

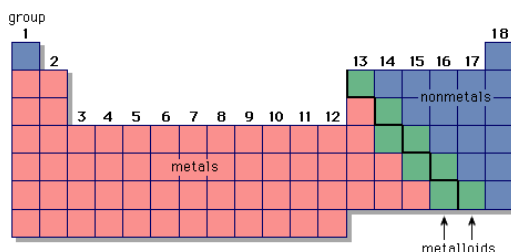
6th Grade Science End of Year Test Review

Physical and Chemical Properties of Matter.

- **Physical properties** include: color, shape, length (anything that can be observed or measured). Physical changes are reversible.
- **Chemical properties** give a substance the ability to undergo a chemical change. Example: Flammability and Reactivity. Chemical changes are NOT reversible.
- A new substance is ALWAYS formed when there is a **chemical change** or reaction. The new substance has different properties than the original substances that were combined. Evidence of chemical change is: production of a gas (bubbles), production of a precipitate (solid), change in temperature, or change in color.
- A **physical change** can be reversed. A change in state of matter is a **physical** change.
- **Density**- Mass divided by Volume.

Elements and Compounds:

- **Atoms** - The smallest unit of an element that maintains the properties of that element.
- **Element** – pure substance that cannot be separated into simpler substance by physical or chemical means
Chemical Symbol is the 1 or 2 letter abbreviation (Ni is the symbol for Nickel).
- **Compounds** – pure substance composed of two or more different elements joined by chemical bonds
 - Ex: C₆H₁₂O₆, H₂O



Metals, Metalloids & Nonmetals:

- Most elements are **metals**. They are usually shiny, very dense, and only melt at high temperatures. Their shape can be easily changed into thin wires (ductile) or hammered into sheets (malleable) without breaking. They are good conductors of heat and electricity.
- **Nonmetals**, on the right side of the periodic table, are very different from metals. Their surface is dull and they don't conduct heat and electricity. They are brittle and break easily. Many nonmetals are gases.
- Elements that have properties of both metals and nonmetals are called **metalloids**. They are semi-conductors. They are found between the metals and nonmetals on the periodic table.

Element Composition of our World

Solid Earth (Lithosphere) = 46% oxygen and 28% silicon

Living Matter (Biosphere) = 65% oxygen and 18% carbon

Oceans (Hydrosphere) = 86% oxygen and 11% hydrogen

Atmosphere (air) = 78% nitrogen and 21% oxygen

Mineral – a naturally occurring solid made of specific chemicals that is inorganic and has crystalline form

To classify **minerals**, you can test the physical properties:

- Hardness is a number from 1-10 based on Moh's Hardness Scale
- True color is the streak on the streak plate, not the color of the rock
- Luster is how shiny or dull it is

Energy Resources

Resource	Advantages	Disadvantages
coal	inexpensive	nonrenewable, pollutes
oil	makes gasoline	nonrenewable, pollutes
natural gas	cleanest fossil fuel	nonrenewable
biomass	renewable	not efficient
wind	renewable, clean	need wind
hydropower	renewable, clean	disrupts habitat of fish
geothermal	renewable, clean	limited to certain locations on Earth
nuclear	efficient	Radioactive waste
solar	renewable, clean	doesn't work at night, expensive

Force - a force is a push or pull

Inclined planes and pulleys can reduce the amount of force needed to move an object.

Newton's Universal Law of Gravitation states that every object exerts a gravitational pull on every other object. The greater the object's mass, the greater the pull of gravity it has.

Gravity is the force that governs the motion of our Solar System

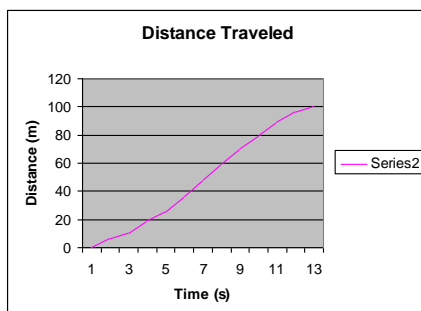
- Force is measured in Newtons (N). If the forces are working together you add the forces together example: A force of 50 N and 100N are working together to move an object. $50\text{ N} + 100\text{ N} =$ a net force of 150 N. If a force of 100 N and 50 N are pushing against each other you subtract $100\text{ N} - 50\text{ N} =$ a net force of 50 N.
- *if the forces are balanced the net force is zero and the object does not move.

Motion

- Speed is **Distance divided by Time**
 1. Example: On a short bike ride, you ride 30 km. It takes you an hour and a half to complete your ride. What was your average speed?
 1. You know:
 - Distance = 30 km
 - Time = 1.5 h
 2. Average speed = total distance ÷ total time
 3. $30\text{km} \div 1.5\text{h} = 20\text{ km/h}$

Graphing Motion

2. Time is plotted on the horizontal axis
3. Distance traveled is plotted on the vertical axis



Energy

- Potential Energy (Stored Energy) Kinetic Energy (Energy of Motion)
- Thermal-Energy of Heat
 - i. **Conduction**-direct transfer of heat from one particle to the next.
 - ii. **Convection**-movement of heated gas or liquid.
 - iii. **Radiation**-transfer of heat through empty space
- Thermal energy ALWAYS moves from the warmer substance to the cooler substance
- Electric-Energy from electric current
- Radiant-Energy of light
- Chemical-Energy found in chemical bonds (ex. batteries, food)
- Energy is constantly being transformed from one type to another.

Earth Materials

Three main layers make up Earth's interior:

- **Crust** – layer of rock that forms Earth's OUTER surface.
 - It includes both dry land and the ocean floor.
 - The crust beneath the ocean is called oceanic crust.
 - The continental crust is crust that forms the continents (land)
- **Mantle** – layer of hot, solid rock between the crust and core.
 - -Upper mantle and crust together form the **Lithosphere**
 - -Liquid part of the upper mantle is called the **Asthenosphere**
- **Core** – consists of two parts:
 - The **outer core** is a layer of molten metal (iron, nickel) that surrounds the inner core. (It is in the liquid state)
 - The **inner core** is a dense ball of solid metal (iron, nickel).

Three types of Tectonic Plate Boundaries

Tectonic plates move very slowly, therefore, landforms change very slowly.



1. Transform boundaries

- Place where two plates slide past each other moving in opposite directions. Earthquakes occur frequently along these boundaries.

2. Divergent Boundaries

- Place where two plates move apart



- **Sea-floor Spreading** happens here! As the two plates move away from each other, magma wells up from the Earth's interior. It then hardens into rock as it is cooled creating new ocean floor.

3. Convergent Boundaries

- Place where two plates come together to form mountains.



Subduction-Continental crust slides over the more dense oceanic crust forming a deep **trench**.
Volcanoes and Volcanic Islands form in subduction areas.

Rocks are classified by how they are formed:

- Sedimentary- particles or sediment is deposited and then cemented or compacted together
- Metamorphic – pressure and heat are needed
- Igneous – formed from lava or magma from a volcano when it cools and solidifies

Solar System:

- Our solar system is comprised of our Sun, the planets, asteroids, comets and meteors.
- Gravity keeps Earth and the other planets in our solar system in orbit around the Sun. The larger the mass the greater the gravitational pull.

Space Technology:

- Probes-unmanned spacecraft that travels through space to gather scientific data.
- International space station-a station that orbits Earth, where astronauts live and work in space.
- Space Shuttle-was used to carry humans into space.

All **organisms** are composed of one or more cells

- Prokaryotic – NO nucleus. DNA floats freely. Unicellular (one Cell)
- Eukaryotic – has a nucleus. DNA is neatly contained in the nucleus. Usually multicellular (many cells).

Taxonomic Groups:

Three Domains:

- Archea (includes Kingdom-Archaeobacteria)
- Bacteria(includes Kingdom-Eubacteria)
- Eukarya (includes Kingdoms-Protist, Fungi, Plant, Animal)

Six Kingdoms:

- Archaeobacteria – bacteria that can survive in extreme conditions -- very hot, acidic or salty environments.
- Eubacteria
- Protist
- Fungi
- Plant – autotrophic (makes own food from the sun)
- Animal – heterotrophic (eats other organisms)

Ecosystems:

- Primary Energy source for Earth is the Sun.
- Producers (plants), primary consumers (herbivores-plant eaters), carnivores, omnivores, decomposers.
- Biotic – living parts of the ecosystem.
- Abiotic – nonliving parts of the ecosystem.
- Organism (only one) -> Population (whole species) -> Community (all living parts) -> Ecosystem (all living and nonliving parts)