Teacher’s Guide: **Basic Economic Geology of the World**

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| Grade: 4-10 |
| Related Discipline: Economics |
| GLCE: G212, G433-4, E311 |
| Time: 10-20 minutes |

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|  Overview: overlaying maps is a basic geographical skill, because  spatial association is a major way of organizing information.Gaining a mental map of basic geology is also useful as background for many topics in economics, world history, and US history. For example, many migrations were started by discoveries of resources such as gold or oil, and many wars were fought over them!  |

**Preparation:** Duplicate the map, if desired. Make sure that you are comfortable using the clickable map, if you want to use it for debriefing, or to do the lesson as a one-computer demonstration.

**Setup:** Note that resources such as gold or oil were responsible for many migrations, economic booms, and wars. Tell students that many mineral resources are associated with particular kinds of rock, and those rocks occur in specific places in the world. You can drill for oil anywhere, but you are likely to find it only in places that have particular geologic structures and kinds of rock.

**Procedure:** The worksheet is self-explanatory, but teachers can use several ways to introduce it and/or provide guidance while students are working.

**Answers:** This is an excellent topic to emphasize that the world is a big and complicated place, but there are distinct geographic associations that are easy to remember. The associations are not always perfectly straightforward – they are usually probabilistic in nature. In practical terms, this means that the “answers” may not fit neatly into a simplistic standardized bubble-test, but even a third-grader can make many valid inferences by knowing how to do a careful exploration of a map.

 One strategy is simply to count features. For example, the map has 25 diamond symbols. More than 20 of them are clearly inside ancient cratons. The other five are on the edge of cratons (and map edges at this scale are likely to be blurry, etc.) The answer to the first question is therefore a definite “cratons.”

 Nearly every area of fossil fuels is not in a cordillera or craton, though some are near edges. Coal, oil, and gas are formed in sedimentary rocks. The forces that make mountains can help create the geologic traps that make the richest oil and gas deposits. The third answer to question 2 is therefore best.

 Question 3 is more complex – partly for the simple reason that there are many different kinds of metals. Big producers are in the cordilleras of North and South America, Europe, central Asia, and South Africa. There are also some mines associated with older rocks (cratons) in several parts of the world. (Cratons, of course, were cordilleras in the distant past!). Sedimentary platforms, however, seem to hold few rich deposits of these metals.

 Question 4 also has many answers. Some answers are very good, many are just OK, and many are clearly wrong. Students should look for clusters of symbols on the map and then describe their locations – metals in western South America and south Africa, diamonds in India, oil in southwest Asia and central Russia, etc. Give credit for reasonable inferences, but question unreasonable ones.

**Debrief:** The world is big and complicated, BUT we can make many valid inferences by searching a clickable map (and in fact by carefully looking at a more complex map, in effect turning it into a clickable map in our heads by looking at just a few features at a time).

**Vocabulary:** cordillera craton igneous sedimentary metal ore fossil fuel resource

**Extension:** Look at more detailed mineral maps in texts, atlases, and online sources. Describe the extent to which a simple mental map can help them interpret a more complex map. For example, in North America, it’s diamonds and nickel in the Canadian craton, metals in the western mountains, coal in Appalachia, Illinois, and Wyoming, and oil in a long strip that runs from Texas through Oklahoma, Wyoming, North Dakota, Alberta, all the way to northern Alaska.

Find instances where mineral or fuel resources were the reason for regional or international conflict.