, I encouraged students to ask questions about what we were doing. As well as encouraging the class to ask questions, I asked my students to think on a deeper level about what we were doing with our sandwiches to simulate plate tectonics. I was asking them "what if" type questions. After I asked students to simulate a vertical fault with the two halves of their sandwich, I asked them, "What if this happened outside our school? What do you think you would see if you looked outside the door of our classroom?" There was little explanation provided about what would happen but the students were able to think on a deeper level to answer the question.

There were several strategies I used in my video clip to engage student's intellectually. First, I showed them visually what we were talking about by writing/typing on the smart board. I also engaged them orally by talking about it and allowing students to share their ideas. After they could visually see it and process the information, I asked them to write down the definitions of new terms into their notebooks. Now that they had heard me talk about the new terms as well as see them written on the board, they were kinesthetically engaged by writing them in their notebooks.

As the lesson progressed in my video clip, I introduced new vocabulary that is slightly above their level. I told them what these terms mean and had them repeat the definitions in their own words to the whole class. This helped solidify the concept in their minds. I kept checking for understanding as well and allowed students to ask questions after the instruction portion of my clip was over. If an idea was not presented clearly I would explain it in a different way to the class to help them understand it better. I made sure everything was clear before allowing the lesson to progress any further. I did not want students to work ahead because they might eventually have the same question.

3. Describe the strategies you used to monitor student learning during the lesson as shown on the video. Cite one or two examples of what students said and/or did in the video clip or in assessments related to the lesson that indicated their progress toward meeting curriculum standards at a proficient level of performance.

There were several strategies I used to monitor student learning during my video clip. I allowed students to ask clarifying questions before we began the activity as well as after we concluded the activity. At the end of the lesson, one student asked, "what would happen if two of earth's plates collided together after a mountain range had already formed?" Instead of answering her question right away, I posed the question to the class and allowed some students to provide possible answers. Several of the students answered correctly without me providing an explanation.

While students were writing down definitions of the terms we discussed before the activity, I walked around and looked at what students were writing down. I wanted to make sure students were writing down accurate definitions that they could understand easily. I also wanted to make sure each student had something written down because writing something down helps reinforce it in your brain. I did this every time I told students to write down a definition.

Another strategy I used to monitor student learning was observation during the activity. The first thing I asked students to do was show me an anticline. I did not review what an anticline is, but I watched students think about what I said, then demonstrate what an anticline would look like using their three-layer sandwich. I did not demonstrate it first because I didn't want students copying me. As students made their models and held them up for me to see, I looked around to see if student's models looked like they should have.

During the video clip, I also had students explain things to the class and me. This occurred after I asked them to do something or after I introduced a new concept. If a student was able to explain a concept accurately to me, I could tell they had a solid understanding of the concept. If a student struggled to provide an accurate explanation, I could tell they needed more practice in order to solidify their understanding of the concept. During the activity portion of my video clip, I asked students to demonstrate a lateral fault movement. When they did this, I asked them what would happen if this were real life and two plates were really colliding. Several students suggested earthquakes because of the way the sides of their sandwich (the ones that were touching) were crumbling and breaking off.

4. Reflect on your instruction and children's learning in the video clip discussing how the instruction and learning reflect your philosophy of how children learn (example- Vygotsky, Piaget, etc.)

In fourth grade, students are in Jean Piaget's stage of development referred to as the Concrete Operational Stage. In this stage, students have a good grasp on inductive logic as well as a solid understanding of concrete events. Students are still developing their understanding of abstract events.

because of this, the continents are constantly moving and shifting along the earth's surface.

While the students have a basic understanding of how the plates collide and separate and what occurs when these events happen, students seemed to have a more difficult time grasping this concept. When I shared with students that mountains are formed when two plates collide and uplift occurs, they had a hard time understanding that these huge mountains they are familiar with formed in such a way. I tried to help students understand this in the easiest way possible by simulating two plates moving together, colliding, and uplifting. The students also did this by using three-layer sandwiches. While they were able to simulate it correctly, they still struggled to grasp the concept fully.

According to Piaget's theory of cognitive development, children also develop schema's when they learn new information. As they modify their understanding of a certain subject, they are able to modify and revise their previously held schema through accommodation of this new information. This is evidenced in my video clip. As students provided incorrect answers to questions I posed, they were able to correctly answer the question when asked again after hearing the correct answer. I could see students revising their previously held thoughts and beliefs about continental drift and plate tectonics as they simulated plate tectonics with their sandwiches. Students were also able to assimilate new information and add it to their previous schema if it was new information for them.

5. Explain how you scaffold (differentiation, modeling, and support of student learning) curriculum, instruction and assessment in ways that contribute to understanding and facilitate students' construction of knowledge.

In my video clip, it is easy to see how instruction is scaffolded. In order to differentiate instruction, each student was given a three-layer sandwich with which to work with. This way, a student who was struggling with how to demonstrate a lateral fault or a vertical fault would be able to explore it themselves instead of relying on a partner to do it for them. I could also work individually with this student while the other students kept practicing the concept and/or explored/tried something different. Students were also allowed to work at their own pace. Definitions were left displayed on the board as well as in the student's notebooks for reference as we completed the activity. I wanted to reinforce these concepts, not challenge them to memorize and forget them as soon as the lesson was over.

As seen in my video clip, I modeled for students what I expected of them in regards to use of the materials as well as appropriate behavior. I wanted students to understand that although we would be working with food, they were not allowed to eat it because they would not be able to complete the assignment. I wanted students to be able to use a familiar object to demonstrate a new concept. I also expected students to gain a better understanding of plate tectonics through manipulation of an object rather than just lecture. As students demonstrated each new term we had previously discussed, I was able to informally assess students understanding of the concept. I could help guide students in the right direction if they were incorrect as well as applaud them if they did it correctly.

I supported students learning through encouragement and guiding questions. In my video clip, I never directly told students they were wrong but I asked them to think about what they said and if they could revise their thinking in any way.

Lastly, I used several different techniques of instruction to help each type of student gain a solid understanding of plate tectonics. I provided direct instruction, as seen in the very beginning of my video clip, as well as modeling and then student exploration.

**RESOURCES**

**Internet Resources:**

**Good for use by both students and teachers.**

http://www.enchantedlearning.com/subjects/astronomy/planets/earth/Continents.shtml

A website that demonstrates the movement of the Earth's plates (Continental drift), as well as introduces plate tectonics

http://www.classzone.com/books/earth_science/terc/content/investigations/es0602/es0602page02.cfm

A website that takes the learner through the rock cycle, step by step

**Student Resources:**

- Earth Movements book from Delta Science Readers

- Rocks and Minerals book from Delta Science Readers

- What is Rock? by Fred and Jeanne Biddulph

- The Nystrom Desk Atlas

- Rock Records by Beth Geiger (a National Geographic: Reading Expeditions book)

**Teacher Resources:**

- Land of Colorado book from FOSS kit

- Geology Rocks! 50 Hands On Activities To Explore the Earth by Cindy Blobaum

- Everybody Needs A Rock by Byrd Baylor

EVALUATIVE ESSAY

**Evaluative Essay: Evaluation of Graded Assessments/Assignments**

**Pre-test**

In my unit, students were given a variety of assessments to demonstrate their learning. At the start, they were given a pre-test so I could formally measure what they already knew and did not know about what they would be learning in my unit. This pre-test covered content from all seven of my lessons. Below are the results of my student's pre-test scores.

Table 1.1

| Name | Pre-test Score |
|---|---|
| Ben | 16/25 |
| Alondra | 11/25 |
| Rachel | 13/25 |
| Ashlynn | 14/25 |
| Preston | 23/25 |
| Soraya | 17/25 |
| Cameron | 19/25 |
| Jovon | 16/25 |
| Breana | 17/25 |
| Jamie | 19/25 |
| Pierce | 10/25 |
| Morgan | 21/25 |
| Jesse | 10/25 |
| Kirsten | 14/25 |
| Jailyne | 13/25 |
| Kinsey | 17/25 |
| Laura | 11/25 |

Many students did not score above 20 questions correct, which indicated to me that while they had some previous knowledge regarding the land of Colorado, they did not have a solid or extensive knowledge of the subject of my unit. The range of my student's scores was from 10-23, or a range of 13. Here are my scores

10 10 11 11 13 13 14 14 16 16 17 17 17 19 19 21 23

The median value of these scores was 14. The mean value was 15.3 points. The mode for this data set was 17. It is easy to see that there were about two student who scored each of these scores between 10 and 23. The lowest student scored 10 points out of 25, and the highest student scored 23 out of 25 points.

**If The Earth Were An Apple Lesson**

My first unit lesson was about the earth as a whole, and how much of the earth is covered in water, habitable land, and uninhabitable land. New terms were introduced, which were terms included in the pre-test. To assess student's learning, they were asked, after the lesson and demonstration, to draw on a paper plate a fractional representation of the earth's water and land. Below are the results of this assessment tool.

Table 1.2

| Name | Apple lesson-plate Score |
|---|---|
| Ben | 4/4 |
| Alondra | 4/4 |
| Rachel | 4/4 |
| Ashlynn | 2/4 |
| Preston | 4/4 |
| Soraya | 4/4 |
| Cameron | 4/4 |
| Jovon | 4/4 |
| Breana | 2/4 |
| Jamie | 4/4 |
| Pierce | 4/4 |
| Morgan | 4/4 |
| Jesse | 4/4 |
| Kirsten | 4/4 |
| Jailyne | 4/4 |
| Kinsey | 4/4 |
| Laura | 11/25 |

Students were asked to use the terms uninhabitable and inhabitable, and I was able to assess whether students had an understanding of these terms through this assessment. All but two students were able to use the terms correctly when drawing and labeling their fractional representations.

**Colorado Landforms Lesson**

In the second and third lesson, students learned about the different landforms found on the earth as well as the particular landforms found in Colorado. They were asked to complete a poster with their small group describing their assigned landform. They were also asked to complete a blank map of Colorado by labeling the different landforms, and write a short description of the landforms we talked about in class. Below are their results

Table 1.3

| Name | CO Landform Poster | Map of Colorado | Defining Landforms |
|---|---|---|---|
| Ben | 14/15 | 3/5 | 5/7 |
| Alondra | 14/15 | 2/5 | 4/7 |
| Rachel | 12/15 | Excused | Excused |
| Ashlynn | 14/15 | 2/5 | 3/7 |
| Preston | 13/15 | 5/5 | 7/7 |
| Soraya | 14/15 | 5/5 | 7/7 |
| Cameron | 13/15 | 5/5 | 5/7 |
| Jovon | 12/15 | 2/5 | 6/7 |
| Breana | 14/15 | 4/5 | 6/7 |
| Jamie | 14/15 | 5/5 | 7/7 |
| Pierce | 13/15 | 5/5 | 7/7 |
| Morgan | 11/15 | 5/5 | 5/7 |
| Jesse | 13/15 | 4/5 | 5/7 |
| Kirsten | 13/15 | 2/5 | 7/7 |
| Jailyne | 14/15 | 4/5 | 7/7 |
| Kinsey | 13/15 | 4/5 | 7/7 |
| Laura | 13/15 | 3/5 | 4/7 |

- Participated in creation of landform poster with group (2 pts)
- Participated in group presentation of poster (2 points)
- Learned one thing from each of the other four groups (4 points)
- Poster had a minimum of 4 interesting and accurate facts (4 points)
- Poster had a picture of the landform (3 points)

Above is a sample rubric for grading the CO Landforms poster and presentation. Looking at the CO Landform poster, students were able to accurately describe a given landform, as well as present their information clearly to the class, and lastly tell me one thing they learned from each group. When calculating their grade, all three of these components came into play. No one got less than 10 points, indicating they had a pretty good understanding of the information but needed more practice.

Map of Colorado Rubric:

- All mountain ranges drawn correctly (1 point)
- Basins between mountain ranges drawn correctly (1 point)
- Major rivers drawn correctly (1 point)
- Map orientation is correct (N-S) (2 points)

Above is a sample rubric for grading the Map of Colorado. Looking at the Map of Colorado, many students did not do too well. Many students did not have their map oriented correctly when they went to label the mountains, etc. Many students had their blank map vertical instead of horizontal. This indicated to me that many students do not know what the state of Colorado looks like. Several students also did not correctly label the mountain ranges, basins, and rivers. They were provided with information to help them with their maps, yet it appeared many students did not use this information to help them when drawing their own map. Four students drew two single mountains in the middle of their map. Although many did not do well, there were six students who did an exceptional job, and were able to correctly draw these three features on their map.

Lastly, when looking at the Defining landforms worksheet, seven students received full credit as they were able to correctly explain the seven landforms we discussed in class. There were only three students who were not able to describe all the landforms correctly. Several students simply skipped over defining some of the landforms on their worksheet. This indicated though, that the majority of my class had a solid understanding of the different landforms and were able to describe them in their own words.

**Continental Drift Lesson**

In this lesson, students were not formally assessed. We did however complete an in-class activity and as students did the activity, which was assembling a time line of continental drift and how the earth has changed in appearance, I walked around and answered any questions they had. After the instruction portion of the lesson, students seemed to have a solid understanding of what continental drift is, why it happens, and how it affects the earth. Students were able to answer my impromptu questioning accurately and were able to explain why things happened to me as well.

**Peanut Butter & Jelly Geology**

In this lesson, students were informally and formally assessed. Informally, I observed students as they completed the activity and asked them questions while they were working with their sandwiches to model different, new vocabulary that was introduced. While observing students, I would say they had a pretty good understanding of this new vocabulary, and how it helps us understand the earth's rock layers. For formal assessment, students were to take home a worksheet and match a description of a certain type of plate movement (such as lateral fault) to a picture of the plate movement. Below are the results of this assessment activity.

Table 1.4

| Name | PBJ Geology Matching |
|---|---|
| Ben | Excused |
| Alondra | 5/7 |
| | |

| | |
|---|---|
| Ashlynn | 5/7 |
| Preston | 5/7 |
| Soraya | 5/7 |
| Cameron | 7/7 |
| Jovon | 7/7 |
| Breana | 7/7 |
| Jamie | 7/7 |
| Pierce | 7/7 |
| Morgan | 5/7 |
| Jesse | 5/7 |
| Kirsten | 7/7 |
| Jailyne | 7/7 |
| Kinsey | 7/7 |
| Laura | 4/7 |

Eight students were able to match all the descriptions and pictures correctly. Six students mismatched two, and two students mismatched more than two. Overall, I would say about half of my students had a pretty good understanding of the new vocabulary and ideas that were introduced and demonstrated in this lesson. Not only were students able to informally demonstrate their knowledge through a hands-on activity, but they were then able to go home and recall that information to successfully complete an assignment. The other half of my students probably needed more practice in order to fully understand the concept.

**Mineral Mosaics Lesson**

In this lesson, students learned that rocks are made up of different minerals. Students were allowed to examine a piece of granite in order to see this. Then, they were allowed to create their own sample of granite by gluing different colored pieces of paper onto a rock worksheet. Lastly, they had to give fractional representation of how much of their sample was feldspar, mica, or quartz (the three minerals in granite). Students were formally graded based on several criteria, including whether or not they were able to use all three different mineral colors, give a fractional representation for each mineral, and if those fractional representations were correct. Below are the results of this worksheet activity.

Table 1.5

| Name | Mineral Mosaics Sheet |
|---|---|
| Ben | 12/12 |
| Alondra | 8/12 |
| Rachel | 9/12 |
| Ashlynn | 9/12 |
| Preston | 12/12 |
| Soraya | 12/12 |
| Cameron | 11/12 |
| Jovon | 12/12 |
| Breana | 9/12 |
| Jamie | 12/12 |
| Pierce | 11/12 |
| Morgan | 11/12 |
| Jesse | 0/12 |
| Kirsten | 10/12 |
| Jailyne | 12/12 |
| Kinsey | Excused |
| Laura | 12/12 |

Mineral Mosaics Rubric:

- Completed key (2 points)
- Key matches colors on picture (1 point)
- Fractional representations (3 points)
- Correct fractions (3 points)
- Use all three mineral colors (3 points)

Above is a sample rubric for grading the mineral mosaics students created. Seven students received full points on this assignment. While looking over these worksheets, most students did not seem to understand how to write a fractional representation to represent how much of their “granite sample” was made up of each of the

three minerals. Many students just wrote a number, or did not check to make sure it was correct. This tells me that students do not have a great understanding of fractions. I think all my students understand that rocks are made up of minerals though, because they used hand lens's to examine a real piece of granite, then were able to transfer that thinking to their worksheet by gluing different colored pieces of paper onto their sheet. The students who did not receive full points were students who did not complete the correct fractional representation part of the assignment. All students, except one who chose not to do it, demonstrated a solid understanding of the idea that rocks are composed of minerals.

**Rock Cycle Lessons**

During the last two days of my unit, students were learning about the three different rock types, how they are formed, and how they are formed through a process called The Rock Cycle. Throughout these two lessons, students completed several worksheets to demonstrate their knowledge of the rock cycle and different rock types. On the first day, the different rock types were introduced to students as well as the rock cycle. This day was mostly direct instruction and did not allow for any type of formal assessment. Through their questioning toward the end of the lesson, I could tell students did not have an understanding of either of the two concepts and we would need to spend more time going over it so they could understand it.

On the second day, we reviewed what we discussed previously, including what the three rock types are and how they are formed. I did not tell students but rather had them tell me what they remembered. About five students were able to repeat the rock types back to me correctly, and a few students were able to tell me how each rock type is formed. Students then filled out the blanks in a worksheet with the three rock types based on what information was given (i.e. how they were formed). Students then completed a worksheet where they drew the rock cycle diagram and chose one particular rock type to describe. Students were given a complete or incomplete on this assignment rather than a point score. The last worksheet students were to complete was a brief description of how each rock types was formed and then list examples of each rock type. Students were given one point per description and one point per examples listed. Below are the results.

Table 1.6

| Name | Rock Cycle-fill in blanks | Rock types worksheet | Rock Cycle & description |
|---|---|---|---|
| Ben | 3/3 | 6/6 | C |
| Alondra | 3/3 | 6/6 | C |
| Rachel | Excused | Excused | Excused |
| Ashlynn | 3/3 | 6/6 | C |
| Preston | 3/3 | 0/6 | C |
| Soraya | 3/3 | 6/6 | C |
| Cameron | 3/3 | 6/6 | C |
| Jovon | 3/3 | 6/6 | C |
| Breana | 3/3 | 3/6 | C |
| Jamie | 3/3 | 2/6 | C |
| Pierce | 3/3 | 6/6 | C |
| Morgan | 3/3 | 2/6 | C |
| Jesse | 3/3 | 3/6 | C |
| Kirsten | 3/3 | 2/6 | C |
| Jailyne | 3/3 | 0/6 | C |
| Kinsey | 3/3 | 4/6 | C |
| Laura | 3/3 | 5/6 | C |

After reviewing these assignments, it is clear that when given a diagram, students can interpret the given information and accurately fill in the blanks with which rock type belongs in each blank. All students received full points for this assignment. When informally discussing with students this idea, students were able to tell me which rock type would be formed from the description I gave. Looking at the worksheet where students wrote out how each rock type was formed and listed examples, about half the class did really well and the other half did not do well. I think students have a solid understanding of the rock types, they were just simply not given enough time to complete the worksheet fully. This worksheet does not provide an accurate picture of student's learning because most of their demonstration of knowledge came from in-class discussion. Lastly, all students completed their Rock Cycle worksheet by drawing the rock cycle, then writing about one rock type. With the exception of a few students, most of the drawing were accurate and the descriptions were correct.

**Post-Test**

At the end of the unit, students were given the same test they took at the beginning of the unit. Below are the results of the post-test.

Table 1.7

| Name | Post-test Score |
|---|---|
| Ben | 21/25 |
| Alondra | 18/25 |
| | |

| | |
|---|---|
| Ashlynn | 18/25 |
| Preston | 21/25 |
| Soraya | 21/25 |
| Cameron | 24/25 |
| Jovon | 23/25 |
| Breana | 18/25 |
| Jamie | 23/25 |
| Pierce | 23/25 |
| Morgan | 21/25 |
| Jesse | 13/25 |
| Kirsten | 21/25 |
| Jailyne | 22/25 |
| Kinsey | 23/25 |
| Laura | 22/25 |

The range of this data set is 11, from 13 to 24. This is slightly less than the range for the pre-test. Here are the scores, in order from lowest to highest.

13 18 18 18 19 21 21 21 21 21 22 22 23 23 23 23 24

The median value for this data set is 21, which is seven points higher than the data set for the pre-test. This shows that the scores for the post-test were higher, with half of the data values being above 21 points. This is indicative of an increase in the student's knowledge. The mode for this data set is 21 points, with five students scoring 21 points on their post-test. The next most frequently occurring score is 23, with four students scoring 23 out of 25 points. The student scoring the lowest scored 13 points, and the student scoring the highest scored 24 points. The mean value for this data set is 20.6, which is 5.3 points higher than the mean for the pre-test scores. This is also a good indicator that there was an increase in student knowledge because the average score is much higher than the previous average score.

When looking back at Table 1.1 and comparing it to Table 1.7, it is easy to see how much each student improved from their pre-test to their post-test. The students that had the largest increase in their score generally did the best of their assignments throughout the unit, and the students that did not have as large of an increase in their score generally did average to below average on their unit assignments.

Diagram 1.1

| Name | Pre-test Score | Name | Post-test Score | Improvement |
|---|---|---|---|---|
| Ben | 16/25 | Ben | 21/25 | + 5 |
| Alondra | 11/25 | Alondra | 18/25 | + 7 |
| Rachel | 13/25 | Rachel | 19/25 | + 6 |
| Ashlynn | 14/25 | Ashlynn | 18/25 | + 4 |
| Preston | 23/25 | Preston | 21/25 | - 2 |
| Soraya | 17/25 | Soraya | 21/25 | + 4 |
| Cameron | 19/25 | Cameron | 24/25 | + 5 |
| Jovon | 16/25 | Jovon | 23/25 | + 7 |
| Breana | 17/25 | Breana | 18/25 | + 1 |
| Jamie | 19/25 | Jamie | 23/25 | + 4 |
| Pierce | 10/25 | Pierce | 23/25 | + 13 |
| Morgan | 21/25 | Morgan | 21/25 | + 0 |
| Jesse | 10/25 | Jesse | 13/25 | + 3 |
| Kirsten | 14/25 | Kirsten | 21/25 | + 7 |
| Jailyne | 13/25 | Jailyne | 22/25 | + 9 |
| Kinsey | 17/25 | Kinsey | 23/25 | + 6 |
| Laura | 11/25 | Laura | 22/25 | + 11 |

The student that improved their score the most was Pierce, with an improvement of thirteen points. The student that improved their score the least was Preston, who actually decreased by two points. Preston most likely has a decrease in his score due to not paying attention while taking the post-test, or he was not trying. His scores on all the assignment indicate a good grasp of the concepts as well as a good understanding of the ideas and vocabulary. Most of my students increased their score by 4-7 points. One student scored the same on both her pre and post tests. All but two of my students had an increase in their score.

## Evaluative Essay: Evaluation of meeting the Content Standards

**Science Standard 4:** Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, meteorology, astronomy, oceanography)

Students met this content standard through the following activities/discussions/assessments:

using an apple

- participating in a discussion about how the earth has plates that move and change the surface of the earth
- participating in a discussion of how layers of rock change the earths surface and cause anticlines, synclines, lateral faults, and vertical faults
- viewing an online simulation of the rock cycle and explaining it to me and fellow classmates
- participating in a discussion about rocks and how they are composed of minerals as well as how rocks and minerals are different
- participating in a discussion about rock types and the rock cycle
- completed worksheets labeling the parts of the rock cycle and explaining how each rock type is formed

**Science Standard 5:** Students understand that the nature of science involves a particular knowledge and making.

Students met this content standard through the following activities/discussions/assessments:

- watching a demonstration using an apple and related how we divided up the apple into land and water to our earth
- students draw fractional representations on a paper plate to demonstrate how much of the earth is water and land

students create mineral mosaics using colored construction paper to model a piece of granite

students assemble a timeline displaying the changes to the earth's surface and make predictions for the future appearance of the earth's surface

- students use manipulatives (three-layer sandwiches) to model the terms- anticline, syncline, vertical fault lateral fault

**Mathematics Standard 1:** Students develop number sense and use numbers and number relationships in problem solving situations and communicate the reasoning used in solving these problems.

Students met this content standard through the following activities/discussions/assessments:

- draw correct fractional representations on a paper plate to represent 3/4 of the earth's surface as water and 1/4 land.
- Students wrote correct fractional representations on their mineral mosaic worksheet, indicating how much of their sample was feldspar, mica, or quartz.

**Mathematics Standard 6:** Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers in problem-solving situations and communicate the reasoning used in solving these problems.

Students met this content standard through the following activities/discussions/assessments:

students were introduced to distance = rate X time equation and use it to compute how far the continents have moved in 200 million years.

**Geography Standard 1:** Students know how to use and construct maps, globes, and other geographic tools to locate and derive information about people, places, and environments. 1.1: Students know how to use maps, globes and other geographic tools to acquire, process, and report information from a spatial perspective.

Students met this content standard through the following activities/discussions/assessments:

- students study maps of Colorado that display the mountain ranges, basins and rivers
- students draw their own map of Colorado, drawing the mountain ranges, basins, and rivers

**Geography Standard 2:** Students know the physical and human characteristics of places, and use this

characteristics of places.

Students met this content standard through the following activities/discussions/assessments:

students participated in a discussion about what uninhabitable land is and what habitable land is

students were able to tell me and their classmates how much of the earth's land is habitable and uninhabitable

**Geography Standard 3:** Students understand how physical processes shape Earth's surface patterns and systems. 3.1: Students know the physical processes that shape Earth's surface patterns.

Students met this content standard through the following activities/discussions/assessments:

students participate in a discussion about how the earth's plates move and how this changes the earth's surface

students use a three-layer sandwich to model these changes to the earth's surface

students participate in a discussion about which landforms are found in Colorado

students complete a poster presentation about one landform found in Colorado and share it with the class

**Geography Standard 5:** Students understand the effects of interactions between human and physical systems and the changes in meaning, use, distribution, cooperation, and conflict. 5.3: Students know the changes that occur in the meaning, use, location, distribution, and importance of resources.

Students met this content standard through the following activities/discussions/assessments:

- students are able to tell me what landforms are found specifically in Colorado
- students label a worksheet of the rock cycle
- students draw the rock cycle and describe one rock type and how it is formed through the rock cycle

**Geography Standard 6**: Students apply knowledge of people, places, and environments to understand the past and present and to plan for the future. 6.2: Students know how to apply geography to understand the present and plan for the future.

Students met this content standard through the following activities/discussions/assessments:

- students draw a rock cycle
- students explain to me how each rock type is formed
- students discuss with their classmates what they think happens when two of earth's plates collide or separate, before using three-layer sandwiches
- students demonstrate what happens when plates collide or separate using a three-layer sandwich

Before each day's activity, I would introduce the topic of the day and relate it to the previous lesson, if applicable. I would let students share with me their previous knowledge before just diving into my lesson. After a good class discussion about the topic, we would transition into the day's activity.

Throughout my entire unit, students were engaged in many discussions among their peers as well as with the teacher. In each of my lessons, I spent a fair amount of time letting students share their own ideas or findings, as well as ask questions of me. I believe many students benefitted from these discussions because they were able to actively participate instead of listen to me lecture them. Students sometimes disagreed with each other and used evidence to support their reasoning, most times I did not have to intervene. This allowed me to provide students with constructive feedback if they were confused or did not have the right idea. I did not ever tell a student they were wrong but asked them to think about what they said and if it made sense. Then they were allowed to revise their thinking.

**Alondra- label rock cycle.pdf**

**File Name:** Alondra- label rock cycle.pdf

**Size:** 7689k

**Ben- mineral mosaics.pdf**

**File Name:** Ben- mineral mosaics.pdf
**Size:** 7689k

**Breana- rock cycle drawing.pdf**
**File Name:** Breana- rock cycle drawing.pdf
**Size:** 7664k

**Kinsey- define landforms.pdf**
**File Name:** Kinsey- define landforms.pdf
**Size:** 7689k

**Morgan- PBJ geology.pdf**
**File Name:** Morgan- PBJ geology.pdf
**Size:** 7689k

**Jamie- draw rock cycle.pdf**
**File Name:** Jamie- draw rock cycle.pdf
**Size:** 7689k

**Jailyne- rock types.pdf**
**File Name:** Jailyne- rock types.pdf
**Size:** 7689k

**Soraya- mineral mosaics.pdf**
**File Name:** Soraya- mineral mosaics.pdf
**Size:** 7689k

**Rachel- draw rock cycle.pdf**
**File Name:** Rachel- draw rock cycle.pdf
**Size:** 7689k

**Preston- rock types.pdf**
**File Name:** Preston- rock types.pdf
**Size:** 7689k

**Breana- mineral mosaics.pdf**
**File Name:** Breana- mineral mosaics.pdf
**Size:** 7689k

**Kinsey- define landforms.pdf**
**File Name:** Kinsey- define landforms.pdf
**Size:** 7689k

**REFLECTIVE ESSAY**

**Reflective Essay**

**Standard Two: Knowledge of Mathematics**: The teacher shall be knowledgeable about mathematics and mathematics instruction.

**Planning:**

While it was admittedly difficult to integrate mathematics into my lesson, I was able to plan for students to practice and demonstrate their knowledge of fractions as well as using an equation to find out a particular piece of information. In two of my lessons, students were asked to demonstrate their knowledge of fractions in different ways. In *If The Earth Were An Apple* students were asked to draw fractional representations on a paper plate of how much of the earth is land versus water. In *Mineral Mosaics* students were asked to write fractional representations for how much of their "sample granite" was each of the three minerals. In the lesson *Tune into Geology* students were asked to use the equation, distance = rate X time to figure out how far continents have moved over a given period of time. I read through the entire unit and decided where it would be appropriate to integrate mathematics before writing any of my lessons.

**Teaching:**

When teaching, I did not want students to feel like they had to do math, but rather I wanted it to come more naturally. I explained the assignment to the students as well as the math portion, but I did not put too much emphasis on the math portion because I knew these were skills each

of my students knew how to use. For example, I reminded students that they knew what fractions were and how to write fractions so that was all they needed to do. I found that students were able to incorporate these math skills fairly easily and accurately without too much extra explanation.

**Assessing:**

I measured and assessed student's knowledge of these skills the same way I did their knowledge of the science aspect, through worksheets, group work, presentations, and a pre and post test. Part of student's grades on assignments, if applicable, included a portion that was based on the math that was being addressed. For example, students were graded on whether or not they wrote a fractional representation for their mineral mosaics and whether or not the fractional representations were correct. I found that most students were able to apply these math skills easily and did fairly well on that portion of their assignment. There was only one student in particular that seemed to struggle with the idea of fractions, but he also had to leave halfway through class.

**Standard Three: Knowledge of Standards and Assessment**: The teacher shall be

knowledgeable about strategies, planning practices , assessment techniques, and

appropriate accommodations to ensure student learning in a standards-based curriculum

**Planning:**

As I was planning my unit as well as each individual lesson, I made sure I looked at each content standard in order to make sure I was addressing at least one standard per lesson. In all my lessons, there were at least two standards being addressed. By looking and analyzing these standards, I was able to plan my instruction to make sure it was standards-based. I also wrote my lesson objectives based on what the standards called for regarding student learning. At the end of my lesson, I made sure the assessment was reflective of what they were supposed to learn based on the standards and lesson objectives.

**Teaching:**

Since my lessons were standards-based, I did not directly make sure I was teaching the standards to my students during in-class instruction. Instead, I reviewed my lesson and what I wanted students to learn before teaching so I did not miss anything important. I also made sure I had a solid understanding of the standards I was addressing before beginning so I was not left wondering if my lesson really was standards-based.

**Assessing:**

My assessments, whether worksheets or tests, were all designed so I could measure whether or not the students succeeded in learning the material contained in each standard. When grading these assessments then, I was able to see whether students were learning or whether they needed more practice in order to gain an understanding of the knowledge.

**Standard Four: Knowledge of Content**: The elementary teacher is knowledgeable, in addition to literacy and mathematics, in the following content areas: civics, economics, foreign language, geography, history, science, music, visual arts, and physical education.

**Planning:**

When planning my unit, it was very easily integrated with geography because it was centered around the land of Colorado. While we were studying the science aspect behind the land of Colorado, I easily could connect it with geography. When planning then, I planned to teach my

students the science aspect as well as the geography aspect. I integrated them too so I could teach them almost simultaneously.

**Teaching:**

While teaching, my instruction of the geography aspect easily flowed into the instruction of the science aspect. In the lesson concerning continental drift for example, I introduced the idea of continental drift to my students and talked about the geography of the oceanic and continental plates. Then I introduced and asked students what they think would happen if these plates collided or separated. This was the science aspect of my lesson, the what if, but the geography easily came into play when discussing how the geography of the land would change. When learning about the rock cycle as well as different rock types, I was able to discuss with my students the science behind how the different rock types form as well as how they are different; I was also able to discuss how the geography of the earth causes these different rock types to form.

**Assessing:**

Assessing students and their knowledge of the geography aspect came in the same form as the assessment of their knowledge of the science aspect. This came through different types of assessment- worksheets, group work, presentations, and a pre and post test. These were formal assessments, while informal assessments came through discussions and what I observed while students were working.

**Standard Five: Knowledge of Classroom and Instructional Management**: The

teacher is knowledgeable about classroom practice in order to successfully manage time, communications, and record keeping procedures that will support and enhance student learning.

**Planning:**

When planning my unit, I definitely took into consideration what I knew about my classroom practice. I had been in the classroom for almost two months before I began to teach my unit so I was very familiar with the time allowed for science as well as how long it would take to provide instruction and complete an activity. When planning then, I considered the time required for instruction and completion of the activity. I wanted to make sure I did not plan to fit too much in and rush through everything, but I also had to make sure I did not plan too little and ended up scrambling for an activity to do. I also was very familiar with the students and each individual students work habits. I was familiar with how to pass out, collect, and grade papers and record those grades.

**Teaching:**

While teaching, I made sure I was always checking time to make sure I was on track with my lesson. If I found I was short on time, I would tell students we would continue/finish our conversation about said subject the next time we met; I did not want to cut out any important information just to get through the lesson. While teaching I also made sure I did not change classroom procedures drastically. For example, to turn in assignments I either picked them up or had students turn them in where they would normally turn in completed assignments. On several occasions I set a timer and told students they had a certain amount of time to complete a portion of their activity before we could continue. I made sure I motivated those students who had a hard time getting started and/or finishing an assignment under time constraints so they could finish it. Lastly, I consistently checked for understanding.

**Assessing:**

When grading students assignments, I was able to see if I allowed adequate time for the assignment to be completed and if the techniques I used were successful or not, such as using a

timer or providing a list of what students were expected to complete on the board. This helped me see if I needed to change something for the next sessions lesson in order to fit in things we didn't get to on that day or plan extra instruction if we finished early.

**Standard Six: Knowledge of Individualization of Instruction**: The teacher is

responsive to the needs and experiences children bring to the classroom, including those based on culture, community, ethnicity, economics, linguistics, and innate learning abilities. The teache is knowledgeable about learning exceptionalities and conditions that affect the rate and extent of student learning, and is able to adapt instruction for all learners.

**Planning:**

When planning my unit, I took into consideration individualization of instruction for my students Much like Standard 9, I considered the different needs that students might have if they are accelerated learners versus lower-level learners, or ESL students who may not speak English very well. I considered all these things when planning instruction as well as the student activities. I made sure there was time in each of my lessons for students to ask questions of me as well as time for in-class discussion. Lastly, I implemented individual work time to complete the activity. This time would allow me to walk around and provide individual instruction to any students who may need it. I also created different types of assessment techniques for different types of learners. I had some worksheets that students could use books to help complete. I had some small group work as well as individual work. I had many hands-on activities for students to complete as well.

**Teaching:**

As stated above, during instruction for each of my lessons, I allowed time for students to ask clarifying questions or questions to further their understanding of the subject matter. I also provided work time for the students to complete their activity and more often than not, this allowed me time to help struggling students. Instead of just providing them with the answers though, I challenged them (appropriately) to think about what we talked about to help them answer their questions. Frequently, these students, whether high or low level students, were able to figure it out themselves. I also implemented different types of assessments (worksheets, group work, books to read) for students to use; if one particular type of learning wasn't working for them, they could try something different if available for that lesson.

**Assessing:**

I feel like assessing my students while considering individualization of instruction went hand in hand in my unit. I was constantly checking for understanding from my students in order to modify my instruction so I could reach every student. Some assessment was informal, through questioning and impromptu discussions, and some was formal assessment, through different types of activities/worksheets.

**Standard Seven: Knowledge of Technology:** The teacher is skilled in technology and is knowledgeable about using technology to support instruction and enhance student learning.

Technology was definitely a consideration and useful tool when planning, teaching, and assessing my unit.

**Planning:**

When planning individual lessons, I almost always made a corresponding flipchart for show on the Promethean board. This flipchart was at times interactive, requiring students to move/match objects to pictures. Other times it simply served as a visual, for example, displaying a picture of a sedimentary rock.

displaying a picture of a sedimentary rock.

**Teaching:**

When teaching, I used the flipcharts and/or animations on the Promethean to help carry my instruction. I found that students pay more attention when you are using the Promethean board and allow them to come up and use it as well. It is also easy to add things to flipcharts during instruction in case I forgot to add something or wanted to add additional information for students. I was able to pull up several animations to aid in my instruction with continental drift/plate tectonics and the rock cycle. Students seemed to enjoy these.

**Assessing:**

I did not formally assess student's use of technology in my unit but I made sure that if a student came up to use the Promethean board, they were using it appropriately and correctly.

**Standard Nine -Diversity**: The teacher candidate creates an inclusive learning environment for all students by drawing upon representations from students' experiences, knowledge, and beliefs.

While planning, teaching and assessing my unit I was always considering the diversity of my students and planning instruction based on the individual needs of all my students.

**Planning:**

I would say the most consideration for the diversity of my students occurred during the planning of my unit. While planning teacher instruction as well as deciding what activities to do with the class, I made sure I was accommodating aural learners as well as visual learners and kinesthetic learners. I planned, in all my lessons, for students to listen to instruction. In most of my lessons, I included a visual aspect; this took the form of a flipchart on the Promethean (smart) board or a demonstration with actual objects. Lastly, in all my lessons students were physically handling and manipulating materials to help further their understanding of the day's lesson. I also considered the needs of the accelerated students as well as the lower-level students, including ESL students. I made sure I had something the accelerated students could work on while the lower-level students were working. I also made sure I used vocabulary that was new but easily learned so both accelerated and lower-level students would learn new terms.

**Teaching:**

While teaching my unit, all the considerations I planned in my lessons came into play. While I was providing my students with direct instruction, I had a visual for those visual learners. Most of my visuals were flipcharts or interactive animations on the Promethean board. As I lectured, I referred back to the visuals. At the end of my lessons, I followed up with a student activity that was hands on. This allowed me to walk around and provide further clarification and/or instruction for students who may have needed it. I also encouraged all the students to listen to others questions because they could learn something new. I did not allow any put-downs from any students in my class and I allowed students to work with other students if time allowed.

**Assessing:**

While assessing students, such as creating rubrics for grading an assignment, I made sure I clarified any unfamiliar terms for those students who may have trouble figuring out what a word meant. I also repeated instructions several times and had students repeat back to me what was expected of them on assignments. I took into consideration different students learning levels and made sure I was not grading too easily or too harshly on any assignment/assessment.

**Standard Ten -Professionalism**: The teacher candidate conducts him/herself in a professional manner.

manner.

Throughout my entire unit, I maintained a sense of professionalism around my students as well as any staff/faculty that may have been present. I maintained professionalism while planning, teaching, and assessing my unit.

**Planning:**

While planning my unit, I was constantly keeping in mind the needs of my students so I would not leave anyone behind while providing instruction. I also made sure I had a strong understanding of my unit before beginning instruction because I did not want to teach my students the wrong thing. Professionalism during planning also occurred when considering how I would be interacting with my students as well as other faculty/staff. I made sure all teacher-student and teacher-staff interactions were appropriate and would not hinder any students learning. I also made sure I used appropriate vocabulary and language as not to offend any students or staff.

**Teaching:**

When teaching my unit, many things I planned came into play. I was very careful with the language and terms I used as well as how I talked to students. I didn't want any students to fee I was personally singling them out to embarrass them in front of other students. I made sure I conducted myself appropriately during instruction as well. I consistently checked for understanding so as to make sure all my students were staying with me.

***Assessing*:**

While assessing my unit, I made sure all assessment techniques (tests/quizzes, worksheets, handouts, activities) were designed professionally; most of these worksheets, etc. were designed on the computer and not drawn hastily on notebook paper minutes before my lesson. Throughout the whole unit, I made sure I was prepared ahead of time so I knew what I was doing and would not have to leave the classroom during instruction to get a material I needed. Lastly, I clarified expectations about appropriate behavior with students at the beginning of the lesson so I would not have to correct anyone later.

While teaching this unit, I learned many things from my students about effective instruction as well as classroom management. I learned what techniques work and do not work when doing whole group instruction as well as doing a class activity that requires many supplies and preparation. I learned how to effectively teach students so that I am able to reach every student, including challenging the higher-level students and helping the lower-level students. My students responded positively to many of the strategies I tried when teaching whole group as well as during individual work time. I learned how to manage students when doing a fun activity so things do not get out of hand but students can still have a good time.

I did not realize how much time it takes to really plan an effective lesson until completing my unit lesson plans because of how many different aspects need to be taken into consideration. After doing so, though, I realized taking the time really helps you as the teacher because you are prepared to help each individual student and it has taught me to definitely plan ahead for my future classroom.

While teaching, I learned that flexibility is so important. It is important to not rush through a lesson just to cover everything that you had planned. It is much better to take the time to explain a concept students are struggling with so everyone can enjoy the activity, even if it is done the following day.

I found that using a variety of assessment strategies work best when looking at studen performance, because what having multiple ways to assess a student provides a clearer picture of the student's learning. I enjoyed creating my own worksheets and implementing ideas and

activities built into the FOSS kit.

When reflecting overall on my unit over the land of Colorado, I think I was able to successfully meet most of the Performance Standards through how I planned my unit as well as individual lessons, how my lessons/unit were taught, and how I assessed my students in a variety of ways. I feel I successfully took into consideration many different aspects about the classroom dynamics and schedule, as well as student diversity and integration of other subject

**Supporting documents**

Scan, upload, and attach two files here:

1. The Diverse Field Experience Form, signed by you and your UNC Supervisor.
2. Your last Field Assessment form, signed by you and your UNC Supervisor.

We also need you to click on Self-Rate link, and the on Add Self-Rating, and enter the data from the FAF form in this portfolio. Make sure the scanned document and the data you enter are exactly the same.

**diversity requirement.jpg**
**File Name:** diversity requirement.jpg
**Size:** 148k

**FAF form and Diversity requirement.jpg**
**File Name:** FAF form and Diversity requirement.jpg
**Size:** 197k

**Owner:** [redacted]
**Feedback on:** Capstone Project (Elementary Undergraduate)
**Portfolio:** Capstone Project (Elementary Undergraduate)
**Reviewer:** Fertig, Gary
**Feedback Date:** Dec 3, 0090
**Feedback Type:** Public Affiliated

**Rating:**

| | Developing 1.0 | Proficient 2.0 | Advanced 3.0 | |
|---|---|---|---|---|
| **TITLE PAGE and TABLE OF CONTENTS** | **[no points]** Title Page contains four or fewer items of information listed under "Advanced". | **[no points]** Title Page contains at least five items of information listed under "Advanced". | **[no points]** *Title Page* contains all of the following:<br>1. Title of Unit<br>2. Grade level taught<br>3. Teacher candidate's name<br>4. Cooperating teacher's name<br>5. Dates unit was taught<br>6. School and school district | 0.0 |
| **Row 2 RATIONALE STATEMENT** | **[5 points]** Provides reader with an incomplete description of the community, school, classroom setting, and student characteristics.<br><br>Most of the "contextual factors" effective teachers consider when planning instruction and assessment, differentiating instruction, and setting appropriate learning goals are not identified or discussed.<br><br>Curriculum standards are listed but not discussed. Assessment does not appear to be aligned with curriculum standards or lesson objectives. | **[10 points]** Describes demographics of the local community, school, and classroom in terms of characteristic cultural, linguistic and socioeconomic factors.<br><br>Classroom and individual variables that affect student learning are identified. Changes in curriculum, instruction, and assessment are explained.<br><br>Strategies for pre-assessment, formative and summative assessment are well-thought-out and aligned with major content standards. | **[15 points]** Provides a thorough description of the community, school, classroom, and all student characteristics that will affect curriculum, instruction and assessment.<br><br>Reflects on and explains how instruction and assessment will be modified to accommodate a diversity of student differences and needs.<br><br>Pre-assessment, formative, and summative assessments are aligned with curriculum standards and lesson objectives.<br><br>Multiple assessments are combined to provide a comprehensive overview of student learning that is linked | 15.0 |

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| | | | to curriculum standards. | |
| **Row 3 UNIT GOAL** | **[3 points]** The Unit Goal is not derived from relevant content standards or stated verbatim from them (i.e., not in the candidate's own words). It appears to be hastily written and does not accurately describe the major concepts, skills, and attitudes students will learn. | **[4 points]** The Unit Goal is derived from content standards but stated in the candidate's own words. It accurately describes in no more than one paragraph the major concepts, skills, and attitudes students will learn. | **[5 points]** The Unit Goal is derived from content standards but stated in candidate's own words. It accurately describes in no more than two paragraphs "what" students will learn and "how" students will learn major concepts, develop skills, and acquire attitudes. | 5.0 |
| **Row 4 LESSON PLANS** | **[5 points]** Curriculum standards and lesson objectives are not clearly aligned. Learning activities do not support standards-based learning or allow students to apply new skills and content in a meaningful context.<br><br>Only lower-order thinking skills are emphasized. No efforts are made to differentiate instruction and assessment based on student characteristics identified in the unit's Rationale Statement. | **[10 points]** Each lesson plan contains relevant curriculum standards and clearly written lesson objectives; instruction is aligned with curriculum and assessments are aligned with instruction and learning activities.<br><br>Lessons provide opportunities for children to apply new skills and content in a meaningful context. "Teacher procedures" do not obscure what students are expected to do in order to learn. | **[15 points]** Curriculum standards, lesson objectives, and assessments are clearly aligned and linked to specific performances and products. Multiple opportunities are provided for students to apply new learning in authentic and meaningful contexts.<br><br>Multiple and complementary assessments are used. Lesson activities support conceptual development and higher-order thinking for all students | 15.0 |
| **Row 5 EXTENSION ACTIVITIES** | **[3 points]** Extensions are not aligned or directly related to content standards and unit goal(s).<br><br>Activities require lower-level thinking skills that do not involve application of newly acquired skills, knowledge, and attitudes to real world problems and issues. | **[4 points]** Suggested activities would enable students to internalize their learning relative to content standards and unit goal(s).<br><br>Extension activities require the application of newly acquired skills, knowledge, and attitudes that challenge students to think at higher levels through analysis, synthesis, and evaluation. | **[5 points]** Extension activities would enable students to further their learning relative to content standards and unit goal(s).<br><br>Extension activities require higher-order thinking and "transfer" of newly acquired skills, knowledge, and attitudes to a variety of unique situations and problems having significance in the real world. | 5.0 |
| **Row 6 INSTRUCTING** | **[10 points]** Instructional strategies | **[20 points]** Instructional strategies | **[25 points]** Instructional | 25.0 |

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| | **STUDENTS AND SUPPORTING LEARNING** | for engaging students in learning key concepts, skills and attitudes provide limited access to structured opportunities for active development and application.<br><br>These strategies do not appear to reflect attention to student characteristics, academic needs and learning styles.<br><br>The candidate monitors student understanding of subject matter through surface-level questions that do not require active thinking.<br><br>Candidate struggled with maintaining a positive classroom environment that was conducive to student learning. Students appeared to be off-task, frustrated or bored in response to instruction.<br><br>Candidate responses do not address student concerns, are inaccurate or are unlikely to guide development of important skills and attitudes. | for engaging students in learning key concepts, skills, and attitudes provide structured opportunities for active development and application.<br><br>These strategies reflect attention to student characteristics, academic needs, and learning styles.<br><br>The candidate monitors student understanding of subject matter by eliciting student responses that require active thinking.<br><br>Candidate establishes a positive classroom environment that is well managed and conducive to learning.<br><br>Candidate responses build on student input to guide development of skills and attitudes in ways that enhance understanding. | strategies for engaging students in learning key concepts and their relationships, skills and attitudes provide multiple structured opportunities for active development and application that transfer to more than one context.<br><br>These strategies are differentiated for students in ways that clearly reflect attention to diverse student characteristics, academic needs, and learning styles.<br><br>The candidate monitors understanding of subject matter by eliciting student responses that require higher-level thinking and decision-making.<br><br>Candidate establishes a positive classroom environment that supports and enhances student learning.<br><br>Candidate responses scaffold on students' prior learning in ways that contribute to understanding and facilitate the active construction of knowledge. | |
| | **Row 7 RESOURCES** | **[3 points]**<br>Few resources are cited for teachers and students. Some materials appear to be inappropriate for the developmental or other needs of students. There appears to be a haphazard connection to lesson standards and | **[4 points]**<br>A reasonable number and variety of identifiable resources (i.e., cited) are used to support student learning relative to unit standards. Resources are well organized by type, how they will be used in the unit, by whom, and for what purposes. | **[5 points]**<br>A rich variety of resources facilitate meeting content standards, for example, through the creative use of technology, children's literature, material artifacts, primary sources, and guest speakers. Each resource serves an identifiable | 5.0 |

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| | a random collection of unrelated materials. | | purpose in the unit and increases all students' learning. | |
| **Row 8 EVALUATIVE ESSAY** | **[5 points]** Essay does not clearly communicate the effects of instruction on student learning. Analysis of learning is not grounded in assessment results tied directly to the achievement of content standards and the unit goal(s).<br><br>Assessment is anecdotal only; quantitative and qualitative data are not used to evaluate individual and / or whole-class achievement.<br><br>Assessments do not appear to be aligned with instruction, learning experiences, and curriculum standards.<br><br>Few or no representative examples of students' work are included. | **[10 points]** Essay clearly communicates the effects of instruction on student learning by comparing pretest and posttest results.<br><br>Analysis of assessment results is tied to the achievement of curriculum standards and the unit goal(s).<br><br>Both quantitative and qualitative evidence of learning are used to evaluate individual as well as whole-class achievement.<br><br>Representative examples of students' work at different levels of proficiency are provided to illustrate the nature and type of learning that took place relative to curriculum standards and unit goal(s). | **[15 points]** Essay clearly communicates the effects of instruction on student learning through pretest and posttest results.<br><br>Analysis of assessment results is tied to individuals' achievement of curriculum standards and unit goal(s).<br><br>Quantitative and qualitative data are combined to evaluate individual and whole-class achievement. Multiple assessments are aligned with the content standards and lesson objectives.<br><br>Assessment instruments have clear directions and scoring procedures that facilitate valid and reliable interpretations of student learning.<br><br>There is evidence of providing students with constructive feedback.<br><br>Representative examples of students' work at different levels of proficiency are provided to illustrate the kind and degree of learning that took place relative to curriculum standards and unit goal(s). | 15.0 |
| **Row 9 REFLECTIVE ESSAY** | **[5 points]** The candidate describes, but does not reflect on or articulate insights concerning, how the process of | **[10 points]** The candidate reflects thoughtfully and clearly articulates how engaging in the process of planning, | **[15 points]** The candidate thoughtfully reflects on and clearly explains how planning, teaching | 15.0 |

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| | unit planning, teaching and assessing students' knowledge, skills, and attitudes before, during, and after instruction enabled him or her to meet selected Performance-Based Standards for Colorado Teachers (i.e., PBSCT). | teaching and assessing students' knowledge, skills, and dispositions before, during, and after instruction enabled him or her to meet selected Performance-Based Standards for Colorado Teachers (PBSCT).<br><br>Using artifacts and examples of classroom practice, candidate reflected on all PBSCTs not directly addressed in the thematic unit. | and assessing student learning before, during, and after instruction enabled him or her to meet selected PBSCT.<br><br>Self-assessment, along with feedback from candidate's cooperating teacher, university consultant and university faculty, are evident in the reflective essay.<br><br>Demonstrated insight into practice by articulating strategies for improving instruction and support of student learning. | |

**Total: 100.0**

**Feedback:** I really enjoyed reading your Capstone Project for Fourth Graders related to the Land of Colorado - and beyond! You earned all 100 points out of the possible 100 points - congratulations! You taught lots of sophisticated geography, science, and math content and skills to the children and I was so pleased to see that emphasis on learning content and skills, not a lot of "fluff". This content these skills you taught were presented in interesting and creative ways to the children and I imagine that they enjoyed your teaching and learned a lot about landforms, different types of rocks, and how our Earth continues to change, even though it may have seemed to stop changing and morphing because of the relatively slow rate of change in geological time. You might take some time if you were to teach this unit again to make sure that the children understood some more basic geography concepts and relationships related to the Earth, Sun, and Moon. For example, were they aware that a globe is the only really accurate model of the Earth and that no flat map can make that claim, even though people have been trying for hundreds of years to create various types of flat maps that model the Earth accurately? Did the students know about such relationships as why we have night and day, time zones at every 15 degrees, latitutde and longitude, and the four seasons? I realize that this was not the focus of your Capstone Project but would seem to be some prior knowledge students at this age should possess. Don't assume they know it when you get your own class of students. Very nice work in the Evaluative Essay of keeping track of how students met the various curriculum standards, using rubrics to guide and grade their work, and individualizing assessment by way of multiple assessments and review. I'm sure you discovered that constant review is necessary, and that reviewing previous learning doesn't have to be a boring process but can actually be rather fun and done in different ways to ensure engagement. Also, remember that the expert and jigsaw groups is a great idea in theory, I worry that students will only, as you put it, "share" what they learned and not really "teach" what they learned to their peers. This is a big problem with the jigsaw method of teaching and learning. You can cover more material and spread out your resources better using jigsaw methods but I worry that while students can share that they have never been taught "how to really teach" others. You might help students learn how to teach what they learn to others and get them to go beyond "sharing". Nice work too on the Reflective Essay, for you described in detail how planning, teaching, and assessing students' learning enabled you to many of the Performance Based Standards for Colorado Teachers. Best of luck to you in you career as a teacher! Sincerely, Dr. Fertig