The Importance of Minerals and Mining

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Let’s start on a Monday morning.
Six o’clock Monday morning.  
Time to get up.
Electricity to run the clock comes through Copper Wires.
Copper comes from a **Copper Mine**. **Copper Sulfide** minerals have to be concentrated to separate them from worthless **Minerals**.
The ore is hauled in large **Haul Trucks**. Some are 24ft high and 30ft wide with tires 14 ft tall!!!
Mining Engineering Students on Field Trip
The copper ore is crushed and then ground to a fine powder in Ball Mills.
The fine ore goes to banks of Flotation Cells in the Copper Concentrator,
and the Copper Sulfide Minerals are collected on bubbles.
The **Concentrate** is dried and the **Sulfur** is burned off in a furnace.
Molten copper is cast into **Anodes** which are refined to make Copper Rods.
The Copper Rods are heated and extruded to make Copper Coils,
and wire is made from the Copper Coils.
It takes a lot of work to get from the Minerals in the rocks in the Copper Mine to the Copper wire bringing electricity to the clock.
The electricity comes through power lines,
from a Coal fired **Power Plant** made out of Concrete and Steel.
Over 40% of all electricity used in USA comes from Coal Fired Power Plants.
The **Coal** might come from a distant **Open Pit Coal Mine**, 

![Image of a distant open pit coal mine with machinery in operation.](image-url)
delivered by long **Unit Trains**.
The Coal is burnt in boilers to generate steam which drives the generators to make electricity.
Power distribution requires a lot of Structural Steel,
which comes in many different shapes and sizes.
To make Steel we need **Iron Ore**. Here it comes from a Minnesota **Taconite Mine**.
The ore goes to a Taconite Pellet Plant,
and is made into Taconite Pellets,
which are delivered by train to Lake Superior docks,
and transported by ship to Lower Lakes Steel Mills,
where they are fed into a Blast Furnace With Coke (made from coal) and Limestone to make liquid iron.
Molten iron is tapped from the Blast Furnace,
and poured into a **Basic Oxygen Furnace** to make Steel.
Large steel sections are made from ingots in large Integrated Steel Mills,
while small shapes like Rebar are often made from Scrap Iron in Mini Mills.
What about Concrete?
All roads and buildings need Concrete.
Concrete is made with Sand from Sand Pits,
and **Gravel** or Crushed Rock **Aggregates**,
from a Rock Quarry,
and Cement.
Cement is made at a Cement Plant in a high temperature Cement Kiln,
from Limestone and other minerals,
with the Limestone mined in a Limestone Quarry.
It’s 6:05.  
Time to get up and go to the bathroom.
We use the toilet, clean our teeth and take a shower.
Where does the water come from? It comes into the house through Copper Pipes,
after purification in the local Water Treatment Plant,
which receives large volumes of water through **Steel Pipes**,
or large Concrete Conduits,
from a River or a Reservoir behind a Concrete Dam.
Aerial photo of Lake Mead Reservoir and Hoover Dam showing Steelwork construction for a Highway Bridge
Turbines generate electricity inside the Hoover Dam. About 7% of all US electric power is Hydropower.
Where does the toilet come from?
The toilet is a **Ceramic** product,
and all Ceramic products are made from Clay,
mined from a Clay Pit.
When we flush, the waste water leaves the house in **Cast Iron** Pipes,
and goes through large Concrete Sewer Pipes,
to a **Waste Water Treatment Plant**, 
and now it’s 6:15. Time for breakfast.
Our food is stored in Refrigerators made with Steel, Copper, Aluminum, Plastics and Paints.
But before breakfast be sure to get your **Vitamins and Minerals**.

They’re essential for good health.
Let’s have a donut.
Finally something that’s not mineral.
But the donut comes from the bakery,
and the bakery needs Flour,
which comes from a **Flour Mill** made of Steel and Concrete.

The water tower and Mill sign are **Steel**

The Stone Bridge is made of **Natural Rock**
The grain is transported by train on steel rails,
and is harvested by large Combine Harvesters.
All plants need mineral Fertilizers. Nitrogen (N) is provided by Liquid Ammonia, Urea or Ammonium Salts.
Phosphorus (P) comes from a Phosphate Mine,
and **Potassium** (K) from a **Potash** Mine,
where the **Underground Mine** tunnels can extend for many miles.
Agricultural machinery is needed to till the ground.
Without modern machinery we go back to Horse Power,
and without Minerals: no donuts, no television, no cities, no modern civilization.
That’s the first half hour of the week and look at all the Mines and Minerals we’ve had to rely on.
So: Are Minerals Important?
You Betcha

Absolutely everything we depend on is either made from minerals or relies on minerals for its production and distribution.
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You can also get more information on the RED WORDS by downloading the Teachers Notes.