A mineral is... a naturally occurring, inorganic, solid with a definite chemical composition and arrangement of atoms.

To be a mineral, a substance must be:
1. **Inorganic** (nonliving)
2. **naturally occurring** (not be manmade)
3. be made of one or more **elements**

EXAMPLES of minerals: ______________

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Mohs Hardness</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talc</td>
<td>1</td>
<td><img src="image" alt="Talc" /></td>
</tr>
<tr>
<td>Gypsum</td>
<td>2</td>
<td><img src="image" alt="Gypsum" /></td>
</tr>
<tr>
<td>Calcite</td>
<td>3</td>
<td><img src="image" alt="Calcite" /></td>
</tr>
<tr>
<td>Fluorite</td>
<td>4</td>
<td><img src="image" alt="Fluorite" /></td>
</tr>
<tr>
<td>Apatite</td>
<td>5</td>
<td><img src="image" alt="Apatite" /></td>
</tr>
<tr>
<td>Feldspar</td>
<td>6</td>
<td><img src="image" alt="Feldspar" /></td>
</tr>
<tr>
<td>Quartz</td>
<td>7</td>
<td><img src="image" alt="Quartz" /></td>
</tr>
<tr>
<td>Topaz</td>
<td>8</td>
<td><img src="image" alt="Topaz" /></td>
</tr>
<tr>
<td>Corundum</td>
<td>9</td>
<td><img src="image" alt="Corundum" /></td>
</tr>
<tr>
<td>Diamond</td>
<td>10</td>
<td><img src="image" alt="Diamond" /></td>
</tr>
</tbody>
</table>

The **SEVEN** properties/ characteristics used to identify minerals are (briefly describe each):

1. **HARDNESS**: Hardness is measured using the __Moh’s__ Scale. The scale shows which minerals will scratch and which ones won’t. On Moh’s Scale, __Talc__ is the softest mineral, so it is a 1 on the scale. A __Diamond__ is a 10 because it is the hardest.

2. **DENSITY**: This is also known as **SPECIFIC GRAVITY**. Density is how much mass a mineral has compared to how much space it takes up. Specific gravity can be used to tell the difference between real gold and __Pyrite__ (“fool’s gold”).

3. **LUSTER**: Luster is the way that a mineral __reflects__ light. Is it metallic or non-metallic? Is it glassy? Pearly? Dull?

4. **STREAK**: To find a mineral’s streak, you rub the mineral on an unglazed tile and examine the color of the __mark__ that is left behind (kind of like chalk on the sidewalk). In order to find a mineral’s streak, the mineral must be __darker__ than the streak plate.

5. **COLOR**: __color__ is the first thing that you see when you look at mineral. This is **NOT** the best property to use because some minerals come in MANY colors!

6. **HOW IT BREAKS**: __cleavage__ is when a mineral breaks along FLAT surfaces. __fracture__ is the tendency of a mineral to break along curved or uneven surfaces.

7. **CRYSTAL STRUCTURE**: cubic, hexagonal, etc.

**OTHER SPECIAL PROPERTIES**: MAGNETISM, CHEMICAL REACTION, FLOURESCENCE

**ORES**:
Ores are minerals from which **metal** can be removed. Removing ore from the Earth is called **mining**. Ores can be crushed, then melted, and mixed to produce metals.
A ROCK is a mixture of: minerals, volcanic glass, organic matter, or other material.

THERE ARE three MAIN TYPES OF ROCKS.

**Igneous:** Created by the cooling of **magma** (below the surface) or **lava** (above the surface)

**Sedimentary:** Created through the processes of **Weathering**, erosion, deposition, compaction, & cementation (CHEMICAL)

**Metamorphic:** Created when an existing rock is exposed to extreme **heat** & **pressure**

Characterized by where they are formed & their grain.

**COARSE** grained means it has _large_ grains, while **FINE** grained means it has _small or glassy_ grains.

**Clastic/Detrital:**
- **Rock fragments** SQUEEZED together.
- Grouped by: the size of sediment
  - EXAMPLE: shale, sandstone, conglomerate, breccia

**Chemical**
- Formed through the chemical process when minerals dissolved in water crystallize
  - EXAMPLE: halite, limestone*

**Organic:**
- Form from the remains of once living things
  - EXAMPLE: coal, limestone*

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**INTRUSIVE**
- **Where?** Beneath earth’s surface (magma)
- **Speed of formation?** SLOW
- **Grain size?** **COARSE**
- Possibility of being **PORPHYRITIC,** which means the rock cools in **TWO** stages. These rocks have _large & small_ crystals(grains)
  - **EXAMPLE:** Pegmatite, granite porphyry

**EXTRUSIVE**
- **Where?** On earth’s surface (lava)
- **Speed of formation?** FAST
- **Grain size?** **FINE**
  - **EXAMPLE:** Basalt, rhyolite

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**OTHER IMPORTANT VOCABULARY WORDS:**

**EROSION:** OCCURS WHEN RUNNING _Water_ OR WIND LOOSEN & CARRY AWAY FRAGMENTS OF ROCK.

**DEPOSITION:** THE PROCESS BY WHICH _sediment_ SETTLES in a new location.

**STRATA:** A _horizontal_ layer of material, especially one of several parallel layers arranged one on top of another, created by the deposition of sediments.

**COMPACtion:** THE PROCESS THAT PRESSES SEDIMENTS TOGETHER.

**CEMENTATION:** THE PROCESS IN WHICH DISSOLVED MINERALS CRYSTALLIZE AND _glue_ PARTICLES OF SEDIMENT TOGETHER.
THE ROCK CYCLE

The Rock Cycle is a series of processes that build, destroy, and change the rocks in & on the Earth’s crust and in the mantle.

WHAT TYPE OF ROCK CAN CHANGE IN THE ROCK CYCLE? ALL

- Igneous can change into Sedimentary rock or Metamorphic rock.
- Sedimentary can change into Metamorphic rock or Igneous rock.
- Metamorphic can change into Igneous rock or Sedimentary rock.

1. How does sediment become a sedimentary rock? _________________________________________________________
2. How does a metamorphic rock become an igneous rock? __________________________________________________
3. Describe two ways in which an igneous rock can become a metamorphic rock.
   WAY 1: ____________________________________________________________________________________________
   WAY 2: ____________________________________________________________________________________________
4. How does magma become sediment? ___________________________________________________________________
5. What happens when an igneous rock is exposed to heat and pressure? __________________________________________
   __________________________________________________________________________________________________
6. How does an igneous rock become a sedimentary rock? ____________________________________________________
   __________________________________________________________________________________________________