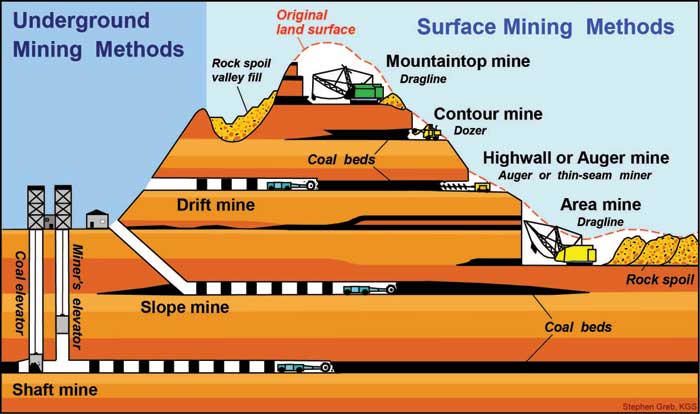
**Environmental Science**

**Chapter 13:**

**Mineral Resources and Mining**

**NOTES**



***Class Website:*** http://aofscience.weebly.com

***Mr. Gutierrez’s email:*** gutierrezbr@elizabeth.k12.nj.us

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| --- | --- | --- | --- |
| **Packet** | | **Followed All Classroom Policies** | |
| /95 | Completed Class Notes | / | Monday |
| /5 | Writing Name on Every Page | / | Tuesday |
|  | | / | Wednesday |
| / | Thursday |
| / | Friday |
| /100 | Total Points | / | Total Points |

Name of Environmental Scientist (Your Name):

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_\_\_\_\_\_\_

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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT explain what a mineral is.** |
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**MINERALS**

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| **A mineral is a naturally occurring, inorganic solid that has an orderly crystalline structure and a definite chemical composition.**  **A Mineral Must Have the Following Criteria:**  **1.**  **2.**  **3.**  **4.**  **5.** |

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| **SIDE NOTE ON CRYSTALS**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are solid, geometric forms of minerals produced by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.** |

**Properties of Minerals**

|  |  |
| --- | --- |
| **Property** | **Description** |
| * **Color** | **A few minerals can be identified by their color. But color varies in most minerals depending on how they form.** |
| * **Streak** | **The streak of a mineral is the color of its powder. Although mineral color may vary, streak color does not.** |
| * **Luster** | **How light is reflected off a mineral’s surface is called luster. It may be described as *glassy, earthy, silky, metallic,* etc.** |
| * **Crystal** | **A mineral can be identified by the particular arrangement of its atoms.** |
| * **Hardness** | **Mohs scale ranks mineral hardness 1–10.  1 = talc, which can be scratched by a fingernail.  10 = diamond, which can scratch all known common minerals.** |
| * **Cleavage** | **A mineral that splits easily along a flat surface and forms a new “face” is said to have cleavage.** |
| * **Fracture** | **Minerals that break irregularly, rather than leaving a flat surface, have fracture, not cleavage.** |
| * **Density** | **Each mineral has a characteristic density—mass per unit volume.** |

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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT describe how minerals form.** |
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**MINERAL FORMATION**

**Minerals can form by crystallization from magma or lava, from precipitation related to evaporation of hydrothermal solutions, or from exposure to high pressure and temperature, or they can be produced by organisms.**

|  |  |
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| **Ways That Minerals Can Form** | **Description** |
| Crystallization from magma or lava |  |
| Precipitation |  |
| Pressure and temperature |  |
| Produced by organisms |  |

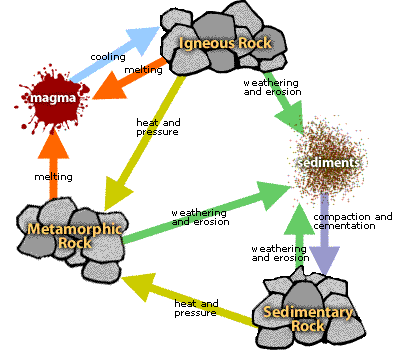
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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT identify types of rocks and the stages of the rock cycle.** |
|  |

**ROCKS**

**Forces deep inside and at the surface of Earth produce changes in rock that cause the same material to cycle between igneous, sedimentary, and metamorphic rock stages.**

|  |  |
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| ***Igneous Rock*** | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_when \_\_\_\_\_\_\_\_\_\_\_\_\_cools and hardens * Can cool inside the earth \_\_\_\_\_\_\_\_\_\_\_\_\_\_ OR on its surface from volcanoes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| ***Metamorphic Rock*** | * Formed from particles of sand, shells, pebbles, and other fragments (together called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**) * Builds up in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**and over time hardens into rock * Only type to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| ***Sedimentary Rock*** | * Formed under surface of the earth from intense \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Some have layered or banded appearance while others do not |

**ROCK CYCLE**

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**Additional Notes/Summary in Your Own Words:**

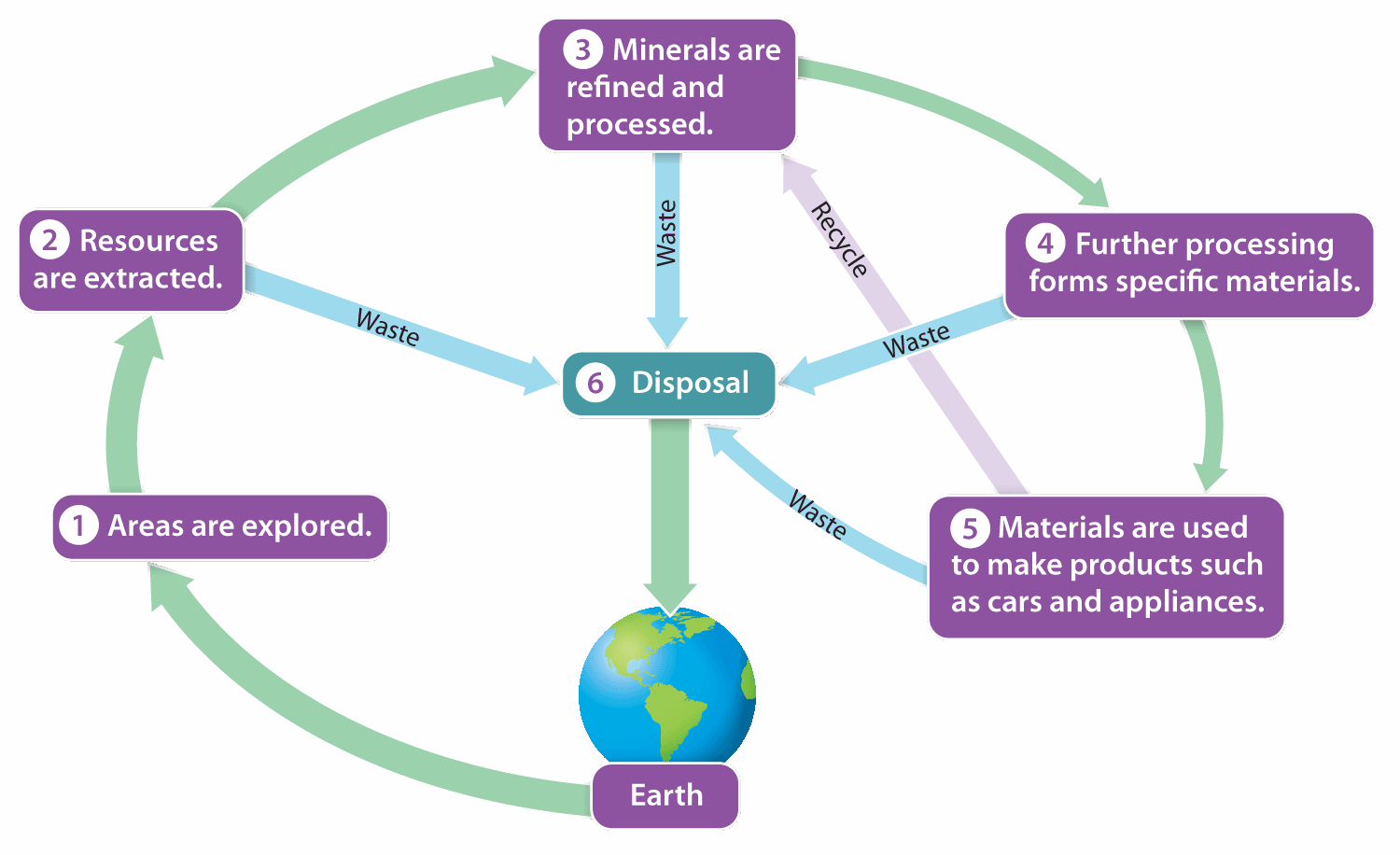
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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT describe different methods used for mining.** |
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**MINING METHODS**

**Mining companies seek and gather valuable resources such as metals, nonmetallic minerals, and fuel sources.**

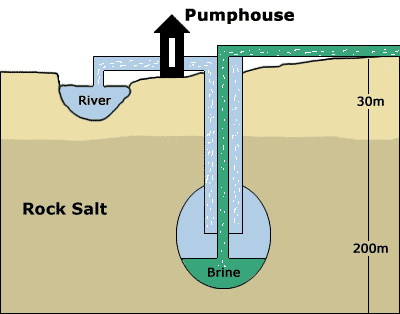
**Mining companies have developed many techniques to access resources close to the surface of Earth, deep underground, and even underwater.**

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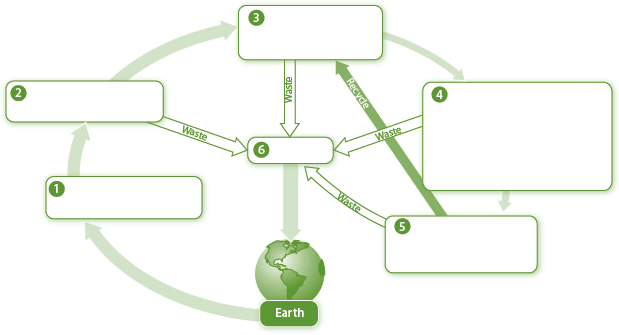
**MINING TECHNIQUES**

|  |  |
| --- | --- |
| ***Mining Technique*** | ***Description*** |
| 1. | * \_\_\_\_\_\_\_\_\_\_\_\_\_ of surface soil and \_\_\_\_\_\_\_\_\_\_\_\_\_ are removed from large areas to \_\_\_\_\_\_\_\_\_\_\_\_ the resource * Used to mine coal, sand, and gravel |
| **2.** | * Vertical \_\_\_\_\_\_\_\_\_\_\_\_\_ are dug deep into the \_\_\_\_\_\_\_\_\_\_\_\_\_, and networks of horizontal tunnels are dug or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to follow deposits of the resource * Used for metals such as zinc, lead, nickel, tin, gold, copper, and uranium and for nonmetallic minerals such as diamonds, phosphate, and salt. |
| **3.** | * When a mineral is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ throughout a rock formation * Involves digging a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and removing the \_\_\_\_\_\_\_\_\_\_\_ and unwanted rock that surrounds the ore. |
| **4.** | * First, forests are \_\_\_\_\_\_\_\_\_\_\_\_\_ and the timber is sold and burned. * Then, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is removed and rock is \_\_\_\_\_\_\_\_\_\_\_\_\_ away to expose the resource. |
| **5. \*\*\*** | * Rather than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the ground, miners sometimes pump a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into a mine to leach the desired resource from the \_\_\_\_\_\_\_\_\_\_ * Once the solution has reacted with the ore, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is removed from the mine, taking the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with it. |
| **6. Placer Mining** |  |
| **7. Undersea Mining** |  |

**\*\*\*SOLUTION MINING**



Label the diagram using sentences from the sentence bank to show how steel is produced and used.

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|  |  |
| --- | --- |
| **Areas are explored.** | **Iron ore is smelted to further extract iron. Mixed with other metals or chemicals, it is melted and reprocessed into steel rods and sheets.** |
| **Disposal** |
| **Steel is used to make appliances and other products.** |
| **Iron ore is removed from the ground.** | **Iron is separated from the ore.** |

**Additional Notes/Summary in Your Own Words:**

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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT explain how metals are processed.** |
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**PROCESSING MINERALS AND METALS**

**After mining, ores and other extracted materials are processed to separate the desired materials, combine them with other materials, or alter their properties.**

|  |  |
| --- | --- |
| *Breakdown of Ore* |  |
| *Separation from Ore* |  |
| *Metal Production* |  |

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| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Objective: SWBAT describe the negative impacts of mining on the environment.** |
|  |

**NEGATIVE IMPACTS OF MINING**

**Environmental impacts of mining include erosion, increased sediment and debris, and pollution of water, land, and air. Mining can also have negative impacts on society.**

**NEGATIVE ENVIRONMENTAL IMPACTS OF MINING**

Make sure Mr. Gutierrez stamps/signs this by the end of the period. You CANNOT get the stamp/signature for a day later on. It is your responsibility to remind Mr. Gutierrez. You will NOT receive a stamp if you did not follow all classroom policies or actively work on the practice problems during the allotted class time.A stamp means you received all 10 points. No stamps means you’ve received zero points. If you completed some work, I may give you partial credit based on my discretion. ***If you are absent, write the date on the day you were absent and write the word “Absent.” DO NOT LOSE THIS SHEET!!!*** (If you lose this sheet, you will lose all of your participation points. NO EXCEPTIONS.)

|  |  |  |
| --- | --- | --- |
| **Day of Week** | **Followed All Classroom Policies** (Respectful, on time, prepared, engaged…) | **Notes**  **(Took all required notes)** |
| *Monday* | / | / |
| *Tuesday* | / | / |
| *Wednesday* | / | / |
| *Thursday* | / | / |
| *Friday* | / | / |
| GENERAL COMMENTS |  | |