

Content from all the required 6th Grade NC Science Standards is included for the year!

Matter and its Interactions

Matter
anything that has mass and takes up space (living or nonliving)

Atom
smallest unit of matter
OVER 100 types

Atoms of the same type form elements.

Elements are organized on the periodic table.

Molecules Form when atoms combine.

H_2O , O_2 , CO_2

pure substance: matter that is made up of only one type of molecule or atom

States of Matter

Gas

The state matter change energy is or removed (usually heat)

Heating lowers density as particles spread out

Sublimation

Condensation

Evaporation

Boiling point which a liquid

do not depend on matter or

solvent

depend on matter or

mass and matter or

Energy

Heat
Thermal energy transferred between objects

Temperature
measure of hotness or coldness (or average kinetic energy)

Heat moves from warmer to cooler

Conductors: allows transfer of heat or electrical energy easily

Examples: copper, aluminum, steel, gold, salt water

Waves and Their Types

Waves
repeating disturbance that transfers energy through matter or space

Types of Waves

- mechanical waves: require a medium (solid, liquid, gas) examples: sound and seismic waves
- electromagnetic waves: can travel through space and matter examples: light waves and X-rays

Transverse Wave
up and down perpendicular to the direction that wave travels

crest: highest point of the wave cycle

trough: lowest point of the wave cycle

amplitude: height of higher amplitude = more energy

Frequency (unit: Hertz) = number of waves per unit of time

Wave speed = Frequency x wavelength

Thermal Conductivity: how well matter absorbs thermal energy, faster particle motion, volume increases

Thermal Expansion: matter loses thermal energy; slower particle motion, volume decreases

Thermal Contraction: matter loses thermal energy; slower particle motion, volume decreases

Thermal expansion occur in solids, liquids, and gases

From Photosynthesis to Respiration

Photosynthesis

Carbon Dioxide + Water + Light Energy → Glucose + Oxygen

Chlorophyll is the pigment that absorbs red and blue-green light, giving plants their green color

Respiration

Glucose + Oxygen → Carbon Dioxide + Water

Energy flows in ecosystems as food provides energy

complementary

Transpiration: evaporation from plants through leaf pores (stoma) guard cells control opening and closing to prevent excess water loss

Vascular Plants
plants that have specialized structures to move food and water

Examples: oak trees, sunflowers, grasses

Nonvascular Plants
plants that do not have specialized vascular tissues

Examples: mosses, liverworts, hornworts

- no xylem or phloem
- have rhizoids
- absorbs water and nutrients

Phloem: moves food (sugars)

Xylem: moves water and minerals

Ecosystems - Interactions, Energy, and Dynamics

Ecosystems: community of organisms interacting with each other and their environment

Organisms need energy for their cells to function.

The Sun is the ultimate source of energy for most ecosystems.

producers: make their own food using sunlight (photosynthesis)
Ex. plants, algae, phytoplankton

consumers: get energy by eating other organisms
Ex. rabbit, deer, bear, human

decomposers: break down dead organisms
Ex. mushrooms, mold, bacteria

Abiotic Factors
(nonliving things in an ecosystem)

Examples:
- light
- temperature
- precipitation
- soil
- pH

Biotic Factors
(living things in an ecosystem)

Examples:
- plants
- animals
- fungi
- bacteria
- insects

Changes in abiotic or biotic factors affect organism survival, reproduction, and population

Energy Flow
Energy moves in one direction

A Limiting Factor restricts growth

Earth's Systems

Structure of the Earth

Compositional Layers (chemical)
Crust, Mantle, Core

Mechanical Layers (physical)
Lithosphere, Asthenosphere, Outer Core, Inner Core

The Rock Cycle

The crust and mantle are mostly rock.
The core is mostly iron and nickel.
The mantle is the thickest layer of hot rock that slowly flows.

Earth and Human Activity

It's important for humans to care for the pedosphere (soil) and lithosphere (Earth's outer layer) because they are essential for food production, water filtration, ecosystems, and more. Degradation of these resources can lead to long-term environmental issues.

Stewardship: responsible care for Earth's resources

Human behavior can have both positive and negative effects on the environment.

Positive Impacts

- planting trees
- reducing pollution
- protecting habitats
- protecting endangered species

Negative Impacts

- deforestation
- pollution
- urbanization
- fertilizer overuse

Many human impacts on the environment come from how land is used and managed.

Land Use Practices
(maintains soil quality and ecosystem health)

- Crop Rotation (Nutrient Balance)
- Contour Plowing
- Terracing
- Windbreaks (shelterbelts)
- Conservation Tillage
- Intercropping

Unsustainable
(degrades soil and ecosystems)

- deforestation
- overgrazing
- salinization from irrigation water
- fertilizer overuse
- desertification

Soil quality affects plants, ecosystems, and human health.

Scientists monitor soil quality by measuring:
- texture (sand, silt, clay)
- nutrients
- pH
- water retention
- organic matter (humus)

Soil is made of different sized particles.

- sand:** larger than particles of silt or clay (feels gritty, water runs through quickly)
- silt:** smaller than sand, larger than clay particles (feels like powder)
- clay:** smallest grains of any other soil component (feels sticky when wet, large clumps when dry, holds water best)

A balanced mixture is called loam.

A soil texture triangle is used to classify soils.

© Bright in the Middle

Earth's Place in the Universe

Seasons, tides, phases of the Moon, eclipses, and more are all impacted by the motion and position of the Sun, the Earth, and the Moon.

Rotation
when an object spins on its axis

- Earth rotates every 24 hours
- Causes day and night

Revolution
movement of an object around another object

- Earth revolves around the Sun every 365.25 days
- The Moon rotates and revolves at the same rate.
- This is why we always see the same side of the Moon.

Seasons: summer, winter, spring, autumn

- caused by Earth's tilt (23.5°)
- toward Sun → summer
- away from Sun → winter
- opposite seasons in each hemisphere

Moon Phases: occur as the Moon orbits Earth and we see different parts of its sunlit side; cycle ~29.5 days

Eclipses: when one celestial body enters another's shadow

- Solar Eclipse:** Moon passes between Earth and Sun
- Lunar Eclipse:** Earth passes between Sun and Moon

Tides: rising and falling of the sea primarily caused by the gravitational pull of the Moon

- Spring Tides:** Sun, Earth, and Moon aligned → largest tides
- Neap Tides:** Sun and Moon at right angles → smaller tides

Planet Earth differs in distance from Sun, growth atmosphere, temperature, surface, ability to support life

Includes:
- Sun
- planet
- asteroid
- moons
- comet
- meteor
- dust
- These are Gravity (magnetism)

Food Web shows interconnected food chain in an ecosystem

Decomposers: waste, rot, decay

Energy flows in ecosystems as food provides energy


Transpiration: evaporation from plants through leaf pores (stoma) guard cells control opening and closing to prevent excess water loss

Instrument: telescope

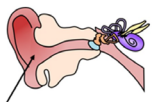
© Bright in the Middle


An editable text version (PPT) is included!

You may also love the [6th Grade Science Word Wall!](#)



6TH GRADE Science Word Wall

pinna and ear canal outer ear 

female part of the flower pistil  shows one path of how animals find food food chain 