



Teacher Guidance for “Minerals In Your Life” Mini-Lessons

Without mining and minerals, we wouldn't have cell phones, televisions, bicycles or soccer equipment. The production of all of these things depends on many mineral resources from countries all over the world. Though mining is crucial to all of these things, many of us aren't aware of the importance of mining in our society. Understanding the role that mining and minerals play in our daily lives can help us make informed decisions, as well as open the world of mining careers to students. You can use these mini-lessons to teach your class about the importance of mining and minerals in the production of the things we use in our everyday lives. In addition to covering information on the topics of earth science and technology, these activities also include opportunities for students to use math, geography and critical thinking skills. The lessons align with National Science Education Standards (A, B, D and E) and Common Core State Standards (CCSS.ELA-Literacy.RI.5.; CCSS.ELA-Literacy.RST.6-8.4 and 7) and incorporate Bloom's Taxonomy framework to promote higher order levels of thinking.

[Access the activities and related answer keys here:](#)

[Soccer Activity link](#)

[Soccer Answer Key link](#)

[Cell Phone Activity link](#)

[Cell Phone Answer Key link](#)

[TV Activity link](#)

[TV Answer Key link](#)

[Bicycle Activity link](#)

[Bicycle Answer Key link](#)

The Answer Key pages contain specific answers, as well as ideas on how to approach the activities with your students. No answers are given for the student thought/opinion questions in order to encourage students to exercise critical thinking skills. You may want to do all the lessons as classroom activities, or you may choose to do the first one together with your students, and then let them complete the others as independent work or homework assignments.

The Minerals Education Coalition website <http://www.MineralsEducationCoalition.org> contains many free resources for teachers, including activities and teaching ideas, SMART Board™ lessons, demonstrations, videos, and mining and mineral fact sheets. Some of these materials may be useful in conjunction with the mini-lessons, such as:

<http://www.MineralsEducationCoalition.org/k-12-education> - teacher resources

[http:// www.MineralsEducationCoalition.org /minerals-elements](http://www.MineralsEducationCoalition.org/minerals-elements) - contains a short glossary

<http:// www.MineralsEducationCoalition.org /minerals> -minerals database

<http:// www.MineralsEducationCoalition.org /minerals-your-life> - fact sheets



As additional resources, the MEC Store [http:// www.MineralsEducationCoalition.org /store/](http://www.MineralsEducationCoalition.org/store/) has low-cost teaching materials and packets available for purchase.

Technical Notes

Each activity page contains questions, activities and content information. The content information for the lists of Major Sources is from Mineral Commodity Summaries 2013 from the U.S. Geological Survey (USGS). This can be found at <http://minerals.usgs.gov/minerals/pubs/mcs/2013/mcs2013.pdf>. This reference manual is revised annually by the USGS to summarize information for the previous year, and is only a snapshot in time of the dynamic global mining industry. Some mineral commodities are estimated because minerals mined by some countries are not available or not disclosed to protect proprietary information. Because some of the minerals are mined in more than 20 countries, the Major Sources table lists the top four sources of the mineral, unless there is a tie within the top four sources when ranked. For example, if there is a tie for fourth place, five sources will be listed (note: the Soccer Activity was finalized and produced prior to the development of these guidelines). The USGS commodity summary does not include all sources for the minerals. It lists “other countries” to summarize the rest of the world’s smaller sources. Net % Imported on the tables is short for “Net import reliance as a percentage of apparent consumption,” which is defined as imports – exports + adjustments for government and industry stockpile changes.

- MEC’s minerals lists for each product — soccer items, cell phone, TV and bicycle—contain many, but not all, of the materials needed to make each of these items. They are also general in regard to the items—they are not particular to any of the various brands or models of TVs or cell phones.
- Quartz used in plastic and fiberglass is listed as “Quartz (industrial sand),” though in the USGS Commodity Summary the statistics are actually for “Industrial Sand and Gravel,” so only a portion of the amount is specifically sand.
- High quality quartz is needed for electronics, and is listed as “Quartz Crystal (industrial; cultured),” because “virtually all quartz crystal used for electronics was cultured [grown from a seed crystal] rather than natural crystal.” <http://www.MineralsEducationCoalition.com/minerals/quartz>

Source List

- Chemicool. <http://www.chemicool.com/elements/iron.html>. Accessed July 2013.
- Cohen, David 2007. Earth’s natural wealth: an audit. NewScientist.com news service. http://www.science.org.au/nova/newscientist/027ns_005.htm. Accessed July 2013.
- Common Core State Standards Initiative. <http://www.corestandards.org>. Accessed September 2013.
- Discovery Channel Canada, History Channel United States, and Channel Five United Kingdom, 2005. How William Shatner Changed the World.
- Environmental Protection Agency, The Life Cycle of a Cell Phone. <http://www.epa.gov/osw/education/pdfs/life-cell.pdf>. Accessed July 2013.
- Fishbein, B.K., 2002. Waste in the wireless world—The challenge of cell phones. INFORM, Inc., New York, N.Y., 81 p. ISBN: 0918780780.
- U.S. Geological Survey, 2013, Mineral commodity summaries 2013; U.S. Geological Survey, 198 p. <http://minerals.usgs.gov/minerals/pubs/mcs/2013/mcs2013.pdf>.
- Geology.com. <http://www.Geology.com/minerals>. Accessed July 2013.



- Greene, Jay, 2012. Digging for rare earths: The mines where iPhones are born. CNET.
http://news.cnet.com/8301-13579_3-57520121-37/digging-for-rare-earths-the-miners-where-iphones-are-born. Accessed July 2013.
- Macaulay, Sean. The Cellphone turns 40: Remembering Martin Cooper's Historic Call. The Daily Beast, 4/3/2013. <http://www.thedailybeast.com/articles/2013/04/03/the-cell-phone-turns-40-remembering-Martin-Cooper-s-historic-call>. Accessed July 2013.
- Minerals Education Coalition. <http://www.MineralsEducationCoalition.org/minerals>. Accessed July 2013.
- Minerals Education Coalition. Researcher: Eric Levonas, Colorado School of Mines.
<http://www.MineralsEducationCoalition.org/minerals-your-life/cell-phone>. Accessed July 2013.
- The National Mining Association. <http://www.nma.org/index.php/minerals-publicatons/40-common-minerals-and-their-uses>. Accessed July 2013.
- National Science Education Standards; National Research Council, 1996, 262 p. National Academy Press, Washington D.C.
- New Horizon Bikes. Bicycle Weight, The Benefits Quantified.
<http://www.newhorizonbikes.com/articles/bicycle-weight-the-benefits-quantified-pg170.htm>. Accessed July 2013.
- Sullivan, D.E., 2006. Recycled cell phones – A treasure trove of valuable metals. U.S. Geological Survey Fact Sheet 2006-3097, July, 4 p.
- Thomas, Daniel. What Materials Are Used to Make Cell Phones. eHow.
http://www.ehow.com/list_6757391_materials-used-make-cell-phones_.html. Accessed July 2013.