

Lab: Formation of Igneous Rocks!

ANSWER KEY

adapted from a lab entitled "Igneous Rocks"

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Today we are going to be studying igneous rocks. We are going to make two igneous rocks and explore how they are formed. **Take a look at rocks A-D in your box.** (A-Granite, B-Rhyolite, C-Gabbro, D-Basalt) You can remove these four rocks and put them on your desk.

1. What observations can you make about these rocks?

Igneous rocks have crystals, some are big, some are small crystals. Some rocks are colorful, others are only one color, etc.

2. What do you think makes the color in these rocks?

Crystals/minerals/other rocks inside

3. Do you see crystals in all four of the rocks? What ideas do you have about why you can see crystals well in some but not in others?

No- only in granite and gabbro (some may say rhyolite). Because they cool slowly?

We are going to find out why. I have melted minerals to make magma. I am going to put this magma on wax paper and I want you to **observe what happens.**

4. What did you see?

Cooling and crystal formation! The rock forms.

This is how igneous rocks are formed! Remember what forms igneous rocks from magma? Cooling! The amount of time magma has to cool affects the size of the crystals.

5. Do you think the crystals in the rock would be bigger or smaller if this magma cooled at a higher temperature? Would they be bigger or smaller if cooled at a lower temperature?

Create a Hypothesis:

*Faster the magma cools, the smaller the crystals
Slower the magma cools, the larger the crystals*

How will you test this Hypothesis? Write out your experimental plan:

*We will cool the magma at higher/lower temperature
OR
We will cool the magma more slowly / faster.*

Carry out your experiment

1. What did you observe this time?

If you use ice, you get smaller crystals...warmer, larger crystals- answers vary

2. How did your test affect the crystallization of the magma?

It went faster/slower

3. How does the magma we cooled at room temperature compare to your cooled magma?

If used ice- mine has smaller crystals OR if use warmer- mine has larger crystals

4. Which magma has larger crystals, one that cools quickly or one that cools slowly? Why do you think this is?

Slowly, crystals have more time to form.

Post-lab questions:

1. Compare the rocks you made with the four igneous rocks in your box (A-D). Which do you think cooled slowly? Why? Which do you think cooled quickly? Why?

Slowly- Granite and Gabbro

Quickly- Basalt and Ryholite

2. Can you think of any place on earth where magma pushes through the crust to become lava and cools quickly? If it cools quickly, will you be able to see the minerals easily?

Volcanoes OR sea floor spreading

The lava to make these rocks extrudes from, or comes out of, the earth. These rocks are called **extrusive** and were formed outside of the earth's crust. They cool quickly and so have small minerals that are hard to see.

3. Which rocks in your set are **extrusive** and came from volcanoes?

Rhyolite and Basalt

Intrusive rocks stay inside the crust until the rock has completely crystallized. We have to wait millions of years until these huge pockets of rock are exposed by plate tectonics and erosion to see them. The mountains at Yosemite are actually huge pockets of intrusive rock that cooled inside the earth and were later exposed.

4. Which of your rocks are **intrusive** rocks?

Granite and Gabbro