Rock Cycle Routes

Track how Earth materials change and move.

MS-ESS2-1 "Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation..."

NAME _____ DATE _____

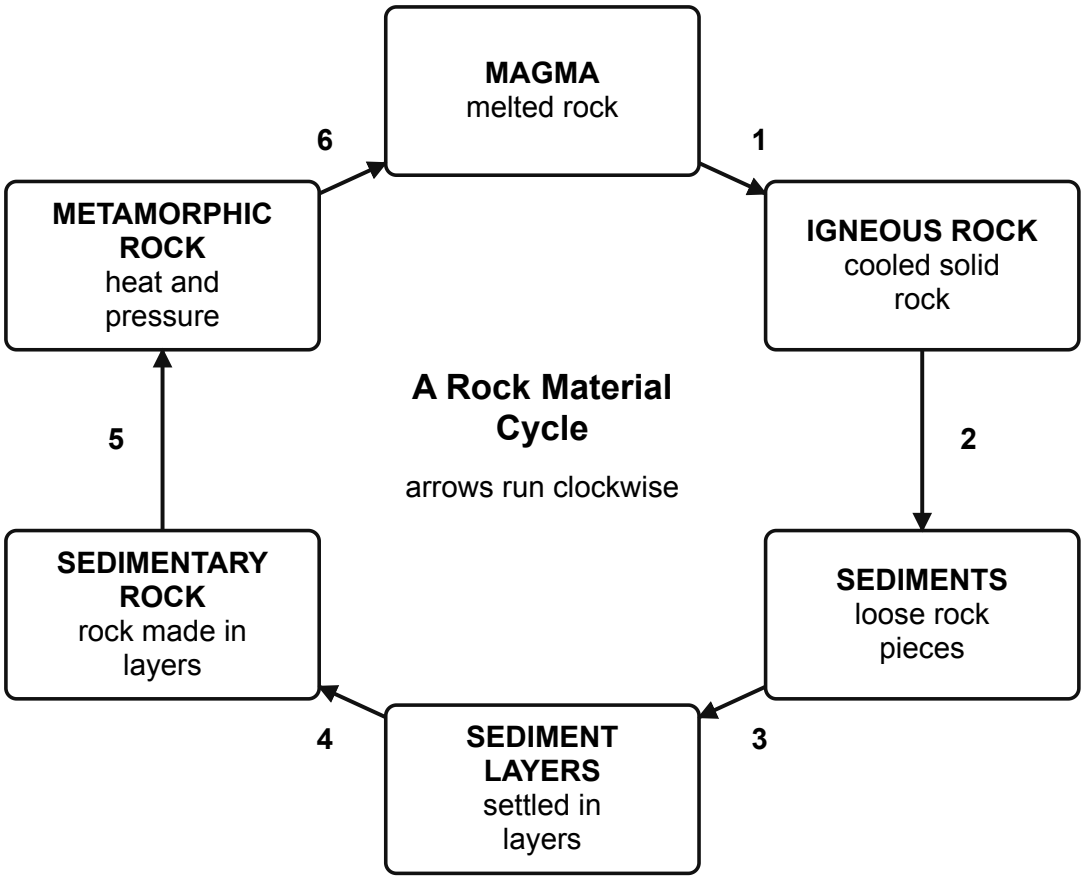
1 LABEL THE MODEL

Word bank below

Use each word-bank process once. Write one process in each numbered box to show how materials move or change. Then develop the model further on separate paper: redraw the material route and add dashed arrows for energy transfer, using a legend to distinguish energy arrows from material arrows. Label Earth's hot interior and the Sun as energy sources. Connect interior thermal energy to melting and heating/deformation, and solar energy to surface water movement and weathering. Add erosion/transport before sedimentation and show gravity moving sediment downhill. At crystallization, show thermal energy leaving the cooling magma for its surroundings. Explain two ways energy transfers drive material changes or movement; do not draw energy returning in a closed cycle.

WORD BANK

- Compaction and cementation
- Crystallization
- Heat, pressure, deformation
- Melting
- Sedimentation
- Weathering


MAGMA
melted rock
1
IGNEOUS ROCK
cooled solid rock
2
SEDIMENTS
loose rock pieces
3
SEDIMENT LAYERS
settled in layers
4
SEDIMENTARY ROCK
rock made in layers
5
METAMORPHIC ROCK
heat and pressure
6
A Rock Material Cycle
arrows run clockwise

Arrow numbers match the response boxes in this student section.

Label the arrows

Use the word bank to write the process for each numbered arrow.

Arrow 1	**Arrow 2**	**Arrow 3**
Arrow 4	**Arrow 5**	**Arrow 6**

2 RUN THE MODEL

Use your finished diagram

1. Which process changes MAGMA into IGNEOUS ROCK?

2. What stage comes immediately after SEDIMENT LAYERS?

3. Starting at SEDIMENTARY ROCK, which two processes take the material to MAGMA?

3 CHECK IT

Before you turn it in

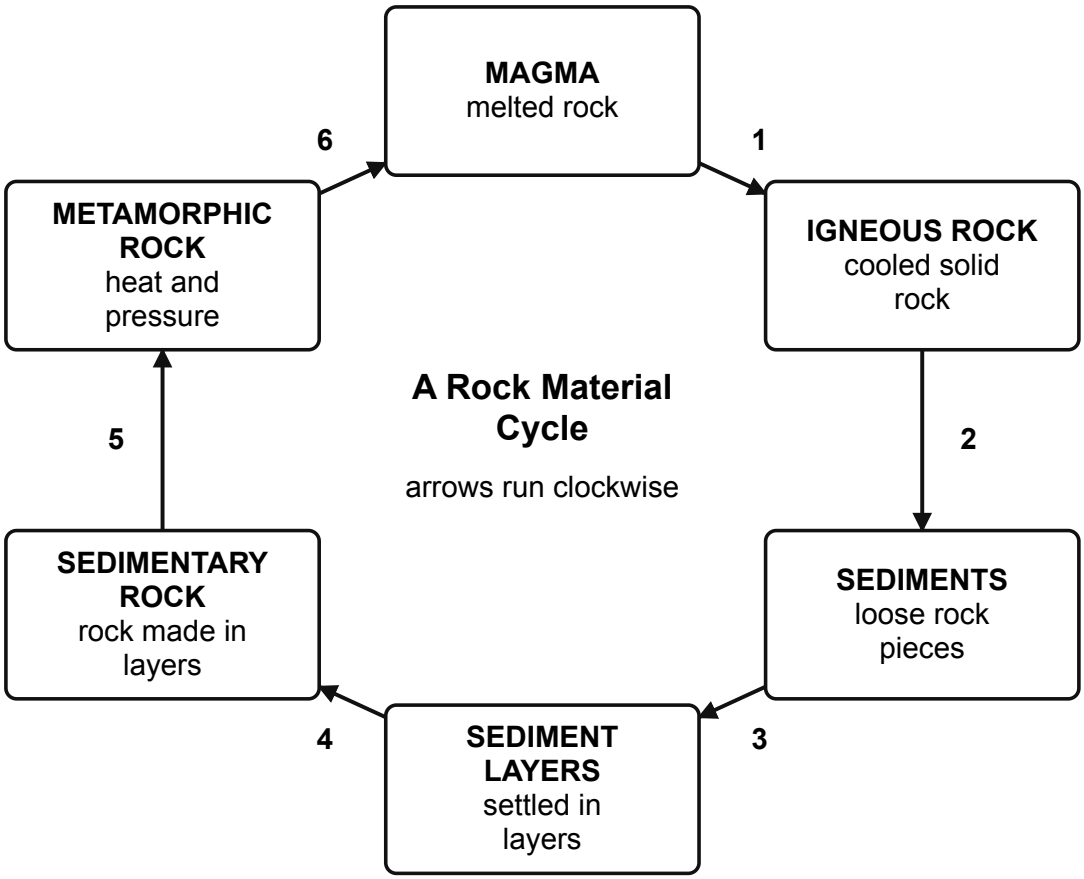
- [ ] I used each process once.
- [ ] I followed every arrow.
- [ ] I modeled material and energy.

TEST THE MODEL

What is one way this model leaves out part of the real rock cycle?

Rock Cycle Routes

PART 1 · COMPLETED MODEL



Arrow 1 Crystallization	**Arrow 2** Weathering	**Arrow 3** Sedimentation
Arrow 4 Compaction and cementation	**Arrow 5** Heat, pressure, deformation	**Arrow 6** Melting

PART 2 · RUN THE MODEL

1. **Crystallization.** (Which process changes MAGMA into IGNEOUS ROCK?)
2. **SEDIMENTARY ROCK.** (What stage comes immediately after SEDIMENT LAYERS?)
3. **Heat, pressure, deformation, then melting.** (Starting at SEDIMENTARY ROCK, which two processes take the material to MAGMA?)

TEST THE MODEL (SAMPLE ANSWERS)

- It leaves out erosion that moves sediments to a new place.
- It leaves out that metamorphic rock can weather into sediments.

Accept the listed word-bank processes in the shown arrow order. This model shows one main rock-cycle pathway, although real Earth materials can follow other pathways. Require the learner's expanded model as well as the six original process labels. Accept dashed energy arrows from the hot interior to melting/heating and from sunlight to surface processes through the water cycle, with cooling magma transferring thermal energy to surroundings. Gravity drives downhill movement and sediment settling; it is not a new supply of matter. Solar energy can drive weathering indirectly through water movement and temperature changes. Require erosion/transport and an explanation connecting two energy transfers to material processes. Energy flows through the system rather than cycling like rock material. The supplied route is one simplification; other accurate rock pathways are valid.