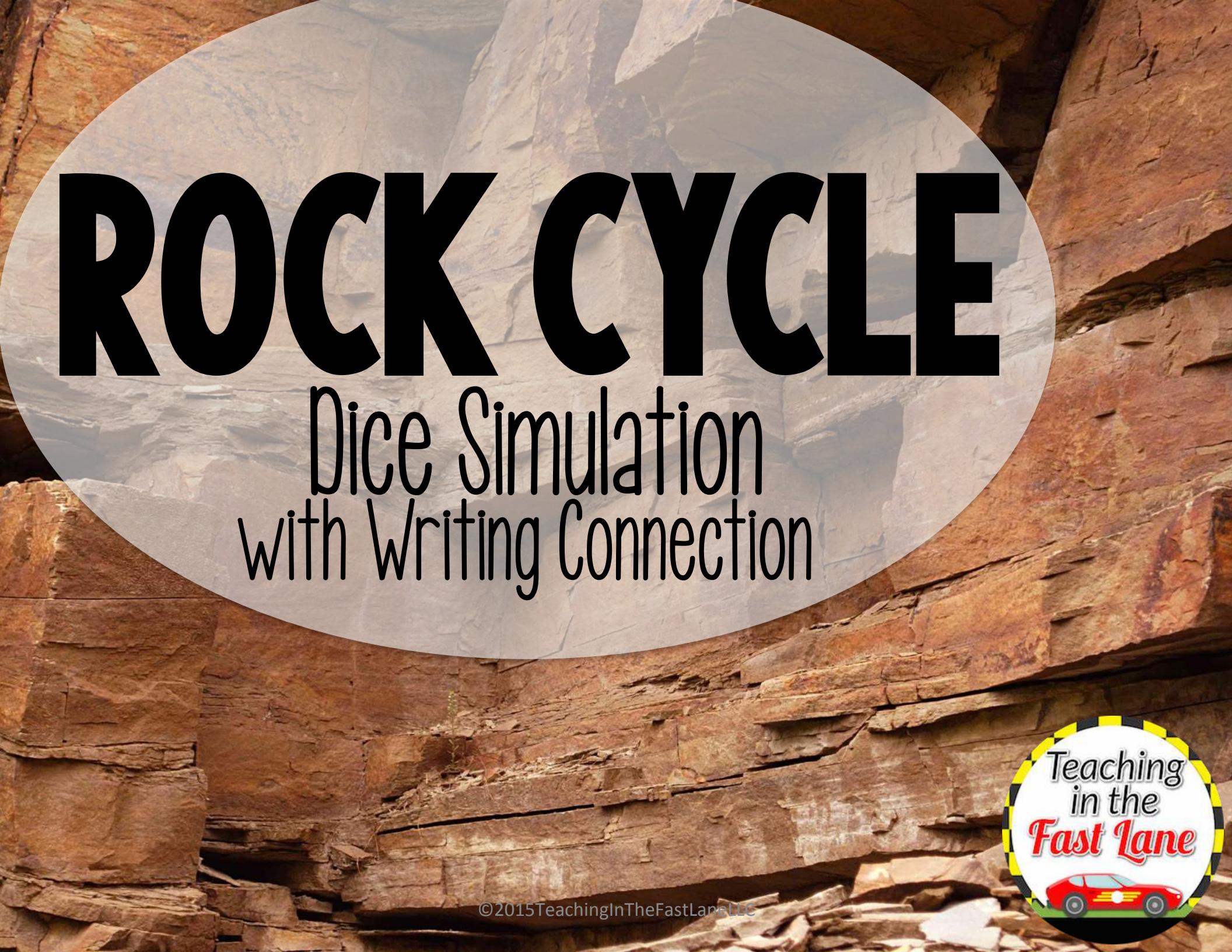

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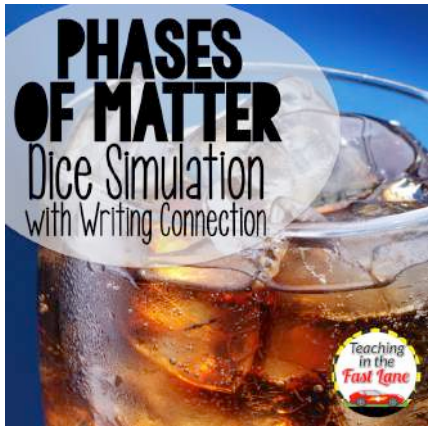
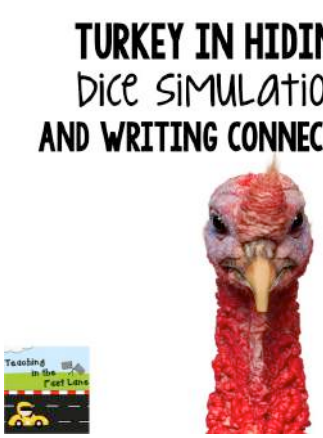
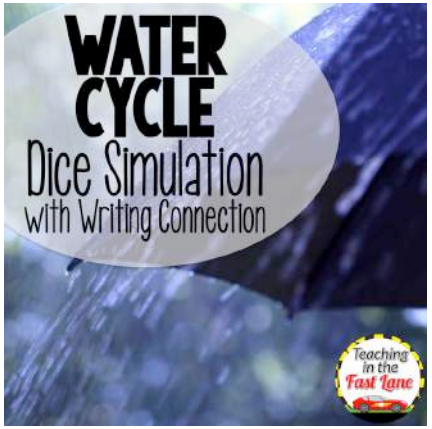
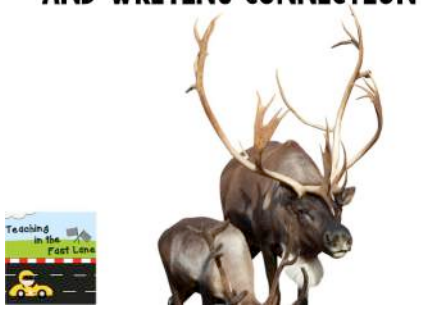
Teaching in the Fast Lane

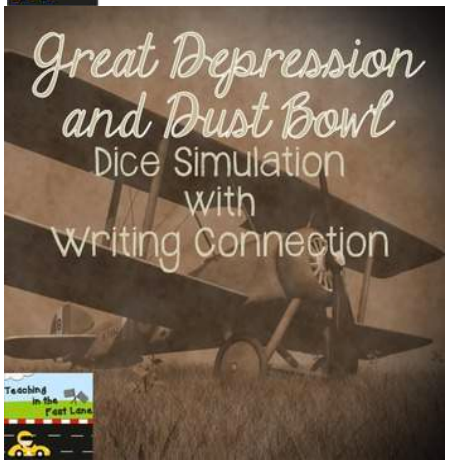
FOR MORE SIMULATIONS!











MANY MORE TO COME!

INCLUDED IN THIS PRODUCT:

- Teacher and student directions for simulation
- Recording sheet
- Sample recording sheet
- Teacher directions for narrative
- Sample narrative based on sample recording sheet
- Rubric for narrative
- Signs for each location with directions
    - For larger classes, I would make multiple copies of each poster and directions, so that lines at each don't get too long.

You will need five dice to complete this simulation. I recommend the large foam dice that can be found at the dollar store.

NOTE TO TEACHER

This is a simulation meant to reinforce students' knowledge of the rock cycle. This simulation is a great way to connect science and writing within your curriculum.

TEACHER DIRECTIONS FOR SIMULATION

- Print and laminate each of the location signs and student directions.
- Hang the location signs and student directions around your classroom and place one die by each poster.
- Hand out recording sheets to students and review the directions with them:
  - Directions are found on the next page.
- Monitor students as they travel around the classroom during the simulation and complete their recording sheet.
- Assign students to their starting location.
  - I do this by numbering students off #1-6 and assign them to the following locations:
    1. Magma
    2. Igneous Rock
    3. Sediment
    4. Metamorphic Rock
    5. Sedimentary Rock
    6. Sediment

DIRECTIONS FOR SIMULATION

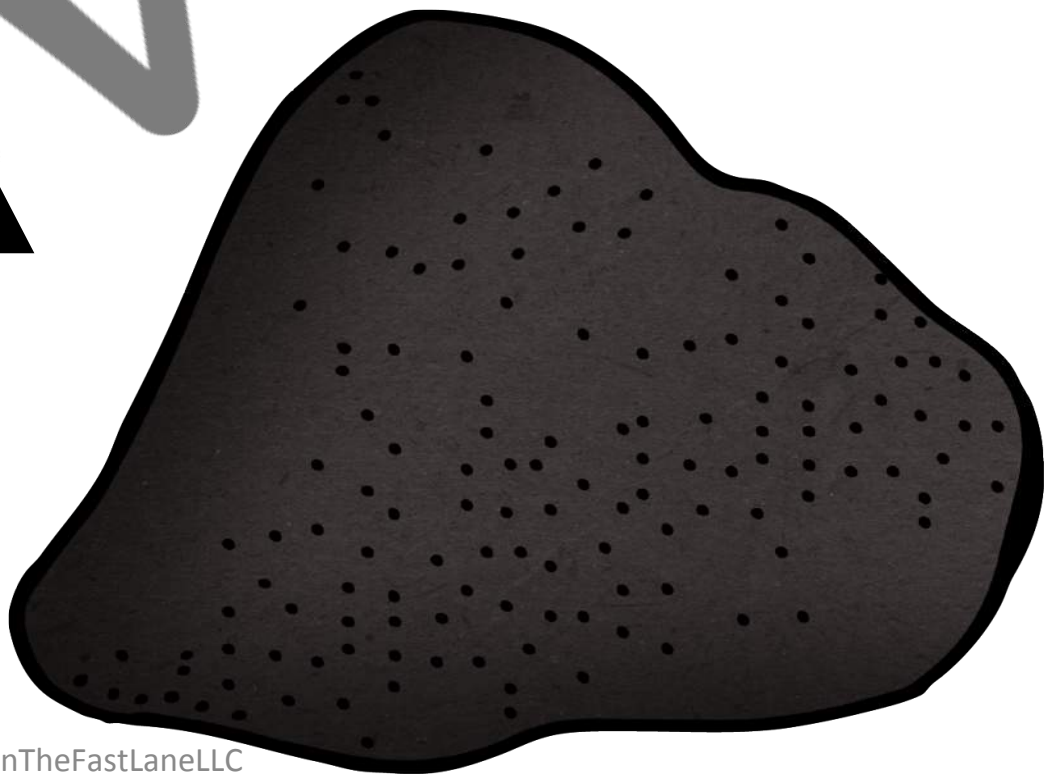
- After each student has their starting location, they should begin to circulate.
- At each location, roll the die and read the event associated with the number rolled. Use the underlined words to record your progress and travel to the next location.
- Once you have established your location, travel there quietly and wait in line to roll the die.
  - If your directive is to stay in the same location, then go to the end of the line and take another turn rolling the die.
- Students should continue to travel from location to location until they complete their recording sheet or time is up.
  - I would recommend allowing students to complete the simulation for about 10-15 minutes.

MAGMA

MAGMA

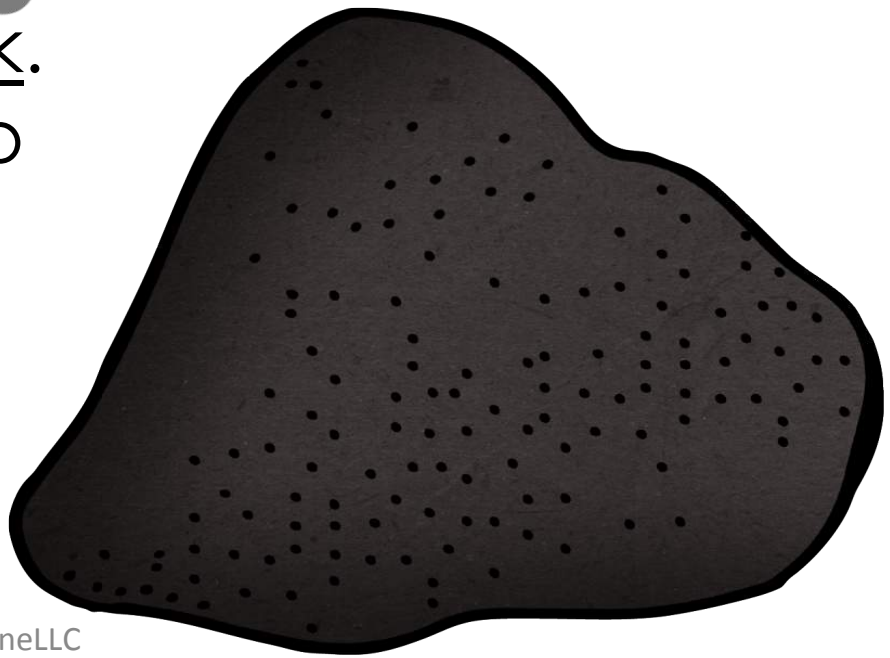
1. After being erupted from a volcano you plunge into the ocean and solidify into an igneous rock.
2. While high in the atmosphere you cool and form an igneous rock.
3. When you hit the ground you are weathered into many pieces of sediment.
4. After being erupted from a volcano you plunge into the ocean and solidify into an igneous rock.
5. You remain magma deep below the surface of the earth.
6. When you hit the ground you are weathered into many pieces of sediment.

IGNEOUS ROCK

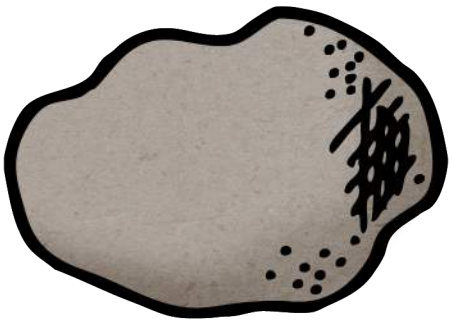


IGNEOUS ROCK

1. Extreme heat causes you to melt into magma.
2. Water crashing over you in waves weathers you into tiny pieces of sediment.
3. Extreme heat and pressure transforms you into a metamorphic rock.
4. You remain an igneous rock.
5. You remain an igneous rock.
6. Extreme heat causes you to melt into magma.

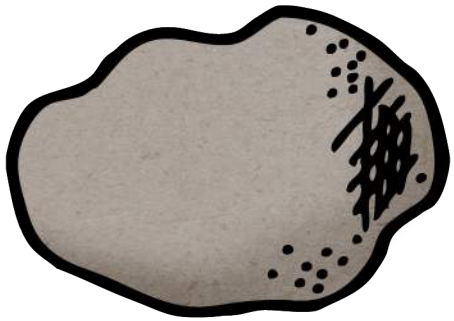


SEDIMENT



SEDIMENT

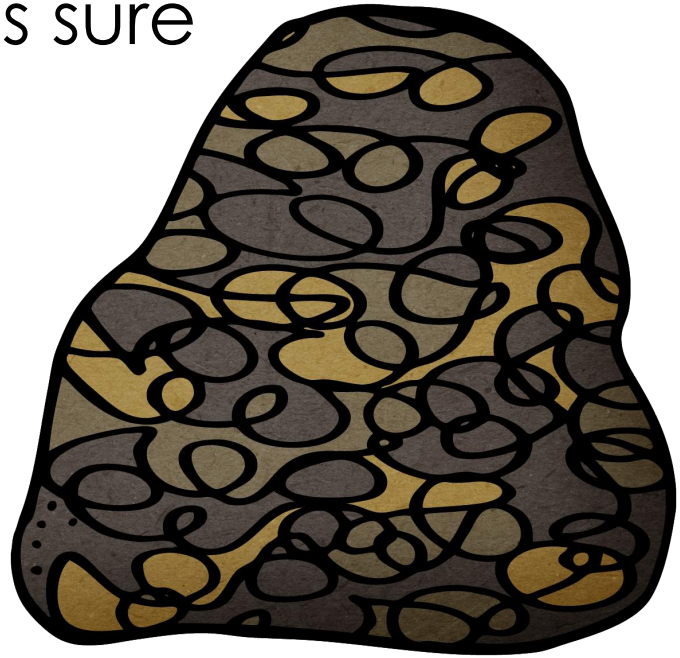
1. You are eroded in the wind, but remain sediment.
2. You are compacted with other sediment to become a sedimentary rock.
3. You are eroded along waves of water, but remain sediment.
4. You are compacted with other sediment to become a sedimentary rock.
5. You are eroded in the wind, but remain sediment.
6. You are compacted with other sediment to become a sedimentary rock.



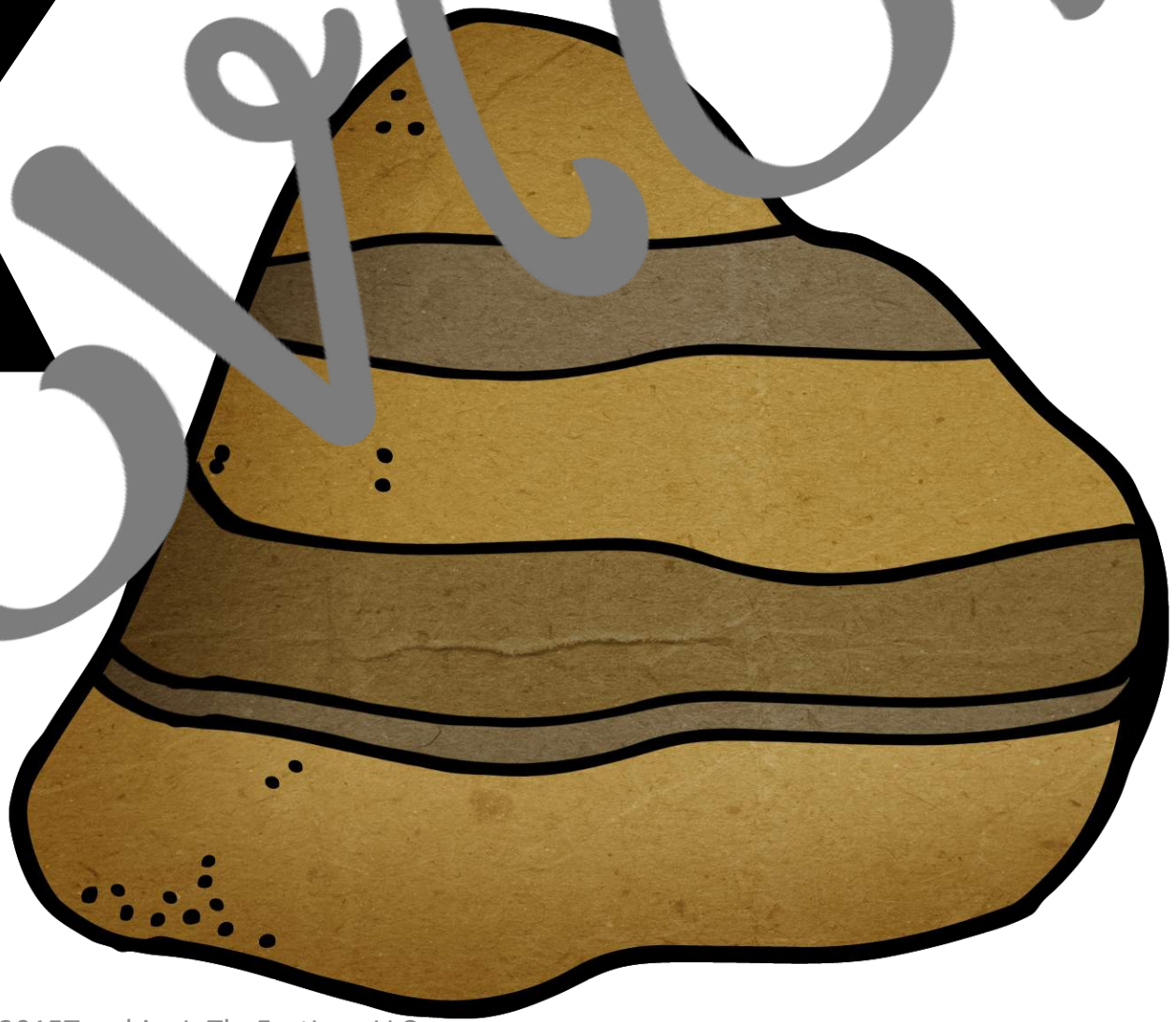
METAMORPHIC ROCK

METAMORPHIC ROCK

1. Extreme heat and pressure makes sure you stay metamorphic rock.
2. You are melted into magma.
3. You are weathered into sediment.
4. You are melted into magma.
5. You are weathered into sediment.
6. Extreme heat and pressure makes sure you stay a metamorphic rock.

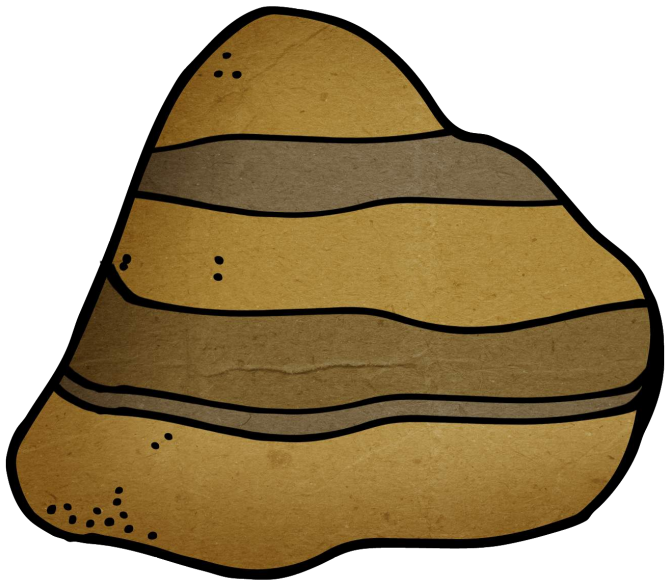


SEDIMENTARY ROCK



SEDIMENTARY ROCK

1. You are weathered into tiny pieces of sediment.
2. You are melted into magma.
3. You remain sedimentary rock.
4. You undergo extreme heat and pressure to become metamorphic rock.
5. You remain sedimentary rock.
6. You undergo extreme heat and pressure to become metamorphic rock.



Name_____ #___ Date____

ROCK CYCLE DICE SIMULATION

1	Begin	11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

SAMPLE RECORDING SHEET FOR ROCK CYCLE DICE SIMULATION

1	Begin as magma	11	Remain metamorphic rock
2	Cool into igneous rock	12	Melt into magma
3	Melt into magma	13	Cool into igneous rock
4	Cool then break into sediment	14	Weather into sediment
5	Compact into sedimentary rock	15	Compact into sedimentary rock
6	Remain sedimentary rock	16	Remain sedimentary rock
7	Melt into magma	17	Heat and pressure transform into metamorphic rock
8	Remain Magma	18	Remain metamorphic rock
9	Cool into igneous rock	19	Weather into sediment
10	Heat and pressure transform into metamorphic rock	20	Remain sediment

TEACHER DIRECTIONS FOR NARRATIVE

- After completing the dice simulation, students are ready to write a narrative from the point of view of a piece of sediment going through the rock cycle.
- Students should use their recording sheet (the locations they visited) to write a narrative piece about their adventure.
- By following their recording sheet and adding details, students will have a narrative describing their adventure. It is also important for students to use their science vocabulary in the narrative.
- It is alright for students to not use all of the locations on their recording sheet, but they should include at least five events.
- A rubric for the narrative is included.

SAMPLE NARRATIVE

The moment I erupted from the earth I felt so free. I flew higher and higher into the atmosphere and could feel my temperature dropping. As I cooled I became harder to maintain my free form self, as I hardened into a solid after reaching my final height I plunged deep into the ocean and cooled into a rock solid igneous rock.

As I drifted closer and closer to the ocean floor I began to feel the temperature rise again. I came to rest in the soft sand, but not a moment later I felt the ground open up and swallow me into an underground volcano. I very quickly melted back into magma. I have to say that I enjoyed the free flowing state that magma affords, but didn't so much enjoy being under the crust.

Before I knew it I was once again flying high into the atmosphere and cooling into a solid. This time though, instead of falling into the ocean I fell onto a hard rock cliff and splintered into a thousand tiny pieces of sediment. It was kind of freeing, but I felt as though I was missing a piece of myself when I became scattered all over the cliff. My perch on the cliff didn't last long, because I was soon blown into the valley below by a strong breeze.

Landing in the valley I had the most amazing view of the sky for just a moment before other pieces of sediment and then a larger rock fell on top of me. The pressure from the rock above forced me and other pieces of sediment together to form a sedimentary rock. It was nice feeling as though I belonged to something again.

The pressure pushing us together continued to increase as other rock fell on top of us, and I could feel the heat starting to build as well. Soon we were transformed into a metamorphic rock deep below the surface. The heat and pressure that melded us together turned us into a beautiful marble slab. It is here that I remain, but I have the sense that we will soon be melted into magma to continue our journey.

RUBRIC FOR ROCK CYCLE DICE SIMULATION NARRATIVE

	1 point	3 points	5 points
Grammar, Mechanics, & Spelling	Many mistakes that make it difficult for the reader to understand.	A few mistakes, but the reader can still understand.	Only 1-2 mistakes and the reader can understand.
Organization and Coherence	The story does not make sense or follow order of events.	The story follows order of events, but lacks coherence.	The story follows a logical order and is coherent.
Events from recording sheet	Includes 3 or less events from the simulation.	Includes 4-5 events from the simulation.	Includes 6 or more events from the simulation.
Details and Scientific Vocabulary	No details are added. Academic vocabulary is not present	A few obvious details are added along with some academic vocabulary.	Many imaginative details are added. Clear use and knowledge of academic vocabulary is present.

Total Score __/20

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