

The Geological Game Design Project

The task: Create a multi-level video game on Gamestar Mechanic that demonstrates your knowledge of an area of Geology. The game must include specific vocabulary from the Science Unit as well be centered around a narrative short story idea. You will also be keeping a “game developer’s log” through each step of this process, reflecting on the experience (the ideas you have, the difficulties you run into, the successes you have, etc.) This writing log will take place at our Electronic Pencil weblog site.

Level One: Brainstorm ideas for a possible story idea that will frame your game. (Consider *Journey to the Center of the Earth* as an example of a story with a science theme). Think of ways you can explain a scientific concept of Geology (Layers of the Earth, plate tectonics, the inside of a volcano, surviving an earthquake, convection flows, etc.) in a fun and meaningful way. Remember: your story must also have specific scientific information about your topic so that the “player” of your game “learns” something about the science while being challenged in your game.

Level Two: Create a paper storyboard of your game idea. The storyboard should document the levels of play in the game, the themes of each level, and include a basic storyline for each level. (For example, what does a player have to accomplish to get to the next level -- think of levels as chapters in a book)

Level Three: Work on a prototype (rough draft) of your game in Gamestar Mechanic.

Level Four: Find a classmate or two to play your game in the prototype mode. Use the feedback sheet to gather input from the player(s). Make improvements. Repeat this step, if necessary.

Level Five: Publish your game to the Gamestar Community. Pay attention to the “game stats” that will give you information about the way people have played your game. Rework your game (the iterative process) to make it better. (Note: You will need to make your way through the first Quest as a player in order to gain access to publish to the Gamestar site).

(Optional) Level Six: Submit your game to the national STEM Computer Game Competition (Mr. Hodgson and Mrs. Rice will help you with this step).

Geological Game Design Expectations

Game Design Expectation	Meeting Expectations
Reflective Gamer Log (posted at the Electronic Pencil)	Journal entries show good thinking skills and are reflective on the experience of creating a video game. Each entry is at least five sentences long.
Storyboard	The storyboard is a clear visual map to the game design process. It includes sketch drawings of the levels of the game, short narrative writing, and directions for playing the game.
Scientific Concepts	The game uses at least five specific vocabulary terms from the Geology unit (see list) and the game is built around an explanation of a scientific idea.
Final Game Design	The game is challenging, but not impossible. The design of the game (including use of colors, choice of characters, use of gaming elements to represent ideas) show planning and thoughtfulness. The final game reflects changes from the feedback stage, and it is published to the Gamestar Mechanic community.

Geological Game Design Project

Name of your Game: _____

Level	Image	Narrative Description

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Geological Terms

Active – a volcano which is currently erupting (gas, ash, steam, full-blown eruption, etc.) or has erupted recently in recorded history

Alfred Wegener - German meteorologist who first suggested the idea of continental drift and Pangaea in the early 1900's

Anticline – The upward fold or peak in a fold mountain

Asthenosphere – a region in the interior of the earth that is directly below the lithosphere. This is made up of magma (molten rock) and is where convection currents take place. The tectonic plates “float” on this region

Continental crust –this crust is made up of land masses and is thicker than oceanic crust but less dense

Continental drift – a theory proposed by Alfred Wegener (but not supported at first) that the continent have slowly moved (drifted) over time to their current location.

Convection currents – the process which is responsible for moving the tectonic plates. This process occurs within the asthenosphere and is the movement of hotter magma at the bottom of the asthenosphere rising because it is less dense. As the magma reaches the top of the asthenosphere it becomes cooler because it is farther away from the core. Because it is cooler it becomes more dense and so it sinks. This is a continuous movement of magma rising and falling.

Convergent plate boundary – a boundary between two plates which are moving towards each other

Crust – this is the thinnest layer of the earth and is made up of continental crust and oceanic crust

Divergent plate boundary – a boundary between two plates which are moving away from each other

Dome mountain – a mountain which is created by magma heaving the crust upwards creating a dome shape, but the magma cools before ever breaking through the crust.

Dormant – a “sleeping” volcano. This volcano is not currently erupting but may become active again at some point in the future.

Earthquake - a sudden release of stored up energy within the earth. This energy is released in the form of seismic waves. P-waves and S-waves are waves which occur in the body of the earth (interior) and Love waves and Raleigh waves are waves which occur on the surface.

Epicenter - The place above ground where the earthquake is the strongest. The Love waves and Rayleigh waves would start from this point.

Extinct – This volcano has not erupted in a very long time and scientists believe that it will never erupt again

Fault – a large, deep crack in the earth that goes through the lithosphere

Fault block mountain – a mountain which is formed at a fault where blocks of crust are moved vertically in relation to each other

Focus – the place underground where the earthquake begins and is the strongest. The P-waves and S-waves would start from this point. It is also called the hypocenter.

Fold mountain – a mountain which is formed at a convergent plate boundary as layers of the crust are

folded into a series of high points and low points without the layers faulting (breaking)

Hot spot - a stationary pocket of extremely hot magma in the asthenosphere which is hotter than the surrounding magma. Because of this, the magma burns through the crust above creating a volcano. As the tectonic plate moves over this hot spot, the volcano also moves off the hot spot and become extinct. Now the hot spot burns through another area of the crust creating a new volcano. This creates “chains” of volcanoes (the Hawaiian Islands were formed in this way)

Hypocenter – another name for the focus of an earthquake

Inner core – the center of the earth. This is a solid ball of iron and nickel. It is solid because it is under so much pressure from all of the other layers.

Lava – molten rock which is erupted OUT of a volcano

Lithosphere – the name for the region of the earth made up of the crust and upper part of the mantle. This is solid and is what the tectonic plates are composed (made up) of.

Magma – molten rock INSIDE the earth

Mantle – this is the thickest layer of the earth. The upper part of the mantle is solid and is combined with the crust to make up the lithosphere. The lower part of the mantle (directly below the lithosphere) is made up of magma and is called the asthenosphere.

Mid ocean rift – this is another name for seafloor spreading

Oceanic crust – this crust is found under the oceans and is thinner than continental crust but is more dense

Outer core – this is a liquid layer of iron which surrounds the inner core. The earth's magnetic field is found here

Pangaea – the name of the giant land mass from over 200 million years ago when all of the continents were joined together

Seafloor spreading – occurs at a divergent boundary when two plates with oceanic crust at their edges move away from each other. As they do, magma from the asthenosphere comes up between the plates creating new crust.

Subduction – occurs at a convergent boundary when a plate with oceanic crust is moving towards a plate with continental crust. The oceanic crust will be pushed under the continental crust because it is denser. As the plate is pushed into the asthenosphere the crust melts creating new magma.

Syncline - the downward fold or peak of a fold mountain

Tectonic plates – made up of the lithosphere and it is the giant pieces that all of the earth's land masses and oceans are broken up on

Transform plate boundary - boundary between two plates which are sliding or slipping past each other

Viscosity – the rate or speed at which a substance flows

Volcano – a type of mountain on the earth's crust which is formed from magma eruptions