

Stamper Record

(to get a current version, go to <http://bit.ly/fossilstamp>)

S.7.ESS.4 Students will construct a scientific explanation based on evidence from rock strata for how the geologic timescale is used to organize Earth's 4.6-billion-year-old history.

(Also **S.8.LS.6** Students will analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.)

The purpose of this activity is to give students an introduction to how the fossil record was created, using a high-energy, hands-on activity. Essentially, you're going to have the students create a fossil record by stamping or drawing on sheets of paper. This activity can be modified in a variety of ways to make it more or less complicated, more or less affordable, and more or less chaotic.

Students will travel around the classroom to various stacks of paper. They will stamp or draw a shape with a particular color. The teacher (or a designated student) will add sheets of paper to the stack. The teacher will also tell students when to switch colors, stamps, or shapes. This will create a model of the fossil record, where the "organisms" change over time, with some going extinct and others evolving.

Materials

Self-inking stampers (pinterest version) **OR** markers (budget version)

Paper (ideally to-be-recycled paper - it can be printed on both sides)

Pinterest Version

The pinterest version uses self-inking stampers. These are fun and cute, but not strictly speaking necessary (if you hate the idea of getting self-inking stampers, the budget version is for you!). This works best if you have enough stampers for each child to have a couple, and if they are in a variety of colors. It's more than ok to have duplicate stampers, and themed sets work really well.

Budget Version

Instead of stampers, you would just use markers. Each student should have at least 3-4 colors, and you will give instructions about what "design" their fossil is to take. Example designs would be: stars, circles, triangles, dots, etc. Anything that is quick to draw and easy to identify. You could even have them write specific letters of the alphabet.

Set-up

You're going to have 3-6 stations set up around the room. Each starts out with a single sheet of paper. You (or a student volunteer) will add sheets to the stack as the activity goes on. This simulates sedimentation - organisms die (your stamps/marks), and are buried in sediments (sheets of paper) that form new rocks.

Students should be divided into groups of 4-5. Give each group a name, number, something that you can call out during the activity. Students are going to be moving around the room, and they do not need to stay with their group. It's mostly to get them started.

Students will be going around the room and stamping as much or as little as they want on the top-most sheet in the stacks. You may want to get a couple volunteers to stay at a single station, to simulate fossils that are geographically isolated. The rest of them can wander as they please.

Depending on your materials, plan how you want to set this up. You are going to be calling out changes or tapping individual students to simulate organisms going extinct and/or evolving. For example, if you have a set of emoji stampers, you can tell that entire group that they're extinct now and to get a new type of stamper. Colors also work well for this. It will be simpler to "read" your fossil record if you start out with a limited number of colors, then add new colors in as you go.

Here's an example. Students will be using markers, and they only have blue and green. Groups 1&2 are drawing stars, groups 3&4 are drawing triangles. Each group should have some blue and some green. In addition to calling out directions, you will be randomly adding sheets to the top of stacks. I space directions out about every minute, give or take. Here we go!

Your Directions (Marker Version)
Go!
If you're blue and in group 3, switch to yellow triangles
If you're green and in group 1, stop drawing stars and draw squares
If you're blue, get a purple marker and start drawing squares
If you're green, switch to drawing dots
If you're yellow, switch to pink
Choose 3 students at random, and tell them to start drawing smiley faces
If you're drawing stars, start drawing letter A's instead
If you're pink, switch to red

You'll notice that at this point, the color blue disappeared, there are no more stars being drawn, and pink and yellow came and went. These are good analogies for the fossil record, because some species are more well-represented in the fossil record than others. Some persist for millions of years, while others are only present in a brief section of the fossil record.

Have the students put their stampers down and carefully flip through the stacks of papers and make some observations. They will notice some patterns and differences between the oldest and newest layers.

Note for the stamper version: Before the activity, I would recommend sorting your available stampers into 3-5 containers. I would use only two different colors in the first container, and then have each other container pre-sorted with some new feature.

For example, I bought this [stamper set on amazon](#) (only one was broken, they come individually shrink wrapped, and the only problem was a couple of the ink parts fell out of the stampers). I started out with just blue and green. In my second container I put all of the dinosaurs, in my third all of the emojis, and last of all anything that had letters on it.

More ordered version (credit to Dr. Deb Hemler!)

Each group can be given a set of instructions as to which stacks of paper they are allowed to stamp on. For example, if you have six stacks of paper...

Group	Able to stamp...
Group 1	1, 2
Group 2	2, 3, 4
Group 3	3, 4
Group 4	4, 5, 6

This will clearly simulate geographical differences in fossils.

More chaotic version

Students can stamp on whatever paper they would like to, and you're relying on the students' differences in energy level to create "geographic" differences. Some slowpoke fossil makers won't get very far, while others will try to stamp every single page on every single stack.

Options!!

This is where it gets fun. There are about a hundred ways to change up this activity. Here are a few.

- Volcanoes! Every once in awhile, erupt a volcano. Take a pencil and scribble across all of the topmost sheets, then lay a fresh sheet on top. Volcanoes are an extremely important part of the fossil record, and allow scientists to verify relative dates across wide geographic areas.
- Mass Extinctions. Make most of the kids sit down for a while, then “come back” as different stamps/markers.
- Tell the kids how they are allowed to move. Good for big classes. For one round they might have to do slow-motion, or crawl, or hop.
- Randomize it with cards! Instead of using a list of directions, write different directions on a stack of index cards, and just run through those. It may be less “accurate” of a model of the fossil record, but it will still show changes over time and is easier.
- Tectonic shifts! You could move the stacks of paper around to simulate the motion of the Earth’s tectonic plates. Start two piles out side by side, and call attention to how they tend to have the same marks on them when they are together. Move them around as you add sheets of paper, and the types of fossils on them will diverge too.
- Erosion. Take a small stack of papers away before putting a new sheet down and recycle them. Make sure at least some of the students notice what you’re doing so you can talk about it during the discussion.
- Have your students come up with new options! Talk about how it is a good model of some things, but how it doesn’t model certain features very well (animals couldn’t go wherever they wanted - they were geographically limited by climate, mobility, etc.). See if they can solve some of the problems the model has.