

SPRING 2019

# My Public Lands

## JUNIOR RANGER

Gold Miner  
Game

Mapping  
America's  
Minerals

DIY: Tasty  
Toothpaste



Bureau of  
Land Management

# MINERALS in Everyday Life

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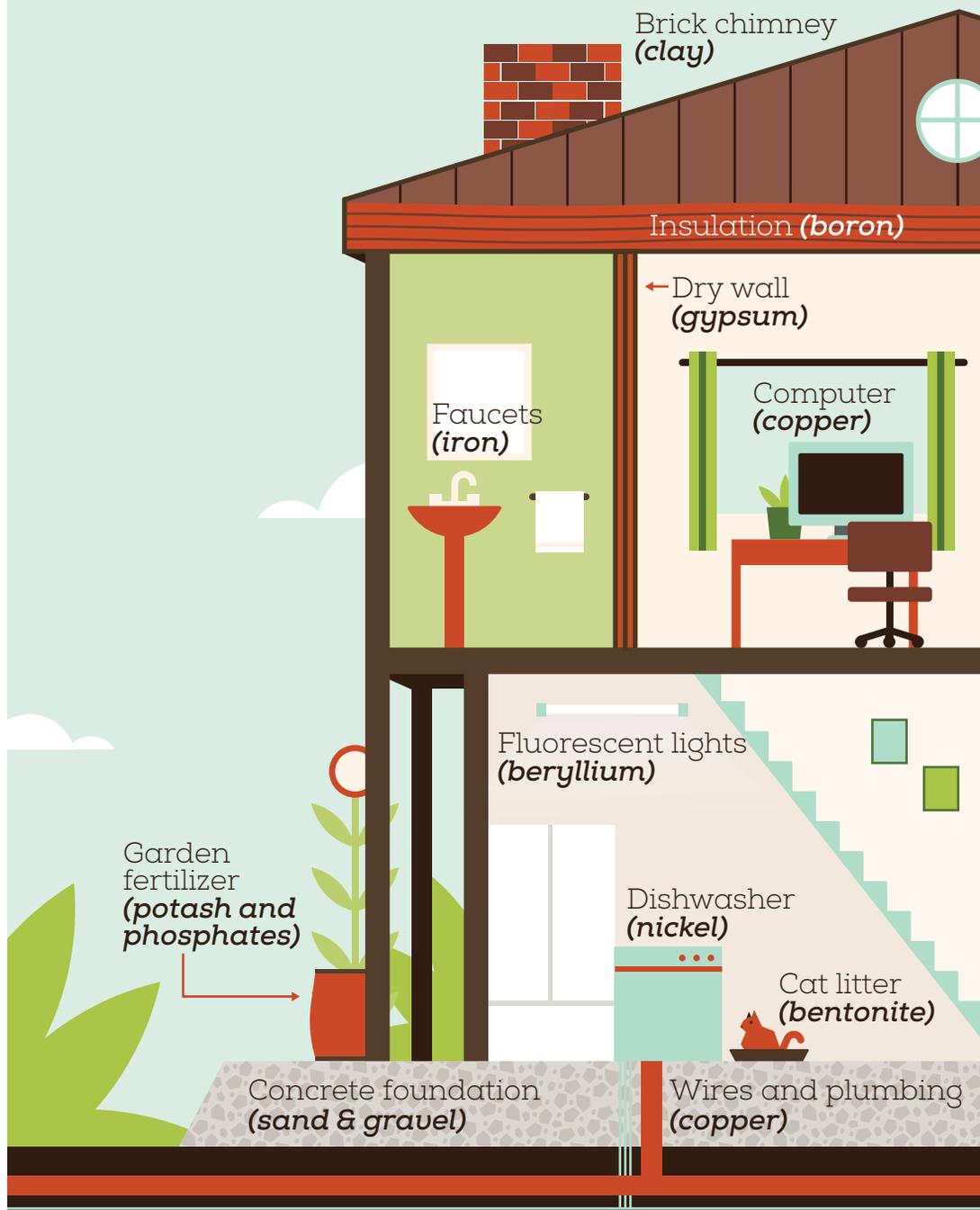
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# Minerals in Everyday Life



Feldspar

The Bureau of Land Management (BLM) manages public lands for the benefit of all Americans on nearly 250 million acres and 700 million acres of minerals underground. These lands are sources of: energy for powering America, habitat for wildlife, food for grazing animals, timber for building, recreation opportunities for people, and conservation for all. Plus, public lands contain evidence of the past and are important in helping us learn about people who lived long ago. Mining and drilling on public lands produces minerals for making items we use every day, at school, work, and play. As the steward of public lands, the BLM

seeks to balance these multiple land uses while protecting the health of the land and its resources for generations to come.

Glass window  
(mica)

Light bulbs  
(tungsten)

Alarm clock  
(lithium)

Car  
(zinc)



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## Become a BLM Junior Ranger!

The Junior Ranger program introduces young adventurers like you to the lands and resources of the Bureau of Land Management. We invite you to join the adventure!

Learn more at  
[blm.gov/education](http://blm.gov/education).



Copper



# At Your Fingertips

Cell phones would not exist without minerals! More than half of a cell phone's parts—the electronics, display, battery, speakers, and more—are made from mined minerals, or are the byproduct of the mining process. Many of these minerals come from BLM-managed lands.

## Wolframite (tungsten)

**Mining locations:**  
Imported from other countries

**Purpose:** Absorbs excessive heat, and enables the phone to vibrate.



## Spodumene (lithium)

**Mining locations:** Nevada, and imported from other countries

**Purpose:** Used in lithium/cadmium batteries, it enables the cell battery to hold a charge and keep the phone on longer.



## Bauxite (gallium)

**Mining locations:**  
Imported from other countries

**Purpose:** Provides backlighting for the phone's screen.



## Tetrahedrite (silver)

**Mining locations:**  
Alaska, Idaho, Montana, Nevada, Utah

**Purpose:** Creates electrical pathways through the phone.



## Sphalerite (indium and germanium)

**Mining locations:** Alaska, Tennessee, and Washington, and imported from other countries

**Purpose:** Creates the conductive coating that makes the phone's touch screen work.



## Chalcopyrite (copper)

**Mining locations:**  
Arizona, Michigan, Missouri, Montana, Nevada, New Mexico, Utah

**Purpose:** Conducts electricity (and heat).



## Bastnäesite (rare earth elements)

**Mining locations:** California, and imported from other countries

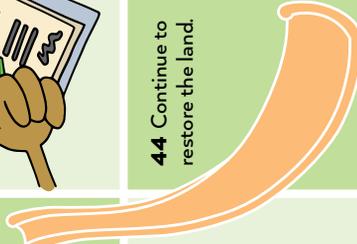
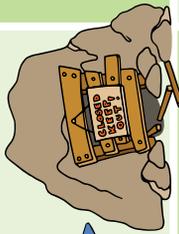
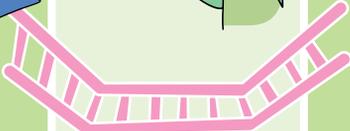
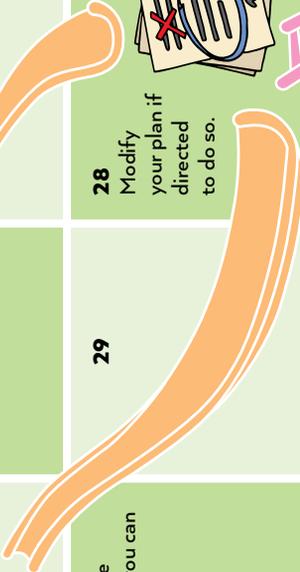
**Purpose:** Provides magnets needed for the phone's speakers and microphones to work.





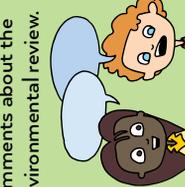
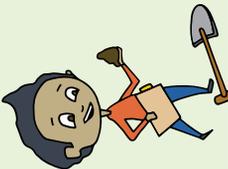
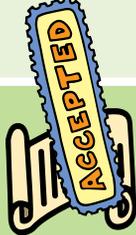
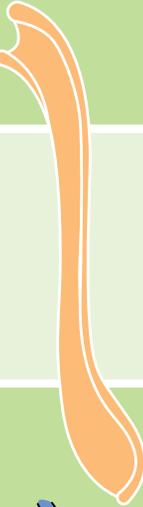
# Gold Miner Game

Managing all these resources is a tough job. We need the minerals, but the mining process can degrade the land and water and create other hazards. That is why the BLM oversees mining companies to ensure that they follow strict rules for protecting the environment. Companies must plan their work carefully, choose the least damaging mining methods, and repair any damage to the land afterward.

<p><b>46</b> It is time to implement your mine closure plan.</p>	<p><b>45</b> BLM notifies citizens that the mine is going to close and the land will be restored.</p>	<p><b>36</b> The Interior Board of Land Appeals says you can continue to mine.</p>	<p><b>35</b> Begin mining.</p> 	<p><b>26</b> You secure the money to mine.</p> 	<p><b>25</b></p>
<p><b>47</b></p> 	<p><b>44</b> Continue to restore the land.</p> 	<p><b>37</b> The price of gold and other minerals crashes. Take a break from mining and wait for prices to go back up.</p>	<p><b>34</b> The Interior Board of Land Appeals reviews your Mining Plan. Miss a turn while the plan is reviewed.</p>	<p><b>27</b></p> 	<p><b>24</b> BLM gives approval to start mining.</p>
<p><b>48</b> A landslide causes unsuccessful land restoration.</p>	<p><b>43</b> You discover a new mineral that will be useful for electronics. Modify your plan.</p>	<p><b>38</b> A Desert Tortoise is spotted. Miss a turn while additional surveys are done and a tortoise fence is installed.</p> 	<p><b>33</b></p>	<p><b>28</b> Modify your plan if directed to do so.</p> 	<p><b>23</b></p>
<p><b>49</b> Final mine closure.</p> 	<p><b>42</b></p> 	<p><b>39</b></p> 	<p><b>32</b></p>	<p><b>29</b></p>	<p><b>22</b> An environmental organization files a request for the</p>
<p><b>50</b> Congrats! You successfully mined for gold and restored the land!</p> 	<p><b>41</b></p> 	<p><b>40</b> You finish mining and begin restoring the land.</p> 	<p><b>31</b> BLM determines your mining is causing unnecessary damage. Modify your plan.</p>	<p><b>30</b> BLM State Director says you can begin to mine.</p> 	<p><b>21</b> The mining is going to cost more money.</p>

## Instructions:

- You are the owner of an electronics company. You want to mine for gold on public lands to create cell phones, calculators, and other small electronics. Your competitor is also trying to mine for gold. Play the game to find out who gets to start mining for gold first. Win the game when you finish mining and restore the land.
- You will need one dice and a friend for this game. Roll the dice to see who gets the higher number to go first.
- Start at square #1 at the bottom of the game.
- If you land at the top of a slide, go down it immediately. If you land at the bottom of a ladder, climb up it immediately. For all other squares, stay where you land and wait for your next turn.

<p>BLM State Director to review your Mining Plan. Miss a turn while the plan is reviewed.</p>		<p>17 All studies are complete.</p>	<p>16 Citizens make comments about the environmental review.</p> 
<p>19</p>	<p>18 Environmental review finds that there are no major impacts to the land.</p>	<p>14</p> 	<p>15 Environmental review needs more wildlife and soil studies.</p>
<p>12 Mining Plan needs an environmental review to study the impacts to the land, wildlife, and local area.</p>	<p>13</p> 	<p>7 BLM has 30 days to review the Mining Plan.</p> 	<p>6</p> 
<p>10</p> <p>9 Provide proof that you have enough money to mine and restore the land.</p> 	<p>8 Congrats! BLM accepts Mining Plan.</p> 	<p>4 Mining Plan is missing information.</p> 	<p>5</p>  <p>Mining Plan is complete.</p>
<p>2</p> 	<p>3</p> 	<p>1 Submit a Mining Plan to the BLM.</p>  	

Some of the biggest hazards come from mines that are no longer in use. People can get lost or trapped inside, lose consciousness while breathing poisonous gases, or fall down a mine shaft. The BLM is working to clean up and close down abandoned mines, but many have never been found or marked. If you come across an abandoned mine: **STAY OUT and STAY ALIVE!**

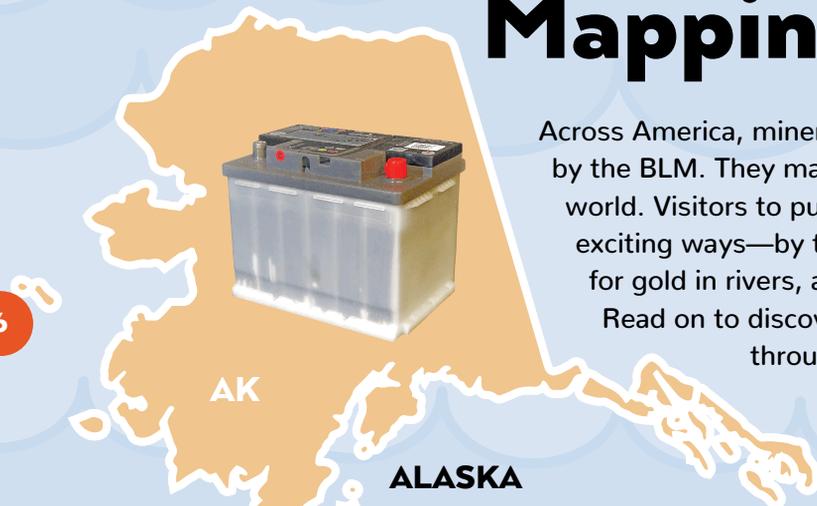


# Mapping America's

Across America, minerals are extracted from lands managed by the BLM. They may be used here at home or across the world. Visitors to public lands can experience minerals in exciting ways—by taking tours of historic mines, panning for gold in rivers, and viewing mining restoration.

Read on to discover more about the minerals found throughout the United States, and where you can go to see or find some for yourself.

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## ALASKA

From the time of the Roman Empire until the 1970s, **lead** was a mineral of choice. That was before people realized that it was toxic to humans. Once common uses of lead in cosmetics, piping, paints, and gasoline were banned by 1996. Today lead is mainly used for car batteries.

## OREGON and WASHINGTON

Placer mining is a form of mining along streambeds—including panning for **gold**—and is common practice in these states. Industrial placer mining, however, can damage fish habitat. BLM regulations require that placer mining companies restore the land and streams.

*Old Miners Meadow (Mill City, Oregon):* This 2-acre meadow, surrounded by forests along the Quartzville Creek National Wild and Scenic River, is popular for gold panning, fishing, scenic touring, and kayaking.



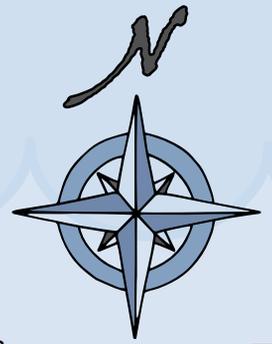
## CALIFORNIA

**Sand and gravel** can be mixed with water and cement (finely ground limestone that is heated) to make concrete. Many bridges, buildings, roads, and other commonly used structures are constructed with concrete.

## NEVADA

Nevada calls itself the “Silver State” because it has been one of the nation’s largest producers of **silver** since the 1800s. Silver is used not only in silverware and jewelry but also in solar panels, digital cameras, cars, and 3D printing.

# Minerals



## IDAHO

Soda companies got their start as the tangy and bubbly phosphate sodas popularized by children in the 1870s. Although formulas have changed since then, many sodas still use **phosphate salts**.

## MONTANA

Along the banks of the Missouri River near Fort Benton, Montana, people discovered a weathered volcanic ash in 1890 that they named **bentonite** after the town. This highly absorbent and useful clay appears today in cat litter, detergent, and natural makeup.

## WYOMING

The world's largest known deposit of **trona** was formed 50–60 million years ago in Wyoming. Trona is used to manufacture a variety of products, including glass, detergent, paper, and textiles, as well as baking soda and other chemicals.

## UTAH

**Beryllium** melts only at high temperatures and does not rust. These features make it ideal for use in machinery, aircraft, and missiles. Utah supplies nearly two-thirds of the world's beryllium production as one of only two known sources in the world.

## COLORADO

During World War II, scientists discovered how to use **uranium** in weapons. Uranium is a yellow substance resembling cake mix. Colorado mining communities, nicknamed Yellowcake Towns, grew to meet increasing demands for this mineral.

*Mica Mine Trail (Grand Junction, Colorado):* At 2.6 miles roundtrip, this easy hike leads to the historic Mica Mine. The mineral **mica** is stable when exposed to light, moisture, and extreme temperatures, making it a good choice for windows.



## NEW MEXICO

Southeastern New Mexico produces **potash** from potassium and salt. It is commonly used in fertilizer. Potash infuses the soil with potassium, which is essential for plant growth. The fruits and vegetables you see in grocery stores most likely got their start with the help of potash.



## ARIZONA

For nearly a century, **molybdenum** was confused with **graphite**, and both were used interchangeably to make pencils. Today, molybdenum is known to be one of the best minerals on Earth for toughening steel.



# Hidden in Plain Sight



Listed below are common minerals (and other natural materials) and their uses. Draw a line matching them up to discover some ways that Americans use minerals every day. If you look around, you will find many objects that contain minerals. Some of these minerals are found on public lands.

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1. This mineral is burned in power plants to produce most of America's electricity.

2. A flexible mineral, it helps make car radiators, home heating systems, and electrical wiring.

3. Rings, earrings, watches, and other kinds of jewelry are made from this shiny metal.

4. Used to manufacture steel, this mineral is also found in nails, magnets, and medicines.

5. This mineral is used in batteries and ammunition.

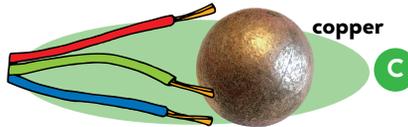
6. These minerals contain phosphorus and are used in fertilizer and food for livestock.

7. Often found as crystals, and in many colors, this mineral is used to make watches and glass.

8. Millions of tons of these materials are used in construction projects.

9. You'll find this versatile mineral in silverware, camera film, and jewelry.

10. These two minerals are often found together in underground deposits.



## Did You Know?

The human body needs certain essential minerals to function. Most, such as sodium, are actually combinations of chemical elements (for example, sodium + chloride, better known as salt). The body will just not accept some minerals unless they are combined with other elements in food or drink. Minerals that are especially important in keeping us healthy include calcium, iron, magnesium, and potassium.

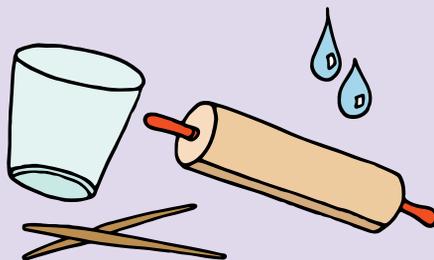


# DIY: Tasty Toothpaste

Did you know that you can make your own toothpaste from minerals that are probably sitting in your cupboard? Antacid tablets contain silica and calcium carbonate, which work as abrasives to keep plaque from building up on teeth. Calcium carbonate (derived from mined and processed limestone) and baking soda (made from trona) can be combined with water to create a paste. The average toothpaste purchased today contains some of these minerals (plus other materials, such as fluoride and glycerol).

## MATERIALS:

- 3 colored antacid tablets, approximately 1 tsp (calcium carbonate)
- 1/2 tsp baking soda (sodium bicarbonate)
- 3 to 4 drops of water
- 1 to 2 drop of peppermint oil (optional)
- Small cup
- Toothpick or small spoon
- Ziplock bag
- Rolling pin (or something heavy to crush tablets)
- Toothbrush



Minerals are all around you! Look at your shampoo, soap, and other cleaning supplies. What minerals do you notice on the ingredients list?

## Did You Know?

As long ago as 5000 B.C. the Egyptians were making a tooth powder from powdered ashes of ox hooves, myrrh, powdered and burnt eggshells, and pumice. Modern toothpaste was developed in the 1800s.



**For additional copies, contact:**

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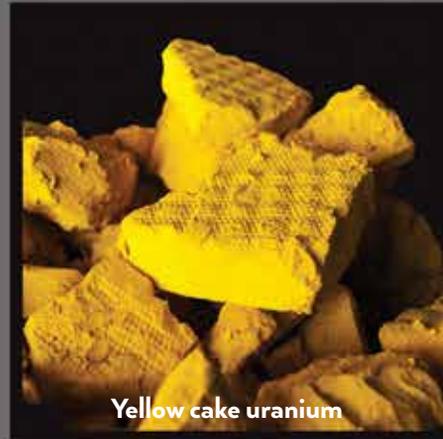
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**Copper**



**Yellow cake uranium**



**Lead**



**Potash**



**Coal**



**Gold**