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Science Booklet

Part II

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7.1 Table to Classify Minerals

To classify minerals a table will be given that you will need to be able to read and compare mineral characteristics. Characteristics you may see include:

- Streak – color of mineral's powder
- Luster – the way a mineral reflects light (dull, shiny, pearly, metallic, glassy)
- Density – mass / volume (g/cm^3)
- Mohs Scale of Hardness – minerals ability to resist scratching (1 softest - 10 hardest)
- Crystal shape – determined by the number of sides
- Way mineral breaks – cleavage (flat and smooth) or fracture (jagged)

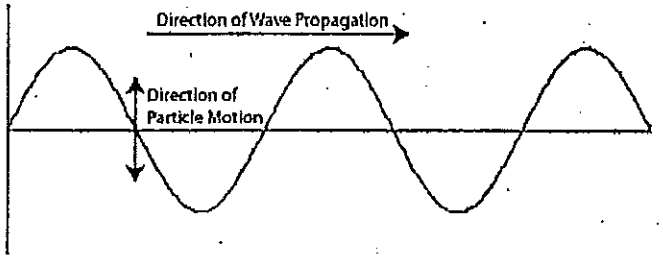
Here is a chart similar to a chart they may ask you a question from.

Mineral	Luster	Color	Streak	Hardness	Cleavage or Fracture	Crystal Structure
Galena	Metallic Luster	Gray	Gray to Black	2.5	Cubic fracture	Cubic
Graphite	Metallic Luster	Black to Gray	Black to Gray	1-2	Flaky Fracture	Hexagonal
Talc	Nonmetallic Luster	White Greenish	White	1	Fracture	Monoclinic
Quartz	Nonmetallic Luster	Colorless/ Var.Color	Colorless	7	Fracture	Hexagonal Prism
Calcite	Nonmetallic Luster	Colorless or White	Colorless to White	3	Fracture	Hexagonal Prism
Magnetite	Metallic Luster	Black	Black	6	Fracture	Cubic
Olivine	Nonmetallic Luster	Shades of Green	White	5-6	Fracture	Ortho-rhombic
Hematite	Metallic Luster	Steel gray to Black	Reddish Brown	5-6	Fracture	Trigonal
Hornblende	Nonmetallic Luster	Green to Black	Gray to White	5-6	Fracture	Monoclinic
Pyrite	Metallic Luster	Lt. brassy Yellow, Gray Green	Greenish Black	6.5	Fracture	Cubic
Halite	Nonmetallic Luster	Colorless, Red, White or Blue	Colorless	2.5	Fracture	Cubic
Muscovite	Nonmetallic Luster	White, Gray, Yellow, Green, Red	Colorless	2.5	Cleavage	Monoclinic
Gypsum	Nonmetallic Luster	Colorless, Gray White	White	2	Cleavage	Monoclinic
Dolomite	Nonmetallic Luster	Colorless, White, Pink, Green, Gray	White	3.5-4	Fracture	Hexagonal
Biotite	Nonmetallic Luster	Black with Brown	Colorless	2	Cleavage	Monoclinic
Fluorite	Nonmetallic Luster	Colorless, Green, Blue	Colorless	4	Fracture	Cubic

11.6 Transverse vs. Longitudinal Wave

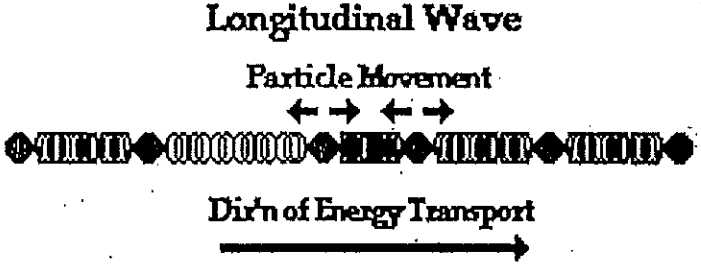
<u>Transverse</u>

- Electromagnetic
- No medium necessary
- Visible light, x-rays, microwaves, gamma
- Particles move perpendicular to the direction of the wave

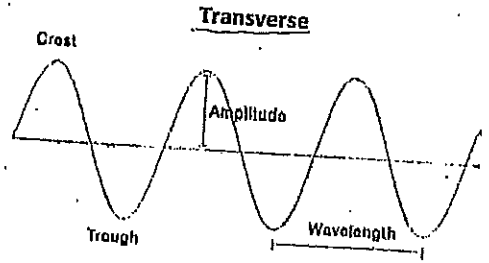


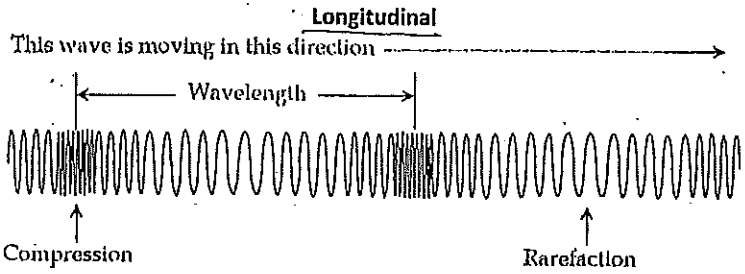
<u>Longitudinal</u>

- Mechanical
- *Requires Medium*
- Sound waves
- Particles move parallel to the direction of the wave



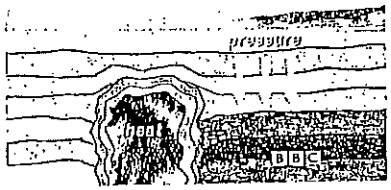
11.5 Parts of a Wave



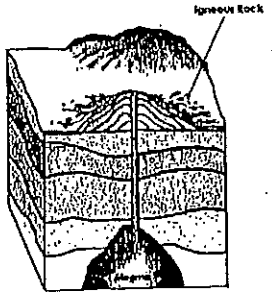


7.2 Three Rock Types

Sedimentary
Weathering and erosion break rocks into small pieces called sediments. These sediments are carried by wind and water and deposited in new places. Over a very long period of time, layers of sediment build up. The weight of the layers cause the sediments to compact (press together) and glue together (cement).



Metamorphic
Surface rock that is pushed/buried deep within the Earth can be exposed to extreme heat and pressure. This heat and pressure causes chemical changes in the rock, thus changing the rock.

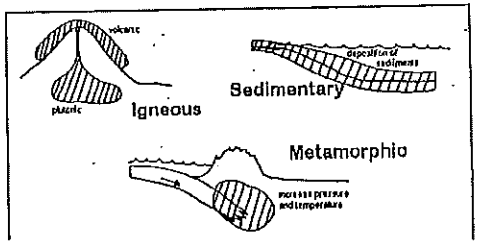


Igneous
Melted Rock (lava or magma) cools and hardens either above or below the surface of the Earth.

Summary:
Sedimentary – Forms from the processes of weathering, erosion, deposition, compaction, and cementation.

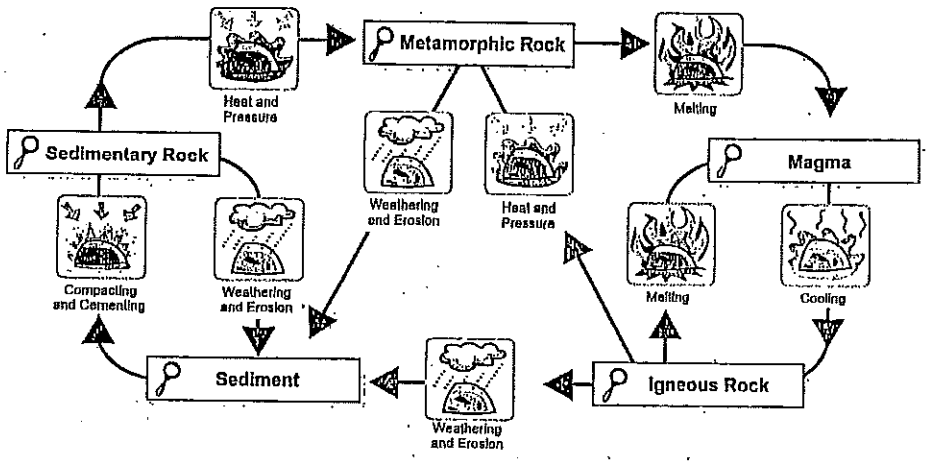
Metamorphic –Forms from heat and pressure.

Igneous –Forms from the cooling of lava/magma.



7.3 Rock Cycle

The Rock Cycle



Keys to Remembering the Rock Cycle:
Cooled Magma/Lava = Igneous
Heat & Pressure = Metamorphic
Weathering, Erosion, Compaction and Cementation = Sedimentary
Melted Rock = Magma/Lava

11.4 Newton's Laws of Motion

1st Law:
An object in motion tends to stay in motion, while an object at rest tends to stay at rest until acted upon by an outside force.

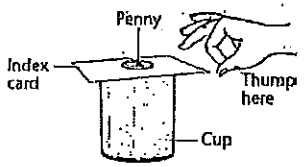
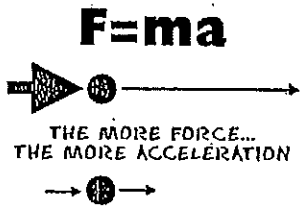
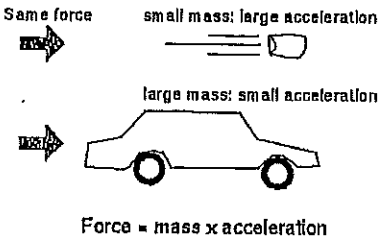


FIGURE 3.1. Law of Inertia
The penny is at rest and wants to stay at rest, as it does not move the direction that you pull the paper out.

The person continues moving at the rate the car was until it comes into contact with an outside force. This is why seatbelts are so important.

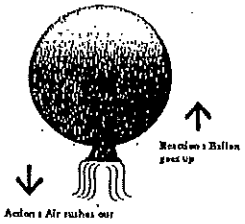
2nd Law:
To move a mass you need a force. The larger the force applied to an object, the greater it will accelerate. The greater the mass of an object, the lower the rate of acceleration.
Force = mass * acceleration (F=ma)





Force = mass x acceleration

3rd Law:
For every action there is an equal and opposite reaction. When one object exerts a force on another object, the second object with exert an equal force back, but in the opposite direction.



11.3 Solve for Speed and Velocity

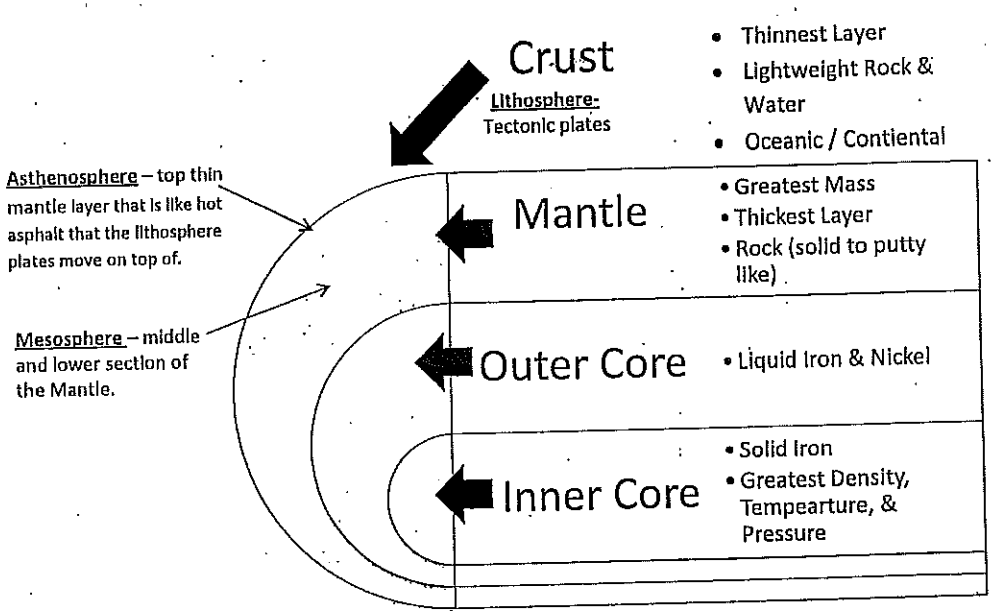
Speed is the measure of distance traveled over a specific amount of time.
Speed = distance / time
S= d/t

Velocity is an object's speed in a certain direction.
Example: 60 km/hr South

Example Problem:
A boat leaves the dock and travels west. The boat travels for three hours. At the end of three hours, the boat has traveled 36 km. What is the boat's average velocity?

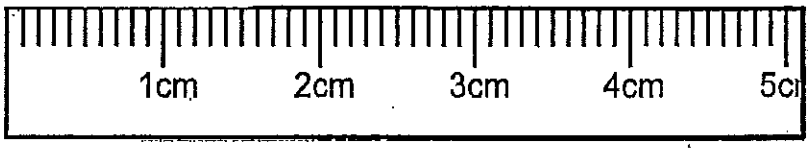
Use: Velocity is Speed = d/t plus direction
So: distance/time
36/ 3
=
12
Answer: 12 km/hr WEST

7.4 Earth's 3 Layers



7.5 Lithosphere Plates move Centimeters (cm) per Year

The Lithosphere, which is broken into tectonic plates, move on top of the mantle's asthenosphere on average 2.5 centimeters (cm) to 15 centimeters (cm) per year.



CENTIMETERS!!!!!!

11.2 Force needed to do Work

Work = Force * distance

- (W=F *d)
- Unit for Work is Joules (J)
- Unit for Force is Newton's (N)
- Unit for Distance is Meters, Kilometers, or Centimeters (m, km, cm)

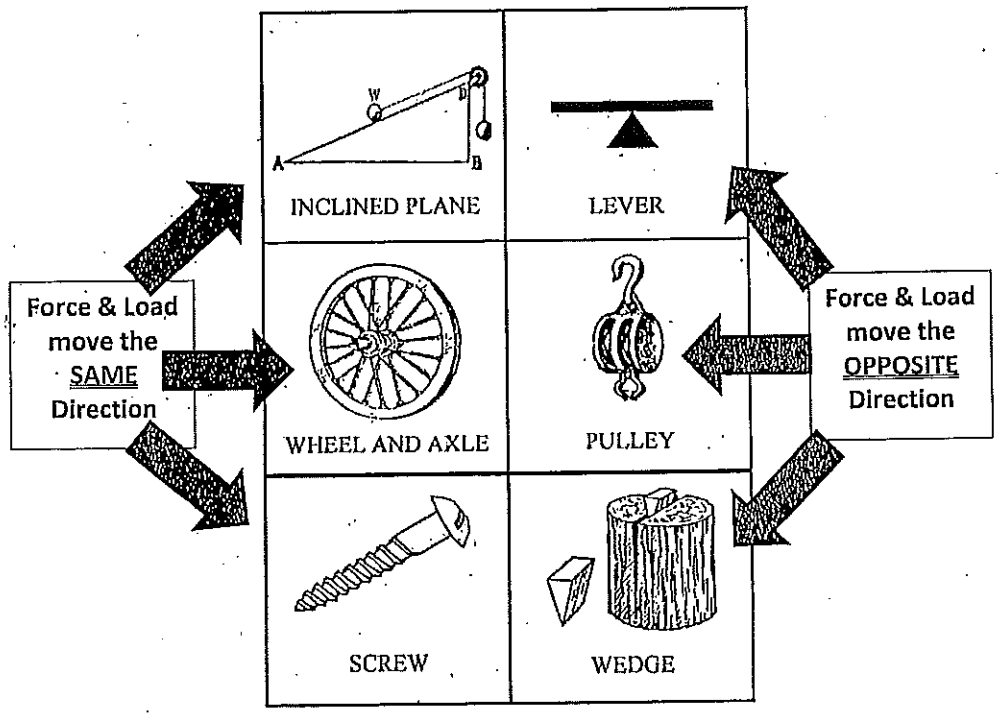
Example Problem:
If 40 N of force is applied to move a box over a distance of 7 m, what is the amount of work performed? (W = F * d)

From the Problem:
Force = 40N
Distance = 7m

To Solve: 40 * 7 = 280
Answer: 280 Joules (J)

11.1 Six Simple Machines

Simple Machine – device that makes work easier and has few to no moving parts.
Force – Push or Pull
Load – Object being Moved

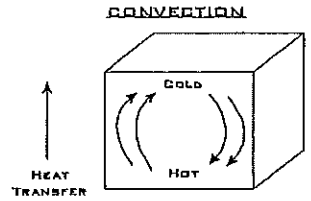


7.6 Causes of Earthquakes, Volcanoes, Mountain Building, & Sea Floor Spreading

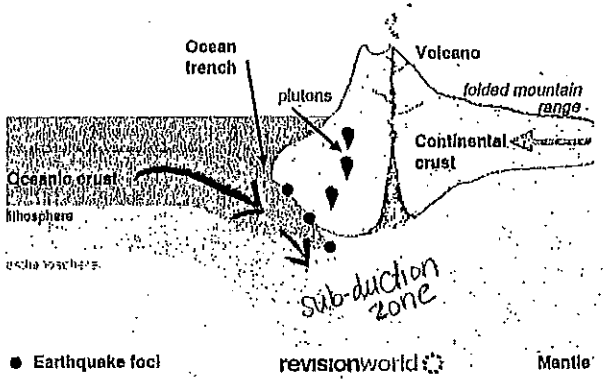
Rules of Plate Tectonics:

- ALL tectonic plate movement causes EARTHQUAKES!
- Oceanic plates are denser than Continental plates. Therefore Continental plates will sub-duct (go underneath) Continental plates.
- Convergent – come together and collide
- Divergent – move part
- Transform – slide past each other

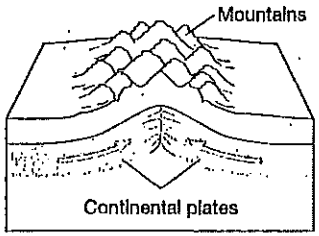
**A theory of why tectonic plates move is because of convection currents in the Earth's mantle.* Hot magma rises as cool magma sinks.*



Volcanoes – created at sub-duction zones where oceanic plates go underneath continental plate. Volcanoes also form at sub-duction zones where older dense oceanic plate sub-ducts under new less dense oceanic plate.

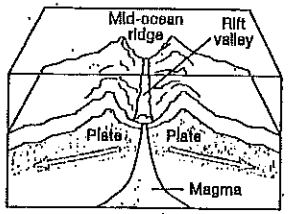


Mountain Building – Mountains created where two continental plates collide.



Two continental plates colliding

Sea Floor Spreading – Occurs at the Mid-Oceanic Ridge where two oceanic plates are pushing apart and creating new land.



Two oceanic plates pulling apart

7.7 Man's Impact on the Environment

Air/Atmosphere

- Burn Fossil Fuels → Increase in CO_2 → Greenhouse Effect → Global Warming
- Use of Refrigerants/Coolants → Depletion of Ozone

Land/Soil

- Deforestation → Loss of Biodiversity, and Loss of O_2 producing and CO_2 using Trees
- Pesticides → Contaminate Ground Water → Impact on Animal Life

Water/Oceans

- Oil Spills → Decrease in Fish/Animal Population → Unbalanced Food Chain
- Littering → 10% of Plastics make it to Ocean → Destroys Ecosystems

Ways to Protect the Environment:

- Recycle
- Use Alternative Resources to create Energy: Wind, Solar, Biomass, Geothermal, and Hydroelectric.