

O.G.T. SCIENCE TEST: QUICK STUDY GUIDE

PLATE TECTONICS

The Earth's outer layer is broken up into 7 **plates**. This is sometimes referred to as the CRUST.

The plates move due to **convection currents** inside the MANTLE.

When the plates move, many things can happen including **volcano eruptions, earthquakes, mountain building, seafloor spreading**, etc.

ATOMS

protons = positive charge, found inside the nucleus

electrons = negative charge, found in the "electron cloud" (outside of the nucleus)

neutrons = neutral charge, found inside the nucleus

THE PERIODIC TABLE

The **atomic number** is equal to the **number of protons**. The *number of protons is equal to the number of electrons* in a neutral atom.

The **atomic mass** is equal to the **number of protons plus the number of neutrons**.

The **group number** (found at the top of each column) is equal to the **number of valence electrons**. *This is used when drawing electron dot structures.*



POTENTIAL ENERGY VS. KINETIC ENERGY

potential energy – an object's stored energy (*Objects that are higher up or have more mass have a higher potential energy because they have further to drop*)

kinetic energy – an object's energy while in motion (*the faster it moves, the more kinetic energy it has*)

DENSITY

density = mass/volume

Substances that are MORE dense SINK.

Substances that are LESS dense RISE.

NEWTON'S LAWS OF MOTION & GRAVITY

Newton's 1st Law: an object in motion stays in motion and an object at rest stays at rest

Newton's 2nd Law: $F = ma$

Newton's 3rd Law: for every action there is an equal and opposite reaction

Friction: will slow down an object

Gravity: Under ideal conditions, objects fall to the ground at the same rate; it does not matter if one is heavier than the other

SCIENTIFIC INQUIRY

Observations are made by gathering information using your senses about events or processes. An **inference is a guess** based on prior knowledge or experience.

A **hypothesis is a proposed scientific explanation** for a set of observations.

The variable that is **deliberately changed is called the manipulated variable**.

The variable that is observed and **changes in response to the manipulated variable is called the responding variable**.

A **control group is not exposed to the independent variable** so that it can be used as comparison to the experimental data.

There should only be one manipulated variable in a scientific experiment.

FOOD WEBS & ENERGY PYRAMIDS

FOOD WEBS show the **feeding relationships between plants and animals in an ecosystem**. *Arrows* show the relationships. They show the direction of energy transfer. (the organism that the arrow is pointing to eats the organism the arrow is coming from)

ENERGY PYRAMIDS show the **relative amounts of energy at each trophic level**. The amount of energy is greatest at the bottom of the pyramid and lowest at the top of the pyramid.

trophic level – each step in a food web or pyramid

Prefixes/Suffixes to know

bio – life (*biology* is the study of life)

geo – earth (*geology* is the study of the earth)

hetero – different (*heterozygous* means different genes)

homo – same (*homozygous* means same/like genes)

a – not (*abiotic* means not living)

thermo – heat/temperature (*thermometer*)

eco – environment/outdoors (*ecology* is study of outdoors)

chemo – chemical (*chemosynthesis* is creating chemicals)

photo – light (*photography* uses light to take pictures)

synthesis – creates (*photosynthesis* uses light to create food)

ENERGY TRANSFER

Energy cannot be created or destroyed. It can only be transferred from one form to another (i.e. electrical to mechanical).

Types of energy:

- thermal – heat
- mechanical – movement
(eg. pedaling a bicycle)
- chemical – chemical reactions
(eg. chemicals in a battery, food in your body)
- electrical – electricity
- radiant – like light waves traveling through the air
(eg. from the Sun to your eyes)

Heat energy ALWAYS travels from **hot to cold**.

CELLULAR ORGANELLES

Nucleus – contains genetic material (DNA) and chromosomes

Mitochondria – respiration occurs here; makes energy

Cell membrane – the “skin” of the cell; it encloses the entire cell and food/wastes pass through it

Flagella – is like a long tail used for movement (cilia are little hairs that could also be used for movement)

Plant cells contain a cell wall and chloroplasts. Animal cells do not.

Chloroplasts – where plant cells use chlorophyll to do photosynthesis

CELLS

prokaryotes = simple cells that do not have a nucleus;
example: bacteria

eukaryotes = complex cells that have a nucleus; includes plants, animals, humans, protists and fungi

CELLULAR PROCESSES

photosynthesis – process in which a plant (or other organism) uses light to convert carbon dioxide and water into food/energy

cellular respiration – process that releases energy by using oxygen to break down sugar (glucose) and other food molecules into food/energy

GENETICS

Genes come in pairs of CHROMOSOMES (half come from your mom and half come from your dad).

The different varieties of genes are called alleles. **Alleles can be dominant or recessive.** If the dominant allele (represented by a CAPITAL letter) is present, it will always have “control.” A recessive allele (represented by a lowercase letter) will only be recognized if it is paired with another recessive allele.

HOMOZYGOUS PAIRS can be 2 dominant alleles (EE) paired together or 2 recessive alleles (ee) paired together. A

HETEROZYGOUS PAIR is one dominant allele and one recessive allele (Ee).

GENOTYPE is the genetic make-up of an individual (eg. EE or Ee). **PHENOTYPE** is an individual’s physical appearance.

PUNNETT SQUARES are useful for finding the probabilities of traits being expressed in potential offspring.

A **PEDIGREE** goes further by tracking the transmission of traits among various generations.

	E	e
E	EE	Ee
e	Ee	ee

Punnett Square

COMMUNITY INTERACTIONS

Competition – occurs when organisms compete for the same resource at the same place at the same time

Predation – an interaction in which one organism captures and feeds on another organism

Symbiosis – any relationship in which two species live closely together

Mutualism – a type of symbiosis in which both species mutually benefit from the relationship

Commensalism – a type of symbiosis in which one organism benefits and other is neither helped nor harmed

Parasitism – a type of symbiosis in which one organism lives on or inside the other organism and harms it

SCIENCE BUZZWORDS

BIAS...unfair prejudice towards a particular opinion; favoring one side of an argument

ETHICS...a set of principles that guide decision-making; whether something is morally right or wrong (*it is ethical to warn people of the side-effects of a drug...it is unethical to secretly test new drugs on someone*)

QUALITATIVE...data that does not use numbers

QUANTITATIVE...data that uses numbers

ABIOTIC & BIOTIC FACTORS

abiotic factor – something that is **not and has never been alive**, *examples: a rock in the forest, the water in a stream*

biotic factor – things that are or used to be **alive**, *examples: a redwood tree, a rotting tree stump*