

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

## PLATE TECTONICS

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

**The plates move due to convection currents** inside the ASTHENOSPHERE or 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" (surround 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.*

kinetic energy – an object's energy while in motion

## DENSITY

density = mass/volume

Objects or substances that are **MORE** dense **SINK**.

Objects or substances that are **LESS** dense **RISE**.

## NEWTON'S LAWS OF MOTION & GRAVITY

**Newton's 1<sup>st</sup> Law:** an object in motion stays in motion and an object at rest stays at rest

**Newton's 2<sup>nd</sup> Law:**  $F = ma$

**Newton's 3<sup>rd</sup> Law:** for every action there is an equal and opposite reaction

**Gravity:** Under ideal conditions, objects fall to the ground at the same rate.

## 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.

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.

PYRAMID OF NUMBERS shows the **relative number of individuals at each trophic level**.

*trophic level – each step in a food web or pyramid*

## SCIENTIFIC INQUIRY

**Observations are made by gathering information** about events or processes. An **inference is a logical interpretation** 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.

## LAST MINUTE NOTES:

### ENERGY TRANSFER

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

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

### CELLS

prokaryotes = simple cells; example: bacteria

eukaryotes = complex cells; includes plants, animals, protists and fungi

### CELLULAR ORGANELLES

Prokaryotes contain genetic material not contained in a nucleus.

Eukaryotes contain complex organelles including a nucleus containing genetic material.

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

### CELLULAR PROCESSES

**photosynthesis** – process in which plants and other organisms use light energy to convert water and carbon dioxide into carbon dioxide

**cellular respiration** – process that releases energy by breaking down glucose and other food molecules in the presence of oxygen

### 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. **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.

### COMMUNITY INTERACTIONS

**Competition** – occurs when organisms attempt to use 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 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

**ETHICS**...a set of principles that guide decision-making

**QUALITATIVE**...data that uses nonnumeric descriptions

**QUANTITATIVE**...data that can be counted or measured

### 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, a weather system*

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