ITQ ARTS AND SCIENCE INTEGRATION
GRADE 4
THEATRE AND EARTH SCIENCE

Are You Ready to Rock? The Rock Cycle
Earth Science: Solid Earth, Investigation 1 – 3
LESSON #2

CONTENT STANDARDS

Theatre Grade 4

1.2 Identify a character's objectives and motivations to explain that character's behavior.
2.1 Demonstrate the emotional traits of a character through gesture and action.
5.2 Use improvisation and dramatization to explore concepts in other content areas.
5.3 Exhibit team identity and commitment to purpose when participating in theatrical experiences.

Earth Science Grade 4

ES4a Students know how to identify differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle).

ESSENTIAL QUESTIONS *(Questions students might ask about the topic)*

- What is the rock cycle?
- Can rocks change?
- How can I create a character and write a monologue about the rock cycle?
- *How did writing the monologue help you to understand the rock cycle?*

OBJECTIVES & STUDENT OUTCOMES *(Students will be able to…)*

- participate as a team member in a group improvisation.
- identify the phases of the rock cycle.
- pantomime the phases of the rock cycle.
- improvise a monologue about the rock cycle.
- demonstrate character with body and voice.
- write a monologue.

ASSESSMENT (*Various strategies to evaluate effectiveness of instruction and student learning)*

- **Feedback for Teacher**
  - Scene Observation
  - Written Monologue
- **Feedback for Student**
  - Student/Teacher Responses

WORDS TO KNOW

Theatre Grade 4

- **Characterization:** The development and portrayal of a personality through thought, action, dialogue, costuming, and makeup.
- **Monologue:** A long speech by a single character.

Earth Science Grade 4

- **Chemical weathering:** The process by which the minerals in a rock can change due to chemicals in

water and air. Chemical weathering can change rocks and cause them to break apart.

- **Crust:** Earth's hard outer layer of solid rock.
- **Earthquake:** A sudden movement of Earth's crust along a fault.
- **Erosion:** The carrying away of weathered Earth materials by water, wind, or ice.
- **Glacier:** A large mass of slow-moving ice.
- **Igneous rock:** Any rock that forms when melted rock (magma) hardens.
- **Landslide:** The movement of earth materials down a slope.
- **Magma:** Melted rock below Earth's surface.
- **Mantle:** The solid rock material between Earth's core and crust.
- **Metamorphic rock:** A kind of rock that forms when rocks and minerals are subjected to heat, pressure, or both.
- **Physical weathering:** The process by which rocks are broken down by breaking and banging.
- **Rock cycle:** The processes by which rocks change into different kinds of rocks.
- **Sediment:** Pieces of weathered rock such as sand, deposited by wind, water and ice.
- **Sedimentary rock:** A rock that forms in layers when sediments get cemented together.
- **Volcano:** An opening in Earth's crust where lava, cinders, ash, and gases come to the surface.
- **Weathering:** The process by which larger rocks are cracked and broken over time to form smaller rocks.

MATERIALS

- "The Rock Cycle" visual aid (included)
- "The Magma Monologues – A Guided Improvisation" packet for projection (included and ActiveInspire Flipchart available)
- Sentence strips [1 per student]
- Pencils for students
- Tape and/or Staplers
- 6 sheets of chart paper with the following pre-written on it: (Magma Monologue Charts Example**.** Included**)**
  Character: **Magma** Man/Woman
  Setting: Upper **Mantle** of the Earth's **Crust**
- Science notebooks (1/student)

RESOURCES

- VAPA Core Learnings: http://www.sandi.net/204510720114515653/site/default.asp
- VAPA Grade 4 Theatre Lessons: http://tinyurl.com/theatrelessons
- *FOSS Kit California Edition Grade 4,* "Solid Earth," Investigations 3 & 4
- Online improvisation lesson videos: : http://www.ehow.com/video_4949233_improv-yes-lets.html
- Rock cycle interactive video
  http://downloads.bbc.co.uk/schools/ks3bitesize/science/activities/activity18/activity_18_09-03-26.swf

PREPARATION

- Review how to play the improv game "Machine" http://www.ehow.com/video_4414639_improv-comedy-games-machine.html
- Review pages 114 – 117 and 142 – 143 in *FOSS Kit California Edition Grade 4,* "Solid Earth"
- Review the reading from the *FOSS Kit,* "Where Do Rocks Come From"
- Optional actor's warm-up for use any time a theatre lesson is being taught. It should be *very* short.
  - Review with students that actors have three tools/instruments to do their work: voice, body and imagination.
  - Each time an actor works they must "tune up" their instrument.
  - Arrange students in a circle, each one having personal space.
  - Lead students through a physical warm up isolating different parts of the body and stretching (e.g., rotate hands at wrist, roll shoulders backwards and forwards, rotate head at neck, gently swing hips from side to side, knee bends, rotate foot at ankle, lunges, stretching on tippy toes, hanging like a rag doll, slowly rolling up, shake each limb vigorously 8 times, then 4 times, then 2 times, then once)
  - Lead students through a vocal warm up with yawning, humming up and down the scale, breath exercises (expelling air with force from the diaphragm), loud and soft voice, and tongue twisters. ("Round and round the rugged rock, the ragged rascal ran.")

WARM UP *(Engage students, access prior learning, review, hook or activity to focus the student for learning)*

(10 minutes)

- Ask students *if* they think that rocks can change.
- Ask students *how* they think changes to rocks happen.
- Project a picture "The **Rock Cycle**" (included) so that students can see.
- Briefly talk through the **rock cycle**.
- Explain to the students they are going to use their imagination and bodies, two of the actor's tools, to show different parts of the **rock cycle.**
- Tell students it is very important they use posture, gestures and facial expression so the audience, or in this case the teacher, can tell which part of the **rock cycle** they are demonstrating.
- Tell students you will guide them through this imagination exploration of the **rock cycle**.
- Instruct students to stand and find a place in the classroom where they have plenty of personal space.
- Explain to students this exercise does not require the actors voice and should be done in silence.
- Say:
  - Imagine you are in underneath the Earth's surface. It is extremely hot and you are the **magma** bubbling. With just your body and facial expression, show me what that would look like. Remember just show me with your body. No talking.
- Allow students about a minute to explore being **magma**.
- *Say:*
  - *Now, imagine you are beginning to slowly cool down to become **igneous rock**. Show with your body what it looks like as you are cooling down and becoming solid.*
  - *Next, imagine you have broken off and have rolled down and landed in the bottom of a lake. You continue to break apart and become **sediment**. Then another layer of **sediment** covers you. With your body show what would that look. Layer after layer of **sediment** covers you and the weight of these layers cements you together with the other layers. You know have become **sedimentary rock**.*
- Encourage students to explore different levels as they move from one rock form to another.
- *Say:*
  - *The pressure continues. Compacting you even more as the years pass. Because of the pressure and heat you have know become metamorphic rock. Explore what that would look like with your body.*
  - *We are going to stop here. Slowly return your bodies to a standing position as you become a human once again.*

- Instruct students to return to their seats.

MODELING *(Presentation of new material, demonstration of the process, direct instruction)*
(15 minutes)

- Tell students rocks are masters of transformation, as they could tell from the warm up they just completed. Rocks can change from **magma** to **igneous rock** to **sedimentary rock** to **metamorphic rock** and back to **magma**. Of course, this happens over very long periods of time.
- Write **magma**, **igneous**, **sedimentary** and **metamorphic** on the board. Have students say the words. Write the definitions of the words.
- Tell students that today they are going repeat the journey of the **rock cycle**. They are going to act it out with their bodies in pantomime. They are going to develop their own character and develop a **monologue** as that character.
- Write **characterization** and **monologue** on the board. Have students say the words. Write the definition of the words.
- Discuss the different paths rocks can take, how they can travel and change.
- Reinforce that sometimes these changes are very sudden, such as **earthquakes** and **volcanoes** and sometimes they are very slow, such as the action of **glaciers**, **chemical** and **physical weathering** and **erosion**.
- Lead students through "The **Magma Monologues** – A Guided Improvisation." (included, also available as a ActiveInspire Flipchart.)
- The entire class participates at the same time in this activity.
- After reading the description on each slide, side coach students to move in a way that reflects the description. Encourage students to use their whole bodies and move about the room, as they feel necessary.
- While students are pantomiming, call out for them to say something in the character of each slide. (e.g. In the first slide they may say something like "Wow, it's hot here!" or "I'm bubbly and flowing.")
- Coach students through all slides/phases of the **rock cycle**.

GUIDED PRACTICE *(Application of knowledge, problem solving, corrective feedback)*
(20 minutes)

- Divide the class into groups of six.
- Explain to the students that each person in the group is going to be responsible for writing one part of the "**Magma Monologue**."
- Assign each student in each group one of the following parts of the monologue which taey will be responsible for writing: Magma/Magma Erupting, Igneous, Weathering and Erosion, sediment/ sedimentary, Metamorphic, Magma.
- Hand out eight sentence strips to each group. [One strip per each part of the Magma Monologue.]
- Post or hand out to each group one of the pre made charts. (See example which is included.)
- Guide students through writing a **monologue** based on the improvisation they just did.
- Tell the students that each person in their group will be responsible for writing a sentence on their sentence strip, which will be used as one line in their "**Magma Monologue.**"[Students should be encouraged to share their ideas with their group but it should be made clear that the student assigned to the section being discussed has the final say on what to write.]
- Show flipchart again. Have students remember what they said in each phase of the **rock cycle**.
- Students write down that line of **monologue** or what they wish they had said at the time. They may also can include a stage direction (movement or intent) in parentheses.
- After each student has written their sentence instruct them to attach it to the chart paper for their group.
- Repeat this process for each of the stages of the **rock cycle**.
- As each student completes their sentence instruct them to tape or staple their sentence strip on the Chart paper in the correct order.
- Repeat until all the sentence strips are placed on the chart papers.
- When this is done each group should have a **Magma Monologue**.

- Invite one student from each group to come to the front of the room with their completed **monologue** to read to the class.

DEBRIEF & REFLECT *(Identify problems encountered, ask and answer questions, discuss solutions and learning that took place. Did students meet outcomes?)*
(5 minutes)

- *Have students think-pair-share responses to the following prompts:*
  - *How are the ideas and information in this lesson about the **rock cycle** connected to what you already knew?*
  - *How are they connected to what you already knew about theatre?*
  - *What new ideas did you get that extended or pushed your thinking about the **rock cycle**?*
  - *What new idea did you get about improvisation and **characterization**?*
  - *What is still challenging or confusing for you to get your mind around?*
  - *What questions, wonderings or puzzles do you now have?*
- *Have students respond to the following prompt in their science notebooks: How did writing the monologue help you to understand the rock cycle?*

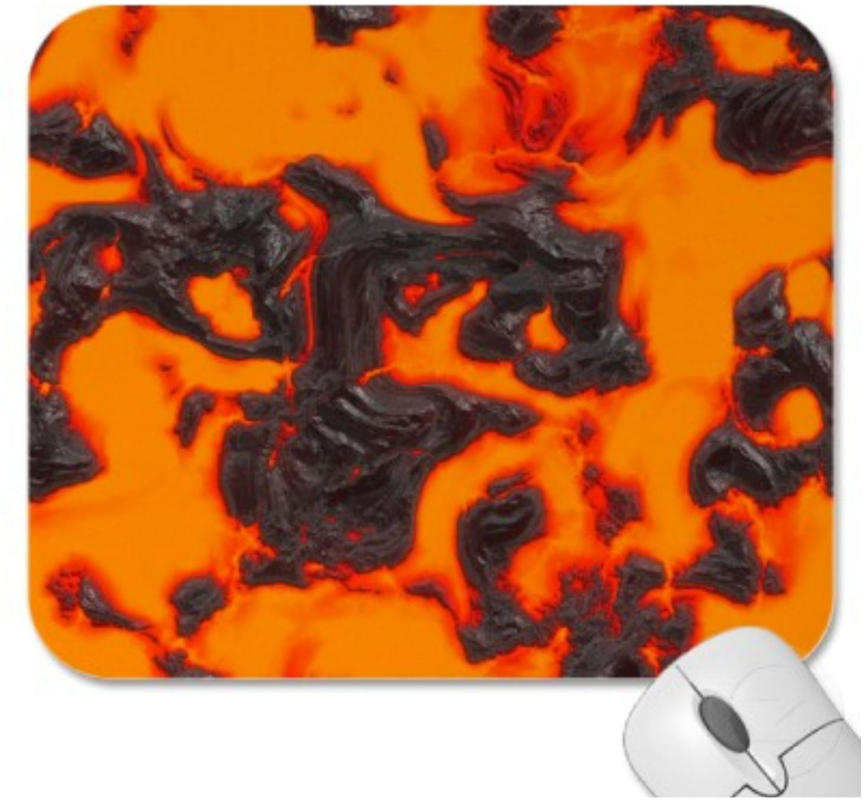
EXTENSION *(Expectations created by the teacher that encourage students to participate in further research, make connections, and apply understanding and skills previously learned to personal experiences.)*

- Students create a theatre piece using pantomime and sound effects to demonstrate the different phases of the **rock cycle**.
- Play **rock cycle** games. http://www.oum.ox.ac.uk/thezone/rocks/games/index.htm
- Create guided **monologues** for other subject areas.
- Do a public reading of the **monologues** created in class. Have students create simple costumes to show the different phases of the **rock cycle**. Use power point to create backgrounds of setting to project.

The Magma Monologues – A Guided Improvisation

Focus on characterization through facial expression, gesture, movement and vocal quality. Statements students make should support the change they are showing in their body. They should also say why the change is happening.

You start the scene as Magma. Hot, molten lava-like substance boiling in the upper mantle, just below the Earth's crust.



Show me with your body. Say something in character.

You break through the Earth's crust and flow out the volcano.

Show me with your body. Say something in character.

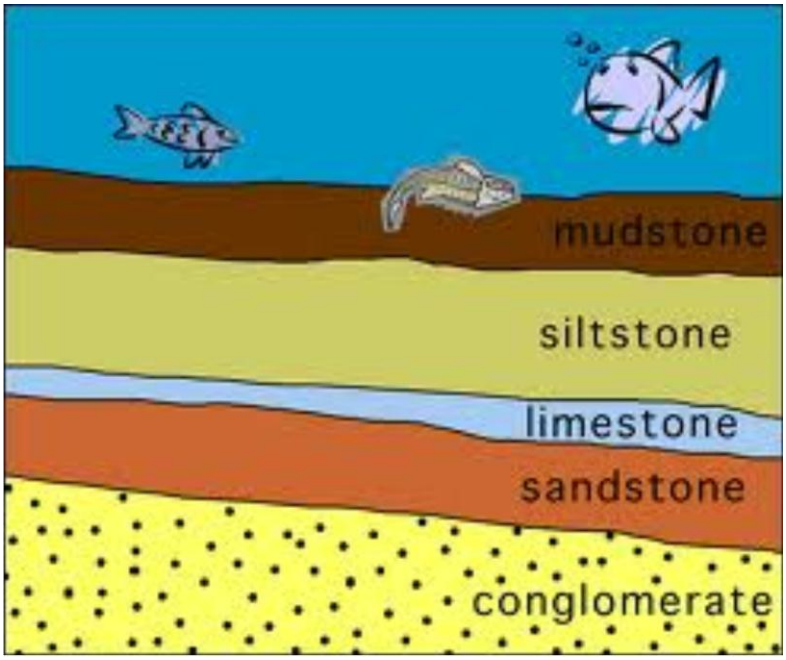
You start to cool down, solidify and turn into Igneous rock.

Show me with your body. Say something in character.

You are a result of weathering and erosion. You roll down the mountain leaving bits of you behind.

Show me with your body. Say something in character

You plop down into the lake at the foot of the mountain, break apart and form sediment.



Show me with your body. Say something in character.

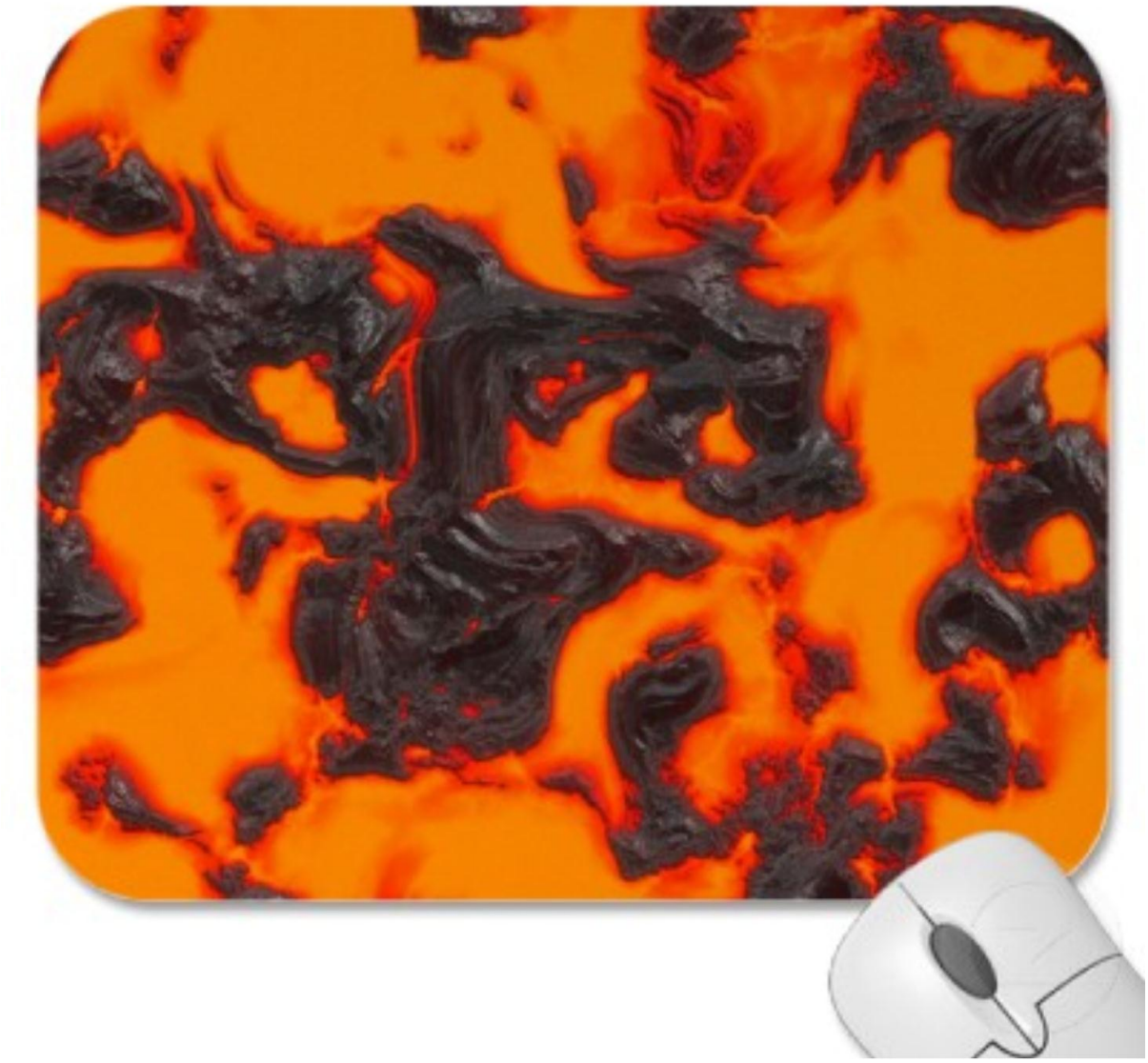
Time passes slowly. Hundreds of years. Millions of years. More layers of sediment form over you. These layers compact down on you. You join with the other layers and are cemented into a sedimentary rock.

Show me with your body. Say something in character.

Here you are millions of years later. You are buried deep in the earth. It's getting really hot underground and there is pressure building up on all sides of you. You are transformed into a metamorphic rock.

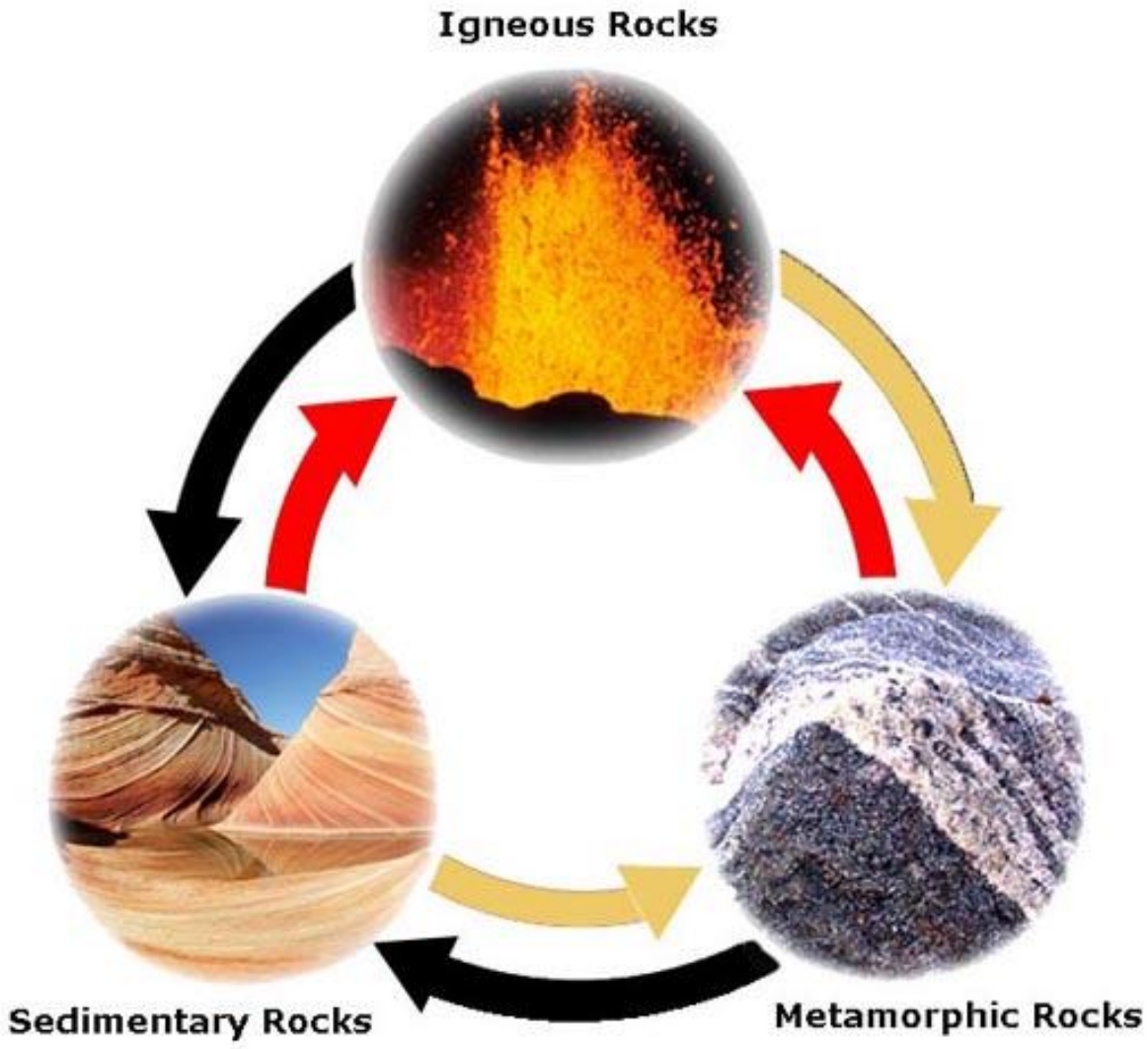
Show me with your body. Say something in character.

Now it is getting so hot that you are beginning to melt. You become magma once again and the whole process starts over again.



Show me with your body. Say something in character.

The Rock Cycle



Magma Monologue Charts Example

Character: **Magma** Man/Woman
Setting: Upper **Mantle** of the Earth's **Crust**
(Write down one sentence of **monologue.** Remember what you said during each part of the improvisation.)

Magma

Erupting Magma

Igneous

Weathering and Erosion

Sediment

Sedimentary

Metamorphic

Magma