

LCM Formal Loop

<p>LCM Lesson Plan: Viscosity Studies</p> <p>Standards: (OLD) Science A7, B1; L. Arts A 1,2,5 <i>[(NEW) Science D2, GLE SD2.2; L. Arts B 3 Cultural B2 E2]</i></p> <p>Science concept: Viscosity of a liquid is its resistance to flow. (Composition/viscosity of magma affects lava flows.)</p>	<p>Name Judy Onslow</p> <p>Grade level 7/8</p> <p>School Girdwood</p>	
<p>Gear- Up Watch a 5-7 minute video clip of the Mount St Helen's eruption – then students create the K / W / L chart of what they know about that eruption and volcanic eruptions in general.</p>	<p>Process Skills</p> <p>Observe Communicate Inference</p>	<p>Materials</p> <p>Video – GEAR UP</p>
<p>Explore What are some thick fluids? What are some thin fluids? How could you test how thick or thin a fluid is and compare it with another? Give students a variety of liquids, plastic beads, and graduated cylinders, and see what methods they come up with as tests. Gather some data to begin a discussion.</p>	<p>Observation Inference Prediction Communication</p>	<p>Water Cooking oil Shampoo Glycerin Liquid Detergent Karo Syrup Alcohol</p> <p>Graduated cylinders Plastic beads Hematite beads Small glass marbles Stopwatches</p>
<p>Generalize: Discuss variables. Did the same thing happen to the beads in all fluid samples and in all tests? Why did results vary? When the beads fall – do they all fall at the same rate? What influences that rate? How can you manipulate one liquid to change the rate of fall? How can you change the viscosity of fluids? Temperature? Pressure? Concentration?</p>	<p>Communicate</p>	<p>Vocabulary Viscosity Aa Pahoehoe Pyroclastic flow</p>

<p>Experiment: Using different fluids, thick to thin, have students create an experiment changing just one variable to see if they can determine how the viscosity of a fluid and time are related.</p> <p>Students need to keep detailed of volumes, liquids, and times.</p> <p>(If making a mixture – be sure it is uniformly stirred.) (Clean out the graduated cylinders thoroughly with soap and water before trying a new fluid.)</p>	<p>Experiment Inference Observe</p>	
<p>Interpret: Display your group results in a data table and on a graph. Make sure the graph is easy for anyone to understand. Write a brief paragraph to explain these results. Be able to compare your results with other groups.</p>	<p>Communicate Graph</p>	
<p>Apply/Assess: Did the viscosity of a fluid have an effect on the rate of flow?</p> <p>How would the viscosity of lava and its rate of flow impact a community that is close to the eruption?</p> <p>How does viscosity affect the explosiveness of an eruption? (Think Hawaiian vs. Mt St Helens)</p> <p>Can you think of implications this might have for Seattle in the shadow of Mt. Rainier?</p>	<p>Communicate</p>	
<p>Extensions: LArts & Cultural Write a Pourquoi “Why” story about the god of fire, Vulcan. In the Roman myth Vulcan uses the heat from Mt. Etna to forge of weapons and armor of other ancient gods and heroes.</p> <p>Check out the word plutonic / relate to Roman mythology. (Pluto- God of the underworld)</p> <p>What are other cultures traditions / myths / stories about the volcanoes they live on or near? Italy – Pompeii -Vesuvius; Mexico -; Philippines - Pinatubo, Hawaii – Kilauea; Alaska - ; Iceland -.</p> <p>Science:</p> <ul style="list-style-type: none"> • Manipulate the temperature and do the same experiment. • Use a plexiglass sheet and test flow 	<p>Observation Collecting Data Graphing</p>	

Volcanoes, Viscosity & Magma Scoring Guide

	FAULTED (Not Proficient) 1 -----2-----3	BASIC BASALT (Proficient) 4-----5-----6	MAGMA cum Laude (Advanced) 7 -----8-----9
Item # 1	Played with materials – during exploration; but little or no thought put into why the fluids acted or reacted as they did. (Exploration)	During exploration started seeing patterns and possibilities for further testing / or explanations.	Participates fully in exploration – has purpose in the method of exploring the materials.
Item #2	No idea. What’s viscosity? What’s a variable? Little or no participation generalization discussion. (Generalize)	Makes some connection between the viscosity (thickness of the fluid) and the time it takes for the beads to fall / liquid to flow. Willing to participate and give ideas during the generalization discussions.	Participates fully and intelligently in the generalization discussions. Backs up comments with examples from exploration results.
Item # 3	“What? You mean I was supposed to listen and do something?” (Experiment)	Followed directions, for the most part, required lots of teacher guidance – experiment may have more than one variable.	Followed the directions with minimal teacher interaction and successfully created an experiment using one variable.
Item # 4	No idea that this is anything but messy and fun. (Apply & Assess)	Makes some connection between the viscosity (thickness of the fluid) and the time it takes for the beads to fall / liquid to flow.	Can explain succinctly either orally or in writing (Science Journal) how the viscosity of a liquid is related to time – AND can propose a relationship between viscosity and lava flows.
Item # 5	Could Care Less Carlyle Needs reminders 4+ times to return to task during the period. Seldom asks questions or poses any kind of related conversation.	Interested (for the most part) Ivan On task with fewer than 2-3 reminders from teacher. Asks questions, usually on the topic, tries to relate to the project at hand.	Seriously Scientific Sal On task, interested in what is happening, asks questions, poses inferences, relates to outside experiences.