

**Activity Goal:** In this activity, you will apply your hard-earned mineral ID skills to minerals representative of the 10 different STAGES of mineral evolution from the first-formed minerals present in meteorites to modern biominerals – 4.56 billion years of Earth history! The goal of today’s activity is for you to discuss, evaluate, and appreciate how the number and composition of minerals (all >4500) have evolved throughout geological time.

**Practical Information:** The activity consists of 4 parts – the completed 2-page activity form is to be handed in at the end of class. Part 1 is completed with your partner; all other parts are done by sharing and discussing information with other members of your specific STAGE in mineral evolution.

**PART 1: IDENTIFICATION & PROPERTIES OF YOUR MINERAL (10 minutes)**

With your partner, identify your unknown mineral – use the basic mineral ID protocols and tools (hand lens, scratching pick, magnet, etc.) that you have successfully learned all term. Indicate the 3 diagnostic properties that allowed you to determine the mineral identity in the bottom part of the table. For the upper part of the table, go on-line to [www.mindat.org](http://www.mindat.org) or [www.webmineral.com](http://www.webmineral.com), search for your mineral, and find the appropriate information.

<b>MINERAL NAME:</b>	<b>CRYSTAL SYSTEM:</b>
<b>MINERAL FORMULA:</b>	<b>DENSITY &amp; HARDNESS:</b>
<b>MINERAL CLASS:</b>	<b>HABIT:</b>
<b>MINERAL SUBCLASS:</b> (for silicates)	<b>CLEAVAGE:</b> (use Miller Index notation)
<b>DIAGNOSTIC PROPERTIES</b> (list 3 properties that you used to identify the mineral)	1. 2. 3.

**PART 2: CHARACTERISTIC MINERALS OF YOUR MINERAL EVOLUTION STAGE (10 minutes)**

Find the other members of your mineral evolution STAGE (see hand-out). Complete the table below for each of the minerals in your STAGE – each pair should describe to the others the mineral they have identified and what the diagnostic properties of their mineral are. Group the minerals in the table by class and look for common attributes.

**STAGE NUMBER + NAME:**

**EON:**

	MINERAL	FORMULA	CLASS/ SUBCLASS	DIAGNOSTIC PROPERTIES
1				
2				
3				
4				
5				
6				
7				
8				

Note: total number of minerals in each STAGE ranges from 5 to 8.

### **PART 3: GEOLOGICAL ENVIRONMENT(S) OF YOUR MINERAL EVOLUTION STAGE (5 mins.)**

As a group, briefly discuss and write-down the essential geological environment(s) that lead to the formation of the minerals in your STAGE of mineral evolution. Use the hand-out information, the pre-reading material, and the “Berkeley geologic time scale” ([www.ucmp.berkeley.edu/help/timeform.php](http://www.ucmp.berkeley.edu/help/timeform.php)) as references. Use this information as a guide for producing your poster in Part 4.

- 1.
- 2.
- 3.
- 4.
- 5.

### **PART 4: SCHEMATIC DRAWING OF EVENTS IN YOUR MINERAL EVOLUTION STAGE (15 mins.)**

**GET POSTER BOARD + MARKERS:** Based on your results from Part 3 above, produce a schematic drawing of the geological environment(s) operational during your STAGE of mineral evolution. Work as a team – use different **colours** to highlight important parts of your poster and don’t be afraid to be original in your drawing! Everyone should be participating – there are plenty of markers.

You need to indicate the following on your poster board:

- ✓ Mineral evolution STAGE number
- ✓ Mineral evolution STAGE name
- ✓ Age range (in billions of years; note EON as well)
- ✓ Names of all MINERALS from Part 2
- ✓ Schematic DRAWING of the essential geological environment(s) that lead to the diversification of minerals during this STAGE!

**COMPLETED YOUR WORKSHEET AND POSTER BOARD?** Take your poster board down to the front of class and place it along the chalkboard in the position where your mineral evolution stage belongs. We will have a (very) short review when all posters have been finished.

**Congratulations** – you now know how minerals evolved on Earth throughout geological time and you are primed for the geology courses you will be taking next term (Geological Time+Stratigraphy, Petrology, Field Techniques)!

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