

Content from all the required 7th Grade NC Science Standards is included for the year!

Motion and Stability - Forces and Interactions

Vocabulary

position when an object changes position over time relative to a reference point

reference point a place or object used for comparison to determine position

distance the length of the path traveled by an object

displacement the change in position of an object

velocity the rate of change in position over time

acceleration the rate of change in velocity over time

force a push or pull that can change the motion of an object

net force the sum of all forces acting on an object

balanced forces forces that are equal in size and opposite in direction

unbalanced forces forces that are not equal in size and opposite in direction

Ways to Explain Motion

Speed

quickly, slowly, constantly, accelerating (speeding up, slowing down, etc.)

Objects Direction

North, South, West, East, left, right, forward, backward, up, down, etc.

Gravity

gravitational force between two objects that depends on the mass of the objects and the distance between them

Special forces

friction a force that opposes motion between two surfaces that are in contact

normal force a force that is perpendicular to the surface of contact

Forces

balanced forces

- no change in motion
- equal in size, opposite in direction

unbalanced forces

- causes motion
- net force $\neq 0$

Newton's Laws

- 1st - **INERTIA** - An object at rest remains at rest unless acted on by a force. An object in motion remains in motion unless acted on by a force.
- 2nd - $F = MA$ - Force = mass $\times$ acceleration
- 3rd - **ACTION-REACTION** - For every action, there is an equal and opposite reaction.

Position-Time Graphs

constant speed

constant speed

constant speed

Distance-Time Graphs

constant speed

constant speed

constant speed

Energy

Vocabulary

mechanical energy kinetic or potential energy associated with the motion or position of an object

potential energy energy that is stored in an object because of its position or state

kinetic energy energy of motion

thermal energy heat energy

chemical energy energy stored in chemicals

electrical energy electron movement

light energy energy we can see

radioactive energy energy of electromagnetic waves

sound energy sound vibrations

nuclear energy fission and fusion

electromagnetic energy electric or magnetic waves

Energy Transfer

Energy can be transferred from one system to another:

- thermally
- mechanically
- electrically
- electromagnetic waves

Simple Machines

inclined plane a flat surface set at an angle used to help raise or lower objects

lever a rigid bar pivoted about a fulcrum

pulley consists of a wheel with a groove in which a rope can run to change the direction of a force

wedge helps cut or split objects

screw: wrapped plane wrapped around a cylinder

wheel-and-axle a large wheel and a small axle

Heredity - Inheritance and Variation of Traits

Vocabulary

genetics the study of heredity

heredity passing of traits from parents to offspring

trait a characteristic that is passed from parent to offspring

allele a variant form of a gene

dominant allele an allele that is expressed in the phenotype

recessive allele an allele that is not expressed in the phenotype

genotype the genetic makeup of an organism

phenotype the observable characteristics of an organism

Mitosis and Meiosis

Mitosis: process in which a cell divides to produce two identical daughter cells

Meiosis: process in which a cell divides to produce four non-identical daughter cells

Mutations

There can be a variation of traits from mutations (may result in altered proteins)

Mutations are random and can be beneficial, harmful, or neutral

Punnett Squares

predicts outcomes of a particular cross

Gregor Mendel "the father of genetics"

Gregor Mendel's work with pea plants was crucial to help people understand how traits were passed down through generations

Classical reproduction

single parent has offspring that is genetically identical

Earth's Systems

Differences in air pressure cause winds and weather changes

Global Winds

All winds blow from high to low pressure

Local Winds

Sea Breeze

Land Breeze

Fronts

Stationary Front

Warm Front

Cold Front

Occluded Front

Severe Weather

thunderstorms, hurricanes, lightning and thunder, cumulus clouds, cold fronts, warm fronts, sea breezes, land breezes, fog, hail, rain, snow, sleet, ice, wind, etc.

From Molecules to Organisms

Vocabulary

cell the basic unit of life

cell membrane outer boundary of the cell

cytoplasm fluid inside the cell

nucleus control center of the cell

mitochondrion provides energy

chloroplast food factories for cells

vacuole stores needed nutrients

Cell Theory

All living organisms are made of cells

Cells are the basic units of life

Cells are made from pre-existing cells

Single-Celled Organisms

Euglena

Amoeba

Paramecium

Volvox

Cellular Respiration

glucose + oxygen $\rightarrow$ carbon dioxide + water + energy

Photosynthesis

carbon dioxide + water + energy $\rightarrow$ glucose + oxygen

Human Body Systems

Circulatory System

transports blood throughout the body

Respiratory System

exchanges gases between the body and the environment

Digestive System

breaks down food into nutrients

Nervous System

controls the body's responses

Endocrine System

produces hormones

Immune System

protects the body from disease

Excretory System

removes waste from the body

Earth's Systems

Vocabulary

atmosphere the layer of air surrounding the Earth

weather the state of the atmosphere at a given place and time

climate the average weather conditions over a long period of time

precipitation rain, snow, sleet, or hail falling from the sky

condensation the process of water vapor turning into liquid

evaporation the process of liquid water turning into vapor

transpiration the process of water vapor being released from plants

Cycling of Water

Composition of the Atmosphere

Air Masses

Clouds

Temperature

Humidity

Wind

Earth and Human Activity

Vocabulary

pollution the introduction of harmful substances into the environment

contaminant a substance that causes pollution

environment the surroundings of an organism

ecosystem a community of living organisms and their physical environment

The Greenhouse Effect

The Sun shines down on Earth

Some of the rays are reflected by the atmosphere

Greenhouse gases (carbon dioxide, water, methane, etc.) help keep heat from escaping to space and help maintain temperature on Earth

Global Warming or Climate Change

Overall average global temperature since 1850 (a little more than 1°C)

Scientists believe it is due to an increase in greenhouse gases in the atmosphere (adding more heat)

Causes of Air Pollution

Human Activity

The Air Quality Index (AQI)

The AQI is a scale used to report daily air quality. It is based on the concentration of two primary pollutants: ground-level ozone and particulate matter.

AQI Values	Health Concern	Color
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Magenta

Recommended Protection

0-2 Wear a hat and/or sunglasses

3-6 Wear a hat and/or sunglasses. Use a low SPF sunscreen

7-9 Wear a hat and/or sunglasses. Cover body with clothing. Avoid the sun

10-12 Cover head, eyes, body, and use strong SPF or do not go out

13-14 Take all necessary precautions. It is advised to stay indoors

An editable text version (PPT) is included!