Rock Cycle Game

The rock cycle is a dynamic force that drives geologic activity and affects entire continents, the formation and destruction of mountains, global weather and ultimately all life on Earth. In this game you will model what can happen to a bit of rock or sediment as it moves through the rock cycle.

Background:

Various stages and rock types in the rock cycle, such as *melting*, *cooling* or *metamorphic*, are located at 11 different stations. Each station has a "die" – a box that is labeled on each of its six sides. The sides of the dice are marked to reflect the relative likelihood of materials actually moving through these stages. For example, rock material may remain in a molten state inside the earth for long periods of time. To show this, the die at station # 10, "Magma," has four sides that say "magma (stay as you are)" and just two sides that say "cooling and hardening." If you roll the "magma (stay as you are)" side of the die, you will stay at station #10 and roll again when it is your turn. If you roll one of the sides that say "cooling and hardening" you would move to station #9, the "Cooling and Hardening (crystallization)" station.

1. Begin by choosing one station to start at. There are 11 stations so there should be two or three students at each station at the beginning of the game. It does not matter where you start; you probably will have a chance to visit most of the other stations during the game.
2. Use you data table to record the # of the station you begin at in the column marked "station #." Record the name of your station in the column marked "station name."
3. Now you get to roll the die. Since this is your first roll, put a 1 in the data column box for "roll #." After rolling the die, record what the die instructed you to do in the "what happened" column of the data table.
4. In reality there is no set formula for how long rocky material spends at each stage of the rock cycle. It may speed through in just 200,000 years or so, or it may stay at the same point in the cycle for millions of years. For the purposes of this game, count each roll of the die as 200,000 years. Even if you end up staying at the same place for multiple turns, every time you roll the die you add another 200,000 years to the age of your rock.
5. Record each of these pieces of information in your data table each time you have a turn. It is important to keep careful records, as you will need the information to complete a "data summary" and answer some questions at the end of the game.

STATION # 1

COMPACTION and CEMENTATION

STATION # 2

HIGH TEMPERATURE and PRESSURE

STATION # 3

SEDIMENTS

STATION # 4

IGNEOUS ROCK

STATION # 5

TO THE SURFACE

STATION # 6

METAMORPHIC ROCK

STATION # 7

SEDIMENTARY ROCK

STATION # 8

MELTING

STATION # 9

COOLING and HARDENING (crystallization)

STATION # 10

MAGMA

STATION # 11

WEATHERING and EROSION

Station #1: Compaction and Cementation

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GO TO

SEDIMENTARY ROCK

YOU ARE STILL COMPACTING and CEMENTING STAY WHERE YOU ARE

GO TO

SEDIMENTARY ROCK

YOU ARE STILL COMPACTING and CEMENTING STAY WHERE YOU ARE

GO TO

SEDIMENTARY ROCK

YOU ARE STILL COMPACTING and CEMENTING STAY WHERE YOU ARE

Station # 2: High Pressure and Temperature

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		GO TO METAMORPHIC ROCK	
YOU ARE STILL AT HIGH TEMPERATURE and PRESSURE STAY WHERE YOU ARE	GO TO METAMORPHIC ROCK	YOU ARE STILL AT HIGH TEMPERATURE and PRESSURE STAY WHERE YOU ARE	GO TO METAMORPHIC ROCK
		YOU ARE STILL AT HIGH TEMPERATURE and PRESSURE STAY WHERE YOU ARE	

Station # 3: Sediments

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		YOU ARE STILL SEDIMENTS STAY WHERE YOU ARE	
GO TO COMPACTION and CEMENTATION	YOU ARE STILL SEDIMENTS STAY WHERE YOU ARE	GO TO COMPACTION and CEMENTATION	YOU ARE STILL SEDIMENTS STAY WHERE YOU ARE
		YOU ARE STILL SEDIMENTS STAY WHERE YOU ARE	

Station # 4: Igneous Rock

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		GO TO MELTING	
GO TO WEATHERING and EROSION	GO TO MELTING	GO TO WEATHERING and EROSION	GO TO HIGH TEMPERATURE and PRESSURE
		GO TO HIGH TEMPERATURE and PRESSURE	

Station #5: To the Surface

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		GO TO WEATHERING and EROSION	
GO TO WEATHERING and EROSION	YOU ARE STILL AT THE SURFACE STAY WHERE YOU ARE	GO TO WEATHERING and EROSION	YOU ARE STILL AT THE SURFACE STAY WHERE YOU ARE
		GO TO WEATHERING and EROSION	

Station # 6: Metamorphic Rock

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		GO TO HIGH TEMPERATURE and PRESSURE	
GO TO THE SURFACE	GO TO MELTING	GO TO HIGH TEMPERATURE and PRESSURE	GO TO MELTING
		GO TO THE SURFACE	

Station # 7: Sedimentary Rock

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		GO TO WEATHERING and EROSION	
GO TO MELTING	GO TO HIGH TEMPERATURE and PRESSURE	GO TO MELTING	GO TO WEATHERING and EROSION
		GO TO HIGH TEMPERATURE and PRESSURE	

Station # 8: Melting

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		YOU ARE STILL MELTING STAY WHERE YOU ARE	
YOU ARE STILL MELTING STAY WHERE YOU ARE	GO TO MAGMA	YOU ARE STILL MELTING STAY WHERE YOU ARE	GO TO MAGMA
		GO TO MAGMA	

Station #9: Cooling and Hardening (crystallization)

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		GO TO IGNEOUS ROCK	
GO TO IGNEOUS ROCK	YOU ARE STILL COOLING and HARDENING STAY WHERE YOU ARE	GO TO IGNEOUS ROCK	YOU ARE STILL COOLING and HARDENING STAY WHERE YOU ARE
		YOU ARE STILL COOLING and HARDENING STAY WHERE YOU ARE	

Station # 10: Magma

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		YOU ARE STILL MAGMA STAY WHERE YOU ARE	
YOU ARE STILL MAGMA STAY WHERE YOU ARE	GO TO COOLING and HARDENING	YOU ARE STILL MAGMA STAY WHERE YOU ARE	GO TO COOLING and HARDENING
		YOU ARE STILL MAGMA STAY WHERE YOU ARE	

Station # 11: Weathering and Erosion

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		GO TO SEDIMENTS	
YOU ARE STILL WEATHERING and ERODING STAY WHERE YOU ARE	GO TO SEDIMENTS	YOU ARE STILL WEATHERING and ERODING STAY WHERE YOU ARE	GO TO SEDIMENTS
		YOU ARE STILL WEATHERING and ERODING STAY WHERE YOU ARE	

DATA

ROLL #	STATION #	STATION NAME	WHAT HAPPENED Stay as _____ or change into ____?