General Information					
UNIT AUTHOR					
First and Last Name Amie Kinyon					
Email contact	amie.kinyon@ndus.edu				
UNIT OVERVIEW					
Unit Title	Properties of matter, rocks, and minerals				
Content Area	Science				
Grade Level	4th grade				
TLC Requirements					
PLAN—Planning Instruction and As	ssessment				
Demonstrate your ability to select, adapt, design, and organize curriculum, instruction, and assessment to help diverse students learn and meet the standards for curriculum content as well as develop academic language related to that content. (InTASC #7 Planning for Instruction)					
A. Unit Foundation					
1. Unit Summary					
My plan for the learning unit is to teach students about matter, minerals, and rocks and learn how to classify the different types of minerals, and rocks such as sedimentary, metamorphic, or igneous. This is an age appropriate unit and meets the CCSS for science in the 4th grade. This unit will allow for different types of hands on activities that will be helpful to retain knowledge as well as get students learning hands on. This unit allows for adjustments to meet different disabilities as well as meets GAT students' needs. This unit will be organized from the basics to the top from starting to learn about matter all the way to rock classification. This allows the students to build on prior knowledge each lesson of the unit. This unit is also beneficial to teach scientific language as it contains many words and phrases that are unique to learning about the properties of matter, rocks, and minerals.					
2. Standards to be met (List and write out. Identify source: NGSS, state standards, CCSS, etc.)					
MS-ESS2- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.					

4-ESS1.C.1 The History of Planet Earth: Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. Supporting (CC & SEP): • Constructing Explanations and Designing Solutions \rightarrow Identify Evidence: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. • Evidence \rightarrow Patterns can be used as evidence to support an explanation.

4-ESS.2.A.1 Earth Materials and Systems:

Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.

RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

PS1.A: Structure and Properties of Matter

Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.

5-PS1-3 Matter and Its Interactions

Make observations and measurements to identify materials based on their properties.

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

3. Objectives/Learning outcomes (based on above standards)

- Students will understand the basic properties of rocks and minerals and be able to identify rock types by observing key characteristics.
- Students will explain how minerals are identified using tests for the physical properties of hardness color, luster, cleavage and streak.
- Students will classify rocks as metamorphic, sedimentary or igneous based on their composition, how they are formed and the processes that create them.

4. Academic Language to be emphasized (List and define in student-friendly terms)

- Properties: characteristics that can be observed or measured.
- Shape: something having a certain form.

- Mineral: a naturally occurring, inorganic solid which possesses a characteristic internal atomic structure and definite chemical composition.
- Rock: a naturally occurring solid made up of one or more minerals.
- Magnetic: an object surrounded by a magnetic field, causing iron or steel materials to be attracted to it.
- Hardness: the hardness of a mineral is its ability to resist scratching.
- Crystal: a solid that forms by a regular repeated pattern of molecules connecting together.
- Color: the aspect of things that is caused by differing qualities of light being reflected or emitted by them.
- Luster: how light is reflected from the surface of a mineral.
- Cleavage: the ability of a mineral to break along preferred planes. Cleavage forms a smooth surface.
- Fracture: when a mineral breaks unevenly. Fractures result in chips and rough surfaces on minerals.
- Streak: the color of the powder left on a streak plate (piece of unglazed porcelain) when the mineral is scraped across it.
- Geologist: a scientist who studies the Earth, the materials of which it is made, the processes acting upon them, and how they have changed over time.

5. Unit questions

a. Essential "overarching" or "big idea" questions

• How are rocks, minerals, and geohazards evidence of our dynamic Earth's surface, and how do we experience these in our communities?

b. Questions for students (developed using Bloom's taxonomy, Kaplan's icons for depth and complexity, English Learner Oral Language Questioning Techniques, etc.) for all levels of thinking

Lesson #1 What is matter and its three states? What are the properties of matter? Lesson #2 What are the different properties of minerals and how can we identify a rock or mineral? Lesson #3 What is a rock and how are rock and minerals similar? How are they different? Lesson #4 Which rock family does each rock belong to? How did you know which rock type it was? Lesson #5 How does the rock cycle work? How do rocks and landforms change under different circumstances?

C. Instructional Technology and Materials to be used in Unit

a. Technology to be used by the teacher (list hardware, software, websites, etc.)

Hardware/Software:

Promethean board

Docucam
Websites:
Epic science. (2020). Unit 3: Properties of Matter, Rocks, and Minerals. Retrieved from https://epicscience.net/4th/unit-3/
Northside Outdoor Wonder & Learning Initiative. (2020). 4 th Grade Earth Science: Rocks & Minerals Unit. Retrieved from https://ie.unc.edu/files/2019/09/4th-Grade-Rocks-Minerals_Final-Version.pdf
UEN. (2020). Classifying Rocks and Minerals. Retrieved from https://www.uen.org/lessonplan/view/2492
CSUS. (2020). <i>Rocks and Minerals</i> . Retrieved from https://www.csus.edu/indiv/j/jelinekd/EDTE%20226/Unit/Rock%20and%20Mineral%20Unit%20Plan%20Summer%202009%20(2).pdf
Science from Murf LLC. (2020). Rocks and mineral flashcards. Retrieved from https://www.teacherspayteachers.com/Product/Rocks-and-Mineral-Flashcards-124631
b. Technology to be used by the students (list hardware, software, websites, etc.)
Hardware/Software:
Hardware/Software: Chromebooks Promethean board White board
Hardware/Software: Chromebooks Promethean board White board Websites:
Hardware/Software: Chromebooks Promethean board White board Websites: Science from Murf LLC. (2020). Rocks and mineral flashcards. Retrieved from https://www.teacherspayteachers.com/Product/Rocks-and-Mineral-Flashcards-124631
Hardware/Software: Chromebooks Promethean board White board Websites: Science from Murf LLC. (2020). Rocks and mineral flashcards. Retrieved from https://www.teacherspayteachers.com/Product/Rocks-and-Mineral-Flashcards-124631 Epic science. (2020). Unit 3: Properties of Matter, Rocks, and Minerals. Retrieved from https://www.teacherspayteachers.com/Product/Rocks-and-Mineral-Flashcards-124631

Mineralogy 4 Kids. (2015). Mineral Properties. Retrieved from <u>http://www.mineralogy4kids.org/?q=mineralproperties</u>

Mystery Science. (2020). What would happen if you drank a glass of acid? Retrieved from <u>https://mysteryscience.com/chemistry/mystery-3/acids-reactions-properties-of-matter/168?r=60999704</u>

Quizizz. (2020). Rock Cycle Rocks. Retrieved from <u>https://quizizz.com/join/search/classifing%20rocks?languages=English</u>

CK-12. (2020). *States of Matter*. Retrieved from <u>https://interactives.ck12.org/simulations/chemistry/states-of-matter/app/index.html?lang=en&referrer=ck12Launcher&backUrl=https://interactives.ck12.org/simulations/chemistry.html</u>

Flocabulary. (2020). Types of Rocks. Retrieved from https://www.flocabulary.com/unit/types-of-rocks/quiz/

c. Materials and supplies

Lesson #1: Chromebooks, promethean board, docucam, science notebooks, pencils, 1 paper towel rook, 1 purple cabbage, trash bags, baking powder, lemon juice, backing soda, coffee stirrers, dixie cups, glad bags, measuring cups, measuring spoons, plastic bins, straws, salt, toothpicks, vinegar, acid test printout, mixing sheet printouts.

Lesson #2: Chromebooks, promethean board, docucam, science notebooks, pencils, mineral kit, copies of student answer sheet, station instruction sheets, Rock and mineral samples: quartz, calcite, gypsum, magnetite, obsidian, coal, limestone, hematite, pumice, talc, graphite, galena, sulphur, feldspar, halite, mica, amethyst, citrine, milky quartz, rose quartz, tiger-eye, agate, aventurine, streak plates, Container of water big enough to float the pumice, about half full of water, paper towels o Magnet

Lesson #3: Chromebooks, promethean board, docucam, science notebooks, pencils, rock kit, rock samples such as granite, schist, or gneiss, magnifiers, rock guide, heavy-duty quart sized clear zipper closure plastic bags, rock match Information cards.

Lesson #4: Chromebooks, promethean board, docucam, science notebooks, pencils, rock kit, rock samples such as granite, schist, or gneiss, magnifiers, rock guide, rock samples representing igneous (I), sedimentary (S), and metamorphic (M) rocks, scrap paper, Igneous, Sedimentary, & Metamorphic • Obsidian (I) • Granite (I) • Pumice (I) • Basalt (I) • Slate (M) • Schist (M) • Gneiss (M) • Marble (M) • Coal (S) • Limestone (S) • Shale (S) • Sandstone (S) • Conglomerate (S).

Lesson #5: Chromebooks, promethean board, docucam, science notebooks, pencils station signs, rock cycle diagrams, dice (at least 5, preferably 10), rock cycle game worksheet.

d. Other resources

Unit Bibliography:

I used two books to reference everything about minerals and rocks.

Smith, M. & Callery S. (2015). Rock, Minerals & Gems. New York, NY: Scholastic Inc.

Zoehfeld, W. K. (2017). Washington. D.C.: National Geographic Society.

D. Assessment Tools and Criteria

1. Explain your thought process for planning a post-assessment, a pre-assessment, and at least one formative assessment within the learning target.

To pre-assess my students to or to provide a diagnostic assessment to gauge what they may already know about the subject and unit I will use a KWL chart that they will paste into their science journals to have with them throughout the unit. The students must add at least 3 things they already *know* and 3 or more things that they *wonder* about. As they learn about the properties of matter, properties of minerals, rock types, classifications of rocks, and the rock cycle, they will be able to add at least 3 things to their *learned* part of the chart. To check for understanding during my lessons, I will have 3 formative assessments. The first assessment will be an answer sheet that they will be filling out during their mineral and rock activities stations to be used for grading with an answer key. This will allow me to check for understanding as well as to see what will need re-taught or what information I may need to provide before going on in the unit.

The second formative assessment will be a rock assessment quiz that will be made available from Flocabulary and set on their Google Classroom. This is a quiz that is multiple choice that allows them to test their knowledge and vocabulary about what we have learned so far in our unit. It also provided me their scores to see what needs retaught and allows them to see what they missed and why and explains to the student the right answer.

The third formative assessment will take place during the 4th lesson in the unit. This assessment will be informal and act as a review before moving on to the rock cycle in the following lesson. The assessment will be in the form of a Kahoot or a few Kahoots to review the knowledge that the students learned in the lesson of the day. They will be reviewing the 3 types of rocks: sedimentary, metamorphic, and igneous. Kahoot is an online source that allows the students to play against each other in a quiz formation that is timed. Each student plays on their own device against each other on the white board. This assessment will help retain and build knowledge.

For the last assessment in this unit, I will have a summative assessment that will have the students creating a minerals and rocks poster collage that includes, the rock cycle, magma, lave, sediments, compaction, and weathering. An example of a sedimentary rock, metamorphic rock, and an igneous rock. The definition of a mineral and five properties used to identify them. The definition of streak, luster, hardness, shape, and texture. They will also need to draw and label a scene of a streak test and a luster test, as well as describe the Mohs Scale. This assessment will show all that will have learned throughout the weeks unit and will allow the students to create their own project to show what they have learned. The poster will be graded off a rubric that students will be provided at the beginning of the unit.

2. Provide samples of the assessments you will use.

a. Sample pre-assessments

The pre-assessment will be a KWL chart. This will serve as a diagnostic assessment to gauge what the students may already know about the subject of rocks and minerals. The students will use a KWL chart that they will paste into their science journals to have with them throughout the unit. The students must add at least 3 things they already *know* and 3 or more things that they *wonder* about. As they learn about the properties of matter, properties of minerals, rock types, classifications of rocks, and the rock cycle, they will be able to add at least 3 things to their *learned* part of the chart.

0000	Occos Occos <td< th=""></td<>						
000000	K	What I Know	What I Wonder	What I Learned			
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õ	00000	00000000	000000000000	000000000000000000000000000000000000000			

b. Sample formative assessments

There will be three formative assessments that I will give the students throughout lessons 2, 3, and 4. This will help the students retain knowledge, remember the lessons, and build on to each lesson each day. The assessment that will be given in the 2_{nd} lesson will be a formative assessment that will have the students filling out an answer sheet that they will be filling out during their mineral and rock activities stations to be used for grading with an answer key. This will allow me to check for understanding as well as to see what will need re-taught or what information I may need to provide before going on in the unit.



The 3rd lessons formative assessment will be a rock assessment quiz that will be made available from Flocabulary and set on their Google Classroom. This is a quiz that is multiple choice that allows them to test their knowledge and vocabulary about what we have learned so far in our unit. It also provided me their scores to see what needs retaught and allows them to see what they missed and why and explains to the student the right answer.

ASSIGN TEACHER RESOURCES	add to favorites 🏠
Quiz	
VIDEO O <td></td>	
VOCAB CARDS	← BACK NEXT →
Which type of rock was the first to exist on the planet?	
VOCAB GAME A igneous	
READ & sedimentary	
C metamorphic	
QUIZ	
Ø	

The final formative assessment will be done in the 4th lesson in which the students are learning about the three types of rocks. The assessment will be in the form of a Kahoot or a few Kahoots to review the knowledge that the students learned in the lesson of the day. Kahoot is an online source that allows the students to play against each other in a quiz formation that is timed. Each student plays on their own device against each other on the white board. This assessment will help retain and build knowledge. They will be reviewing the 3 types of rocks: sedimentary, metamorphic, and igneous.



c. Sample post assessments

This assessment in this unit, I will have a summative assessment that will have the students creating a minerals and rocks poster collage that includes, the rock cycle, magma, lave, sediments, compaction, and weathering. An example of a sedimentary rock, metamorphic rock, and an igneous rock. The definition of a mineral and five properties used to identify them. The definition of streak, luster, hardness, shape, and texture. They will also need to draw and label a scene of a streak test and a luster test, as well as describe the Mohs Scale. This assessment will show all that will have learned throughout the weeks unit and will allow the students to create their own project to show what they have learned. The poster will be graded off a rubric that students will be provided at the beginning of the unit.

Minerals and Rocks POSTER COLLAGE

Follow each part of the required tasks. Use the handouts and interactive not ebook to help you locate information. It must be created on the one piece of paper given to you, nothing bigger, nothing smaller. Everything must be done by hand and by you only. If you need to borrow coloring supplies, please ask. Don't wait till the last minute, you have one week to complete this assignment.

Possible	Points	Required Task					
Point s	Earned						
		Neat, good use of color, evidence a rule use, evidence of					
10		time and effort. Layout is organized and					
points		material/notes/drawings are spaced out well					
10		Creative and artistic, effort in lettering and drawing					
point s							
10		Definitions: magma, lava, sediments, compaction and					
point s		cement at ion, weat hering, melting, cooling					
10		Draw the rock cycle. Use arrows and correctly label the					
point s		processes on each arrow.					
10		Draw an example of a sedimentary rock-label it					
point s		Draw an example of a met amorphic rock-label it					
		Draw an example of an igneous rock-label it					
10		Definition : mineral					
point s		Name five properties used to identify them					
10		Definition of streak, luster, hardness, shape texture					
points							
10		Draw and label a scene of a streak test					
point s							
10		Draw and label a scene of a lust er t est					
point s							
10		Describe the Mohs Scale					
point s							
SCORE:		Comment s:					

3. Describe how you will use formal and informal assessments in order to monitor growth and provide feedback for students toward meeting the objectives.

I would use a formal assessment in this unit to monitor growth by having a summative assessment at the end of the unit to check to see if students met the objective for each lesson and the unit. Student will show this knowledge in their final summative assessment by creating a poster with all the information that they learned throughout the unit. This will allow me to check for understanding as well as check to see if objectives were met. Before reaching the summative assessment, students would have completed three formative assessments in the prior lessons that have prepared them for the last assessment. There was feedback provided on each formative assessment so that students could know what needed to be changed, or what they needed to know more of or about. The feedback would be provided by discussion from both teacher and peers, as well as through monitoring from programs. This allowed student to reflect and correct their mistakes before moving on to the final formal assessment, their summative assessment poster board.

There will be informal assessments given daily throughout the unit to check for pertinent information about the students learning within each lesson. The informal assessments will be quizzes that are done as a whole group, with all members of the class completing the quizzes together. This will allow for immediate feedback as well as allow for the student to reflex and correct on the spot.

4. Describe any modifications or accommodations you have planned in the assessment tools to allow students with specific needs to demonstrate their learning.

First, and foremost, accommodations and modifications will be made to meet the needs of all students in the classroom so that everyone will have the best learning and opportunities provided.

SPED (Special Education)/Title 1

For the SPED students or students with disabilities, I will make all accommodations that are needed and also follow any accommodations that may be in their individualized learning plans. I will give more time on assignments when needed. The student would also be allowed to have a closer seat if needed when teaching on the white board. To help the students with understanding or physical needs, I would allow partner work. For the formative assessments, I would allow the students to be paired up with a classmate to help with understanding. For the summative assessment, I would allow extra time if needed, as well as allow the student to take home their work for additional time or help provided at home. For all assignments, the directions will be clearly stated and posted on the whiteboard in the front of the class for all students to clearly read. I will also break down the steps for each assignment clearly and state them as many times as needed.

ELL

The lessons and assessments could be modified and adapted in various ways in which the ELL student could participate and learn. I would encourage ELL students to use pictures to help when learning about the different types of rocks and their characteristics. I would also pair them up with a traditional student to help with language and understanding. I will give the option to cut out pictures from the internet or draw pictures of their own when discussing the three different types of rocks. The formal assessment will allow for partner work to help with language and understanding. The summative assessment could be taken home to have additional help if needed.

Gifted/Talented

For the gifted and talented students, there will be many opportunities for extended learning. The students could possible be finding the mass of their rocks or they could be finding the density. The GAT student could do a writing assignment about their rocks in story format using a given prompt like "If I were a geologist I would..." Another opportunity would be to have the students do research one particular rock type or mineral. The additional activities would be tailored to each student and their abilities. The assessments will not be tailored as they will be measured all on the same scale.

E. Classroom Management Considerations

1. Detail the management strategies and procedures that will support the implementation of this unit.

The classroom management strategies will include modeling how groups are working together, establishing group norms for the activities, having class discussions, and partner talks. I will model and relate how important it is to have think aloud strategies that will help set up students to be expressive and develop critical thinking skills during the activity. Students will be aware and responsible during this unit as well as accountable for their work and actions. The students will know and understand the procedures for and proper ways to handle the materials in this lesson before they begin. Expectations will be stated, and students will be responsible for their materials. The students will also remember and practice their science safety that was established at the beginning of the year.

Lesson Plans for the Unit

Amie Kinyon Science Topic: Properties of matter, rocks, and minerals Grade Level: 4th grade Lesson Title: EDUC 355 science unit **Day 1**

Standards:

PS1.A: Structure and Properties of Matter

Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.

5-PS1-3 Matter and Its Interactions

Make observations and measurements to identify materials based on their properties.

MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

Objectives:

Students will be able to understand what matter is and the properties of matter. Students will understand that matter is the foundation of rocks and that matter in a state will have an effect on the types of rocks. The video is geared towards young students and shows the 3 properties of matter in a way that they can understand. This video along with the PowerPoint will give students a good foundation on the lesson for the day.

Engage:

To engage student interest and to get the lesson started, the students will watch a short clip on what is matter and the states of matter. After the teacher will present a PowerPoint on the white board to have a class discussion about matter and how it will connect to our week's unit on the properties of minerals and rocks.



Explore:

For the activity, the students will be conducting an experiment from Mysteryscience.com. The activity has students finding out what would happen if you drank a glass of acid? The students will be put into table groups and complete the experiment together as a group. The students are going to discover a chemical reaction based on the properties of matter by using materials that are provided to them.

Explain:

After the experiment, the class would re-group at their desks or tables and we would discuss our results. I would inform the students why the materials changed when they reacted with the acids or acid base. We would then go over some vocabulary to write into their science notebooks. I would also have the students make a short lab report of their finding in the science notebook as well. This will help with retention and will come in useful if needed for the future lessons.

Elaborate (Extend):

To elaborate or extend this lesson, the students would get online to complete an online simulation from CK-12. The simulation is about the properties of matter. The students would be able to experiment with different states of matter (solid, liquid, and gas) and see how they differ when manipulated.

Evaluate:

To pre-assess my students to or to provide a diagnostic assessment to gauge what they may already know about the subject and unit I will use a KWL chart that they will paste into their science journals to have with them throughout the unit. The students must add at least 3 things they already *know* and 3 or more

things that they *wonder* about. As they learn about the properties of matter, properties of minerals, rock types, classifications of rocks, and the rock cycle, they will be able to add at least 3 things to their *learned* part of the chart.



Materials and Resources:

Materials-

Chromebooks, promethean board, docucam, science notebooks, pencils, 1 paper towel rook, 1 purple cabbage, trash bags, baking powder, lemon juice, backing soda, coffee stirrers, Dixie cups, glad bags, measuring cups, measuring spoons, plastic bins, straws, salt, toothpicks, vinegar, acid test printout, mixing sheet printouts.

Resources-

CK-12. (2020). *States of Matter*. Retrieved from <a href="https://interactives.ck12.org/simulations/chemistry/states-of-matter/app/index.html?screen=sandbox&lang=en&referrer=ck12Launcher&backUrl=https://interactives.ck12.org/simulations/chemistry.html&_ga=2.15672620 5.787817883.1588825340-1626246173.1587792525& gac=1.137177348.1587792525.EAlalQobChMI-oaDiuyC6QIVilbACh37vAtEEAAYASAAEgK2xPD_BwE

Mystery Science. (2020). What would happen if you drank a glass of acid? Retrieved from <u>https://mysteryscience.com/chemistry/mystery-3/acids-reactions-properties-of-matter/168?r=60999704</u>

Epic science. (2020). Unit 3: Properties of Matter, Rocks, and Minerals. Retrieved from https://epicscience.net/4th/unit-3/

Day 2

Standards:

MS-ESS2- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

5-PS1-3. Make observations and measurements to identify materials based on their properties.

Objectives:

Students will analyze how minerals are identified using tests for the physical properties of hardness color, luster, cleavage, and streak.

Engage:

To engage students and set the stage for learning, I would pass out printed sheets that would serve as rock and mineral flashcards for the students to look over and discuss with their table groups. I would inform them to look over the minerals to see how they might be different and why. We would talk discuss this to check for prior learning and to spark engagement for the lesson. We would also discuss what a geologist is and what sort of things that might study. I will then inform the students that for the day, we will be playing the role of geologists. I would inform them that they were going to identify the properties of minerals, which include hardness, luster, streak, color, crystal shape, and cleavage.

Explore

For the next part of the lesson, students would be doing a hands-on activity where they will be going to 6 different stations to test their minerals. Each station has directions set up on how to test them as well as the materials needed. They will all get a chance to test at all 6 stations as they will be rotated clockwise every 5 minutes.

Explain:

When all stations are completed, we would re-group and students would return to their desks or tables. We would have a classroom discussion about what we found out through our tests. We would discuss how the tests worked and how each mineral tested differently. I would have the students write down their reflections in their science notebooks.

Elaborate (Extend):

An opportunity for extended learning would be to have the students complete a writing assignment describing what they did in story format using the prompt "As a geologist, today I..." This would give the students an opportunity to relate the activity to their own lives as well as incorporate ELA curriculum to the lesson.

Evaluate:

The assessment will be an answer sheet that they will be filling out during their mineral and rock activities stations to be used for grading with an answer key. This will allow me to check for understanding as well as to see what will need re-taught or what information I may need to provide before going on in the unit.

	Station #1 - Quartz, Calcite, Gypsum (crystal shape and hardness)
1.	Which mineral has a crystal shape like a pencil and is very hard? $\ensuremath{\mbox{Quartz}}$
2.	Which mineral is shaped like a cube and can make you see double? Calcite
3.	Which mineral is soft and has a tabular shape? Gypsum
	Station #2 - Magnetite, Obsidian, Coal (Goldilocks test and magnetism)
1.	Which mineral is very heavy and magnetic? Magnetite
2.	Which mineral is sharp, used for surgical instruments and was blown out of a
	volcano? Obsidian
3.	Which mineral is very light and made of squished and baked plants? Coal
-	
	Station # 3 - Hematite, Pumice, Limestone (Goldilocks test, streak, floating)
1.	Which sample is dull gray, contains remains of fossils, and fizzes? Limestone
2.	Which sample is shiny gray and has a reddish brown streak? Hematite
3.	Which sample is dull gray, very light, filled with holes and was blown out of a
	volcano? Pumice

Materials and Resources:

Materials-

Chromebooks, promethean board, docucam, science notebooks, pencils, mineral kit, copies of student answer sheet, station instruction sheets, Rock and mineral samples: quartz, calcite, gypsum, magnetite, obsidian, coal, limestone, hematite, pumice, talc, graphite, galena, sulphur, feldspar, halite, mica, amethyst, citrine, milky quartz, rose quartz, tiger-eye, agate, aventurine, streak plates, Container of water big enough to float the pumice, about half full of water, paper towels o Magnet

Resources-

Science from Murf LLC. (2020). *Rocks and Mineral Flashcards*. Retrieved from <u>https://www.teacherspayteachers.com/Product/Rocks-and-Mineral-Flashcards-124631</u>

Northside Outdoor Wonder & Learning Initiative. (2020). 4th Grade Earth Science: Rocks & Minerals Unit. Retrieved from <u>https://ie.unc.edu/files/2019/09/4th-</u> Grade-Rocks-Minerals Final-Version.pdf

Day 3

Standards:

4-ESS.2.A.1 Earth Materials and Systems:

Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.

4-ESS1.C.1 The History of Planet Earth: Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. Supporting (CC & SEP): • Constructing Explanations and Designing Solutions \rightarrow Identify Evidence: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. • Evidence \rightarrow Patterns can be used as evidence to support an explanation.

Objectives:

Students will understand and explain the basic properties of rocks and minerals and be able to identify rock types by observing key characteristics.

Engage:

To get the students excited and engaged for the lesson students will watch a clip on rock climbing from dragonfly TV which shows two children testing the climb ability of different rock types. They children then discuss the characteristics of each rock type. This will not only engage student interest, but also set up some background for the lesson.

Explore:

For the hands-on activity to go along with this lesson, students will be completing a rock match activity. Each student will be given a random card that has either the description of a rock sample or a rock sample or a card with a description of how the rock is formed. At the bottom of each card is the rock samples name, split in half, so when the correct cards are matched, they spell out the name of the rock sample. Students will then go around the room and try to match their card with the appropriate match from the other column.

Sedimentary rocks

I am a sedimentary rock that was deposited at the bottom of a lake, pond or other calm, watery environment.	I am a sedimentary rock made of microscopic clay particles and larger silt particles that settled down in a quiet, watery environment. My reddish-brown color comes from oxidized (rusted) iron.
SILT-	-STONE
l am a sedimentary rock that formed in a marine environment.	I am a sedimentary rock that forms when mollusk shells were buried in a calcium- rich mud. These "sea" shells later dissolved away, leaving a 3-D mold of the shells in the gray mud.
LIME-	-STONE
I am a sedimentary rock that was deposited in a fast-flowing stream or current.	I am a sedimentary rock made of river- rounded pebbles and mud. The pebbles are gray and brown, while the mud is reddish brown. The mud glued together the pebbles.
CON-	-GLOMERATE

Explain:

After the students have found the matches, they will return to their desks or tables and we would have a quick discussion. Students will report about what samples they had and will read their descriptions. If time allows, each set could be put under the docucam to project the rock sample as students shared. While each student shares their match, I would like the students to record the rock sample and its information into their science notebooks.

Elaborate (Extend):

To extend this lesson, I would have students log on to BrainPOP and play around with Rock Cycle. This is a website that lets students explore about a topic. It has videos, coding games, vocabulary, quiz, challenges, etc. This would allow students to explore and learn more about the rock types before moving on to the formative assessment.

Evaluate:

This formative assessment will be a rock assessment quiz that will be made available from Flocabulary and set on their Google Classroom. This is a quiz that is multiple choice that allows them to test their knowledge and vocabulary about what we have learned so far in our unit. It also provided me their scores to see what needs retaught and allows them to see what they missed and why and explains to the student the right answer.

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Science Unit Plan Part A Modified TLC Science Methods

Materials and Resources:

Materials-

Chromebooks, promethean board, docucam, science notebooks, pencils, rock kit, rock samples such as granite, schist, or gneiss, magnifiers, rock guide, heavyduty quart sized clear zipper closure plastic bags, rock match Information cards.

Resources-

BrainPOP. (n.d.). Rock Cycle. Retrieved from https://www.brainpop.com/science/earthsystem/rockcycle/

Northside Outdoor Wonder & Learning Initiative. (2020). 4th Grade Earth Science: Rocks & Minerals Unit. Retrieved from https://ie.unc.edu/files/2019/09/4th-Grade-Rocks-Minerals_Final-Version.pdf

Flocabulary. (2020). Types of Rocks. Retrieved from https://www.flocabulary.com/unit/types-of-rocks/quiz/

Day 4

Standards:

5-PS1-3 Matter and Its Interactions

Make observations and measurements to identify materials based on their properties.

RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

4-ESS.2.A.1 Earth Materials and Systems:

Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.

Objectives:

Students will classify rocks as metamorphic, sedimentary or igneous based on their composition, how they are formed and the processes that create them.

Engage:

To set students up for the lesson they will watch 3 videos that show and describe igneous rocks, sedimentary rocks, and metamorphic rocks. After each video we will talk about each type of rock. Igneous rocks are composed of melted rock that hardens and cools. Sedimentary rocks are formed from materials that settle into layers, and metamorphic rocks are changed by heat and pressure. After each video, I will also show them an example of each type of rock with its description and have them write the rocks and their information down in their science journals.

Explore:

For the activity in this lesson, the students and teacher will go outside and gather some rocks. Each student will need to try and gather different types from all over the school area. After we had gathered a good sample of rock types, we would return to the classroom. Now student would divide into groups. Each group would have a worksheet that will have students putting their samples of their rocks into each group of rock family, igneous, sedimentary, and metamorphic. The poster will have hints on it as to help put the rocks in the correct family.

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Directions:

- Put all the samples in the correct rock group on the poster: Igneous, Sedimentary and Metamorphic
- Carefully and slowly pick up each sample to move them. Do not slide them on the table.
- Note: The rock samples don't all exactly match those that are on the poster.

Hints:

Remember the 3 types of rocks.

Metamorphic rocks sometimes:

- $\,\circ\,$ Have zebra stripes an example is gneiss.
- $\,\circ\,$ Are shiny (from the mineral mica) an example is schist.

• Sedimentary rocks sometimes:

 Are made of other pieces of rock like sand (sandstone), pebbles (conglomerate), or fossils, like seashells, (limestone).

Igneous rocks sometimes:

- May have spots or blotches of colors.
- Have interlocking crystals (spots or blotches) of different colors (an example is granite) or the same color (an example is basalt).

How many of each type of rock do you have?

Explain:

After all rocks have been sorted, we will talk about each group's poster with their rocks. We will see how many of each type of rock they found and how they determined them to go into each group and why. This will help the students have independent learning and results that will help with retention.

Elaborate (Extend):

To extend this lesson, students could research one of the types of rocks and find an area where they are abundant. They could then write a short research paper on it and share their results.

Evaluate:

For this lesson, there would be an informal formative assessment will be done in the 4th lesson in which the students are learning about the three types of rocks. The assessment will be in the form of a Kahoot or a few Kahoot games to review the knowledge that the students learned in the lesson of the day. Kahoot is an online source that allows the students to play against each other in a quiz formation that is timed. Each student plays on their own device against each other on the white board. This assessment will help retain and build knowledge. They will be reviewing the 3 types of rocks: sedimentary, metamorphic, and igneous.

Materials and Resources:

Materials-

Chromebooks, promethean board, docucam, science notebooks, pencils, rock kit, rock samples such as granite, schist, or gneiss, magnifiers, rock guide, rock samples representing igneous (I), sedimentary (S), and metamorphic (M) rocks, scrap paper, Igneous, Sedimentary, & Metamorphic • Obsidian (I) • Granite (I) • Pumice (I) • Basalt (I) • Slate (M) • Schist (M) • Gneiss (M) • Marble (M) • Coal (S) • Limestone (S) • Shale (S) • Sandstone (S) • Conglomerate (S).

Resources-

Northside Outdoor Wonder & Learning Initiative. (2020). 4th Grade Earth Science: Rocks & Minerals Unit. Retrieved from <u>https://ie.unc.edu/files/2019/09/4th-Grade-Rocks-Minerals_Final-Version.pdf</u>

Epic science. (2020). Unit 3: Properties of Matter, Rocks, and Minerals. Retrieved from https://epicscience.net/4th/unit-3/

Natevg. (2017). 3Types of Rocks. Retrieved from https://create.kahoot.it/go/upgrade/pro-tip-schools

Day 5

Standards:

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

4-ESS.2.A.1 Earth Materials and Systems:

Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.

MS-ESS2- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

4-ESS1.C.1 The History of Planet Earth: Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. Supporting (CC & SEP): • Constructing Explanations and Designing Solutions \rightarrow Identify Evidence: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. • Evidence \rightarrow Patterns can be used as evidence to support an explanation.

Objectives:

Students will analyze and examine how are rocks, minerals, and geohazards evidence of our dynamic Earth's surface, and how do we experience these in our communities?

Engage:

To begin this lesson and set the stage for the end of the unit, I will begin by asking the students, what is the rock cycle? To check for prior knowledge. I will then project an anchor chart up on the promethean board for the students to have a visual of the rock cycle and as it relates to different parts of the earths surface. The anchor chart shows the continuous cycle of rock changing from one form to another. I will then have the student get out their science notebooks to take notes and draw a diagram while I project a PowerPoint that shows a blank diagram of the rock cycle. As I go through each part of the rock cycle on the PowerPoint, I will have the student go over the parts and label them. Now that students have recorded the rock cycle in their notebooks, we would move on to the game.

Explore:

In this part of the lesson, students will be playing a game about the There will be stations that students can pick where they would like answers. Students will now move through the rock cycle. At each st roll the dice, and according to the Rock Cycle Station sheet, they will depending on how their type of rock would respond. For example, so that student would move to the Sediment station and roll again. underwent in the rock cycle game.

Current Rock Type	Number Rolled on Die	Effect on Rock	New Rock Type

retring weathering and erosion weathering weathering weathering and erosion termentation

round the room widely spaced out. csheet where they will record their t and Rock Cycle Station. Students will c eruption) and will move or stay thering, it will become sediment, and her and compare what forms they

Explain:

After students have played the game, the class would gather back together and compare what forms they underwent in the rock cycle game. We will discuss how different transformations they went through can explain how different rocks appear as they are.

Elaborate (Extend):

To extend the lesson, I would have the students do a turn and talk activity that would have the students discussing the different paths each member took and I would have them look for any patterns of the journey.

Turn and talk norms:

00 What does it look like?	300 What does it sound like?
\star Only one person speaks at a time	★ Conversations are about the question or topic given by the teacher.
★ Every member of the group contributes	
	★ Speaker is loud enough for others to hear
★ All members are sitting and facing the	
speaker so they ready to listen to understand	★ Comments, suggestions, or questions are presented respectfully
What is the role of the speaker?	What is the role of the listener?
★ Speak loud and clear	★ Listen to the speaker
\star Stay on task and on topic	\star Eyes are on the speaker
★ Ask your partner(s) a question about	\star Ask questions related to the topic
somerning you need more clarification on	* Add on to an idea presented

Evaluate:

For this assessment, students will be completing a summative assessment that will have the students creating a minerals and rocks poster collage that includes, the rock cycle, magma, leave, sediments, compaction, and weathering. An example of a sedimentary rock, metamorphic rock, and an igneous rock. The definition of a mineral and five properties used to identify them. The definition of streak, luster, hardness, shape, and texture. They will also need to draw and label a scene of a streak test and a luster test, as well as describe the Mohs Scale. This assessment will show all that will have learned throughout the weeks unit and will allow the students to create their own project to show what they have learned. The poster will be graded off a rubric that students will be provided at the beginning of the unit.

Valley City State University Science Unit Plan Part A Modified TLC

Science Methods

Minerals and Rocks POSTER COLLAGE

Follow each part of the required tasks. Use the handouts and interactive not ebook to help you locate information. It must be created on the one piece of paper given to you, nothing bigger, nothing smaller. Everything must be done by hand and by you only. If you need to borrow coloring supplies, please ask. Don't wait till the last minute, you have one week to complete this assignment.

Possible Points	Points Earned	Required Task
10 points		Neat, good use of color, evidence a rule use, evidence of time and effort. Layout is organized and material/notes/drawings are spaced out well
10 points		Creative and artistic, effort in lettering and drawing
10 points		Def init ions: magma, lava, sediments, compact ion and cement at ion, weat hering, melt ing, cooling
10 points		Draw the rock cycle. Use arrows and correctly label the processes on each arrow.
10 points		Draw an example of a sedimentary rock-label it Draw an example of a met amorphic rock-label it Draw an example of an igneous rock-label it
10 points		Definition : mineral Name five properties used to identify them
10 points		Definition of streak, luster, hardness, shape texture
10 points		Draw and label a scene of a streak test
10 points		Draw and label a scene of a luster test
10 points		Describe the Mohs Scale
SCORE:		Comment s:

Materials and Resources:

Materials-

Chromebooks, promethean board, docucam, science notebooks, pencils station signs, rock cycle diagrams, dice (at least 5, preferably 10), rock cycle game worksheet, poster rubric.

Resources-

Boyden, Carrie. (2020). The Rock Cycle. Retrieved from https://betterlesson.com/lesson/632918/the-rock-cycle

Grading Rubric: Part A Modified TLC	Not Acceptable	Unsatisfactory	Below Basic	Basic	Good	Excellent
	0	1-2	4	6	8	10
General Information	No response.	Incomplete work.	Have some missing content.	Good overall.	Very good overall.	Excellent; Well-written and complete.
Unit Foundation Summary	No effort, incomplete.	Little to no effort put forth into providing a unit description.	Minimal effort. Description of unit provided but lacks details and descriptive words.	Satisfactory description of unit. More details and descriptive words could be used.	Description of unit is provided. Good details and descriptive words used.	Description of unit is provided. Excellent details and descriptive words used.
Standards	No standards identified.	Little to no standards identified; minimally listed.	Little effort identifying standards; few are listed.	Some effort identifying standards; some listed.	Good effort identifying standards; mostly all are listed.	Excellent effort identifying NGSS and state standards; clearly listed and written out.
Objectives	No objectives written.	Very few objectives included but not clear and not clearly tied to standards.	Some objectives included but not clear and not clearly tied to standards.	Satisfactory objectives included; somewhat measurable; based and tied to standards listed.	Good objectives included; mostly well- written and measurable. Mostly based and tied to standards listed.	Excellent higher level thinking objectives included; well-written; clearly measurable and based on standards listed.
Academic Language	No academic language included.	Very few academic language; terms are listed but not defined in student-friendly terms.	Some academic language terms are listed but not defined in student- friendly terms.	Satisfactory amount of academic language; terms are somewhat defined in student-friendly terms.	Good amount of academic language; terms are listed and defined in student- friendly terms.	Excellent amount of academic language; terms are clearly listed and defined in student- friendly terms.
Unit Questions	No unit questions included.	Essential overarching or "big ideas" are not included; not developed, nor tied to Bloom's, Kaplan's and/or ELL Techniques; Mostly low level questions.	Essential overarching or "big ideas" are not evident; underdeveloped, not explicitly tied to Bloom's, Kaplan's and/or ELL Techniques; Limited levels of thinking.	Essential overarching or "big ideas" are included; somewhat developed and tied to Bloom's, Kaplan's and/or ELL Techniques but not explicitly; Meets only some levels of thinking	Essential overarching or "big ideas" are included; obviously developed and tied to Bloom's, Kaplan's and/or ELL Techniques; Variety of levels to meet most learners.	Essential overarching or "big ideas" are explicit and clear; clearly developed and tied to Bloom's, Kaplan's and/or ELL Techniques; Variety of levels to meet all learners.

Technology Used by Teacher and/or Students Material, Supplies, and Other Resources Used	Technology used not listed or included. Materials, supplies, and resources not listed.	Technology used by teacher and students sparsely included; some hardware, software, websites, etc. Few materials and supplies are identified.	Some technology used by both teacher and students; Included most hardware, software, websites, etc. Some materials and supplies are identified.	All technology used by both teacher and student; Included all hardware, software, websites, etc. All materials and supplies are identified.		
Assessment Tools	No assessment tools identified	Little to no explanation of how prior knowledge will be assessed; No specific assessment tools/strategies; little to no pre-assessments, formative, and post assessments included. Modifications and accommodations rarely provided.	Minimal explanation of how prior knowledge will be assessed; Minimal assessment tools/strategies; few pre-assesments, formative, and post assessments included. No descriptions of modifications and/or accommodations provided.	Satisfactory explanation of how prior knowledge will be assessed; Indicates some assessment tools and strategies; sample pre-assessments, formative, and post assessments included. Descriptions of modifications and/or accommodations provided.	Good explanation of how prior knowledge will be assessed; Indicated assessment tools and strategies; sample pre- assessments, formative, and post assessments included. Descriptions of modifications and/or accommodations provided.	Thorough explanation of how prior knowledge will be assessed; Indicated specific assessment tools and strategies; sample pre-assessments, formative, and post assessments included. Clear descriptions of modifications and/or accommodations provided.
Classroom Management Considerations	Classroom management techniques not identified.	More details needed. Little to no management strategies identified; Procedures included but not described.	Some details and management strategies identified; Procedures somewhat described.	Satisfactory details and most management strategies identified; Procedures somewhat described.	Good details and specific management strategies identified; Procedures described.	Excellent details and specific management strategies identified; Procedures described clearly for SPED, ELL, and Gifted Learners
Comments: Points Possible:	Your Points:, , your un ** Your Mineralol	it is off to an excellen ogy4Kids website link	t start, and I look for appears to be brok	rward to viewing you en or changed	ur daily lesson plans! I	(athleen ©

Science Unit Grading Criteria Part B: Daily Lesson Plans			
	Points Possible	Your Points	Suggestions
Standards and Objectives clearly stated and embedded throughout each daily lesson plan	10	10	
Lesson Engagement described well in each daily plan	10	10	
Lesson Exploration well-developed procedures in each daily plan	15	15	
Lesson Explanation described well in each daily plan	15	15	
Lesson Elaboration described well in each daily plan	10	10	
Lesson Evaluation described well and assessments provided snapshots/cut and paste/links at the end of each daily plan	15	15	
Materials and Resources APA format -thorough materials list and citations in each daily plan snapshots/cut and paste/links of all documents used at the end of each daily plan	10	10	
Successes:, this as an absolutely fantastic unit! Your content was rich and your daily lesson designs scaffolded learning well. Your games, interesting video/technology pieces, assessments, and hands on learning activities made this a high quality engaging unit! Excellent effort and design! May I use your unit as a sample to show future students? Kathleen ©	85 pts. Possible	Your Total: 85	