

Taxonomy Exercise

Review the examples of exercises used in a general education Earth Science course at UA and rank them according to the *Taxonomy for Learning, Teaching, and Assessing*.

Place each exercise into one of the six classes (Remember, Understand, Apply, Analyze, Evaluate, Create). Some exercises may display multiple questions that can be ranked at different categories in the Taxonomy. Choose the highest level.

Complete the table below by circling the abbreviation of the appropriate taxonomy level.

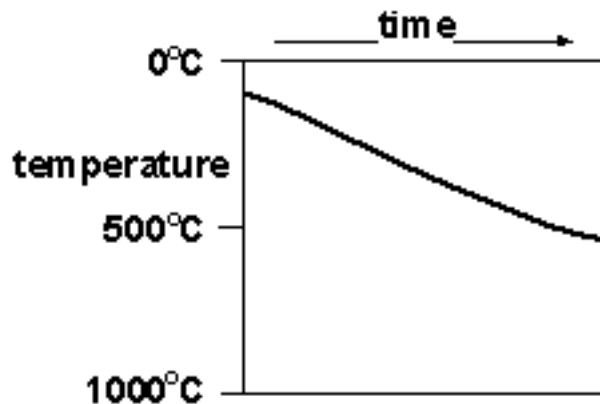
Exercise	Taxonomic Category					
The Rock Cycle	R	U	Ap	An	E	Cr
Atmospheric Pressure and Condensation	R	U	Ap	An	E	Cr
Earthquake Warning System	R	U	Ap	An	E	Cr
Venn Diagram (Hurricanes vs. Tornadoes)	R	U	Ap	An	E	Cr
Reading Quiz: Coasts	R	U	Ap	An	E	Cr
NEO Concept Map Interpretation	R	U	Ap	An	E	Cr
Groundwater Rubric	R	U	Ap	An	E	Cr
Earth's Layers Concept Map	R	U	Ap	An	E	Cr
Relative Time Diagram	R	U	Ap	An	E	Cr

This Taxonomy Exercise	R	U	Ap	An	E	Cr
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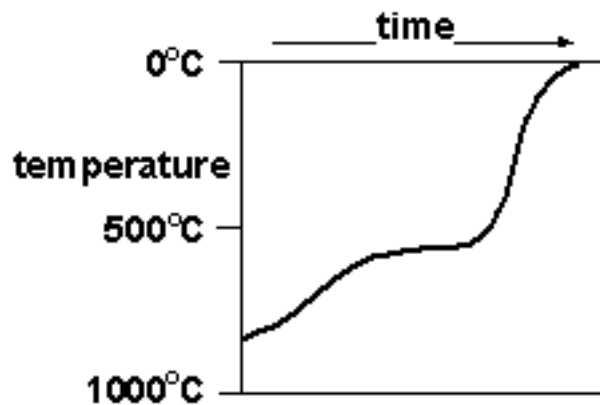
Context: Students complete these exercises following discussions of the rock cycle.

The Rock Cycle

1. The graph below illustrates how the temperature changed with time for part of the rock cycle. Which of the following processes is best represented by the graph?
 - a) Sediment is lithified to form sedimentary rock.
 - b) Sedimentary rocks are converted to metamorphic rocks.
 - c) Metamorphic rocks are uplifted to Earth's surface.
 - d) Magma cools to form plutonic igneous rock.
 - e) Sedimentary rock is converted to magma.



2. The graph below illustrates how the temperature changed with time for part of the rock cycle. Which of the following is best represented by the graph?
 - a) magma forms a plutonic igneous rock that is then uplifted to the surface
 - b) sediment is lithified and then metamorphosed
 - c) volcanic igneous rock is melted to form new magma
 - d) plutonic igneous rocks are uplifted and weathered to form sediment
 - e) sediment is lithified to sedimentary rock that is then weathered to form new sediment



Context: Students complete this exercise following a lecture or reading on air pressure and adiabatic lapse rates.

Atmospheric Pressure and Condensation

An instructor asked her class to summarize some information from the section of the chapter you just read. Four students submitted the four statements below as part of their answers. She returned the statements and told the students that they could correct them for full credit. Identify what is wrong with each statement and describe how you would fix these answers to earn full credit.

- A. The temperature of a rising parcel of air decreases by the normal lapse rate.

- B. The percentage of oxygen in the atmosphere decreases with altitude.

- C. When it rains you have to use the wet adiabatic lapse rate to figure out temperatures at higher elevations.

- D. The dry adiabatic lapse rate is higher than the wet adiabatic lapse rate so air temperatures should be higher in dry air (before condensation occurs) than in wet air (after condensation occurs).

Context: Students complete this exercise following discussion of seismic waves and earthquake hazards.

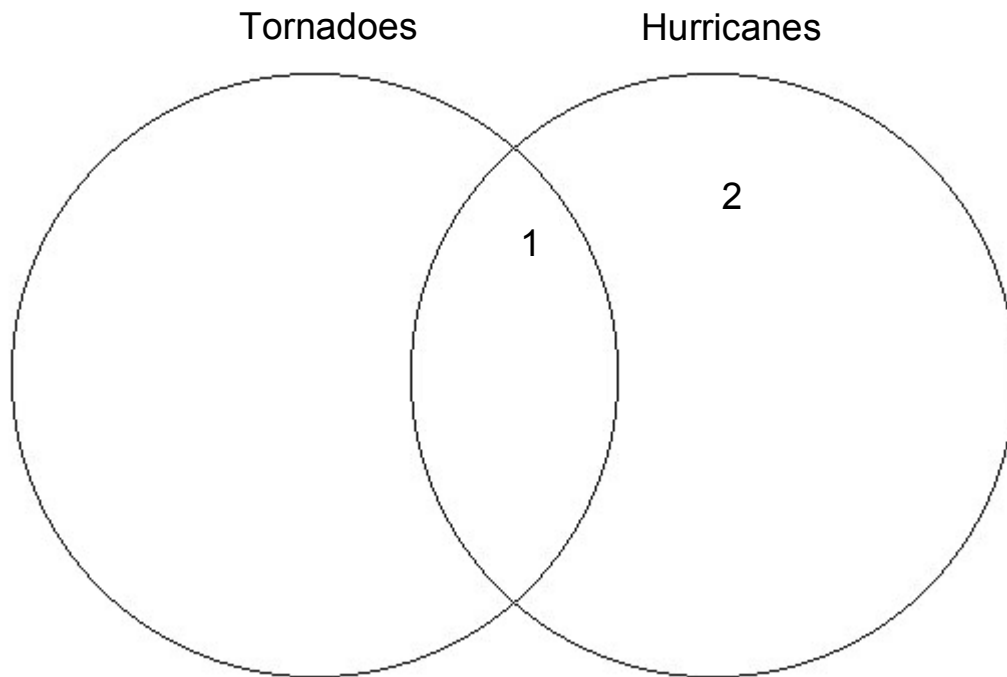
Earthquake Warning System

Warning times associated with other natural hazards can be measured in months (volcanoes), days (hurricanes), or minutes (tornadoes). Recently some scientists have suggested that it would be possible to create an earthquake warning system in regions like southern California where there is an extensive network of seismograph stations. Their suggestion was that the arrival of P waves could trigger an alarm that would give people time to react before the arrival of the more damaging S waves, and later surface waves. Suppose the system is designed and implemented. Develop a community action plan to help citizens best respond to the alarm.

Context: Students complete this exercise at the beginning of class as a review of a reading assignment or as a follow up a lecture segment on the characteristics of extreme weather systems.

Venn Diagram: Tornadoes vs. Hurricanes

List the features that are unique to either group or that they share on the back of this page. Provide a brief but clear description of each feature (see examples). Two features are included as examples. Write the appropriate number in the corresponding locations on the Venn diagram below. (One example has been included.)



Features

- | | |
|-------------------------|-----|
| 1. Low pressure systems | 11. |
| 2. Form over oceans | 12. |
| 3. | 13. |
| 4. | 14. |
| 5. | 15. |
| 6. | 16. |
| 7. | 17. |
| 8. | 18. |
| 9. | 19. |
| 10. | 20. |

Context: Students complete this exercise at the beginning of class as a review of a reading assignment or at the end of a lecture segment on coastal processes.

Reading Quiz: Coasts

Circle the correct answer to the questions below.

1. The most expensive natural disaster in U.S. history was
 - (a) Mississippi Flood, 1993
 - (b) Hurricane Andrew, 1992
 - (c) Northridge Earthquake, 1994

2. Coastal processes are influenced by
 - (a) human activity
 - (b) tectonic cycles
 - (c) climate cycles
 - (d) all of these.

3. Sea level was _____ during the last ice age.
 - (a) lower
 - (b) higher

4. Waves are deflected (refracted) toward
 - (a) headlands
 - (b) bays

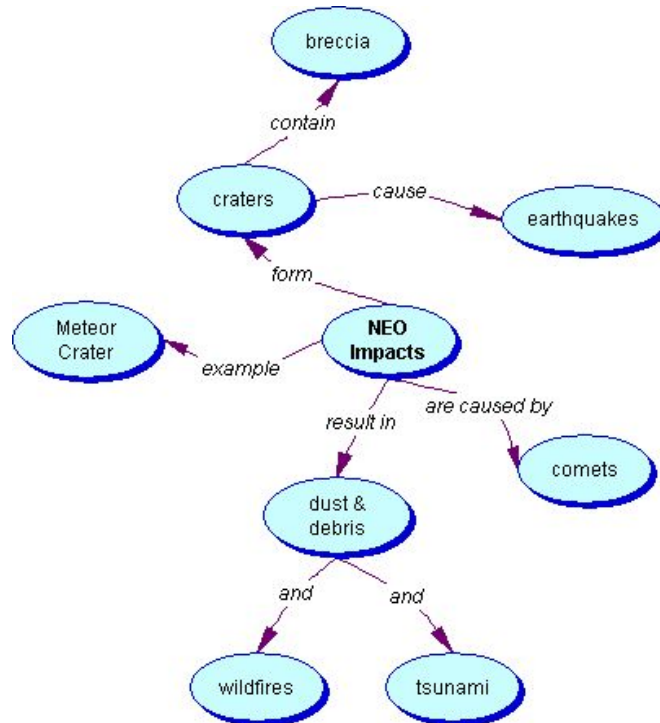
Context: Students complete this exercise as a homework assignment or as a formative assessment exercise at the end of a lecture on NEO impacts.

NEO Concept Map Interpretation

Review the concept map presented below that describes the characteristics of NEO impacts. Score the concept map using the grading rubric and redraw the diagram making whatever changes you believe are appropriate to earn a “4” on the grading scale.

Grading Rubric

- 0 The concept map does not contain any information about NEO impact events.
- 1 The concept map contains some relevant terms but several key terms are omitted and many linking phrases are either absent or inaccurate.
- 2 The concept map contains most relevant terms but they are poorly organized and some linking phrases are absent or incorrect.
- 3 The concept map contains most relevant terms but one or two key term(s) may be absent. The diagram is reasonably well organized, and almost all linking phrases are appropriate.
- 4 The concept map contains all relevant terms in a well organized display that has appropriate linking phrases for each pair of terms.



Context: Students complete this exercise following a review of the characteristics of groundwater systems, including the properties of aquifers.

Groundwater Rubric

You are part of a team that is given an assignment to help locate a new well field that will supply your town with water. In examining the potential site locations you recognize that there are several different factors that will influence groundwater availability and no site is perfect.

You are asked to create a **scoring rubric** to evaluate at least five factors that will influence the availability of groundwater. The location that scores the highest using the scoring rubric will be selected for the well field. One factor is included as an example in the table below; identify four more.

You are given the opportunity to identify which is the most important factor and double its score. Which factor would you choose?

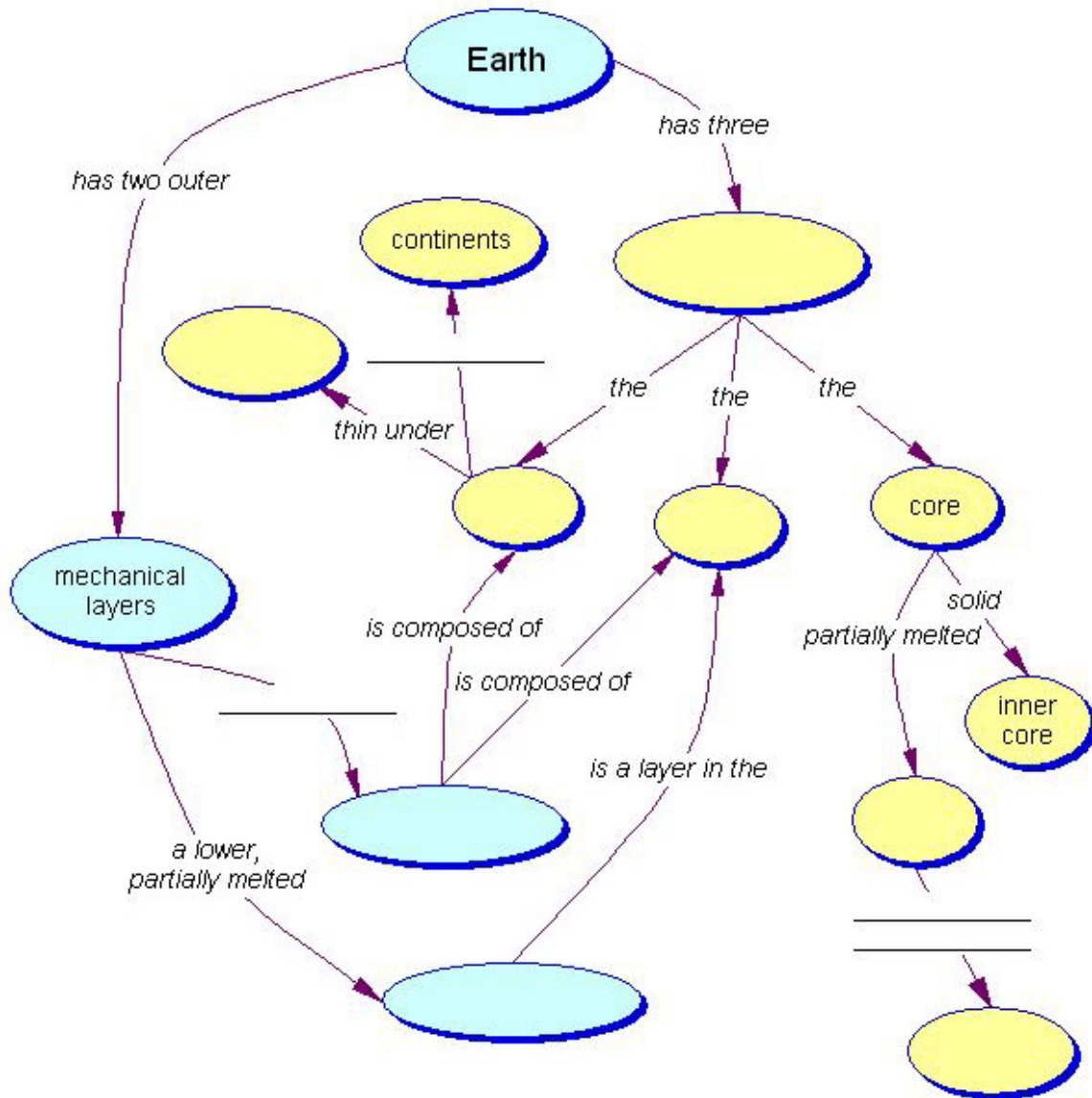
Factors	Good (3)	Moderate (2)	Poor (1)
Depth to water table	Shallow	Intermediate	Deep

Context: Students complete this exercise as a homework assignment or at the start of class following a reading assignment on the structure of Earth.

Earth's Layers Concept Map

Complete the concept map below by correctly adding some of the terms provided to the appropriate blank locations as key terms or connecting phrases/terms. Some necessary terms are not included in the list; others may not be applicable to this diagram.

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. <i>compositional layers</i> 2. <i>crust</i> 3. <i>one of three</i> 4. <i>oceans</i> | <ol style="list-style-type: none"> 5. <i>is the source of Earth's</i> 6. <i>an upper rigid</i> 7. <i>characteristic of terrestrial planets</i> |
|---|---|

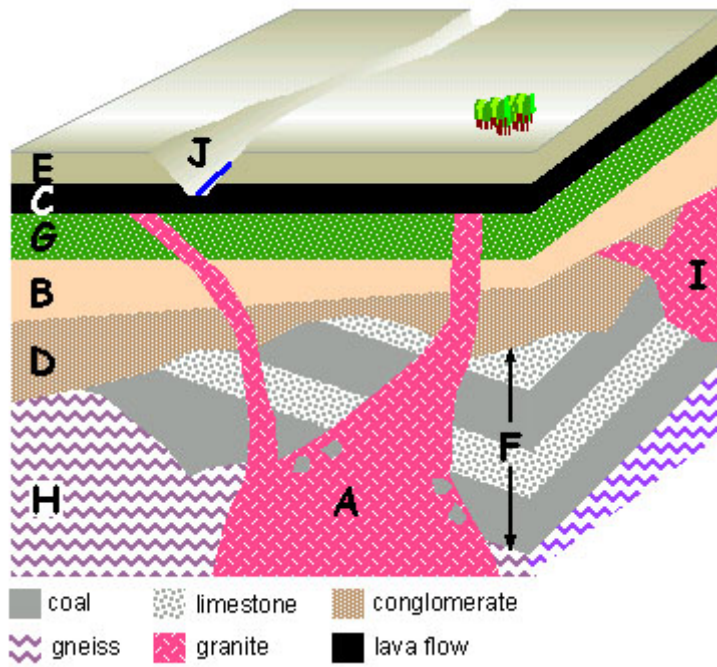


Context: Students complete this exercise following a lecture segment that describes the three principles (superposition, original horizontality, cross cutting relationships) used to unravel the sequence of geological events.

Relative Time

Complete the exercise by using the principles of superposition, original horizontality, and cross-cutting relationships to determine the order of events for the idealized location shown in the figure.

Place the rock units in their order of formation, oldest to youngest



Oldest

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Youngest

