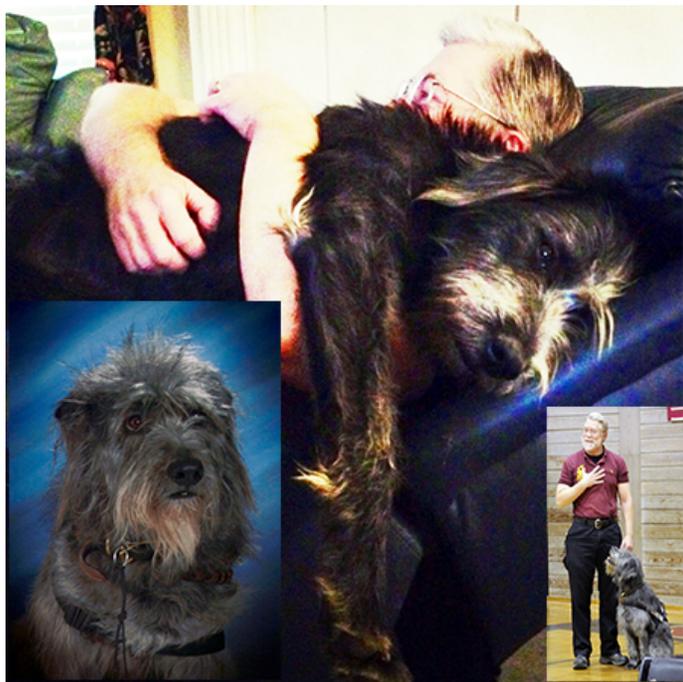


* **ALL** of this exam is **REVIEW** of **PAST** material you have already studied.

* **YOU DO NOT NEED COPIES OF YOUR PAST TESTS.**

The exam questions will be different, so it is best to simply study **THIS** guide and then if needed, look up a term or concept in the textbook or notes to read about it again in context.



REMEMBER:

You need to do **MORE** than simply memorize vocab definitions.

You need to understand the terms and study the connected concepts, **BEFORE** to understand how to apply them.

BE ABLE TO LIST THE 8 STEPS OF THE SCIENTIFIC METHOD IN ORDER:

Observe

Question

Research

HYPOTHESIZE

Test

Results

Conclusion

Communicate

REVIEW SCIENCE MATH - SCIENTIFIC NOTATION:

PURPOSE: scientific notation simply makes it easier to view and work with VERY large or small numbers that are often used in science and technology. REMEMBER, there was a time not long ago when scientist did not have calculators. Like when they sent the first men to the moon. They had to convert and calculate using huge and tiny numbers with ONLY THEIR MIND AND PAPER. And one day not far away, we could end up with no calculators. So it's important for us to know how to do this!

TERMS to LEARN:

1. **Original** number you start with is a very **BIG** or very small number, then you need to **CONVERT** to scientific notation.

2. **Coefficient** is the main number that is multiplied by 10 to a certain power (exponent)

Example: $4.5 \times 10^4 = 45,000$. The 4.5 is the coefficient.

3. **Exponent** is the superscript power on the 10 that shows how many times the coefficient is multiplied by 10.

Example: $4.5 \times 10^4 = 45,000$. The little superscript ⁴ above the 10 is the exponent.

SIMPLE RULES for CONVERTING from standard numbers to scientific notation format:

1. All coefficient numbers must be between 1 and less than 10. So the **decimal** in the original very big or very small number must be moved a number of spaces until the coefficient satisfies rule # 1. **EXAMPLE: $45,000 = 4.5 \times 10^4$.**

The coefficient should **ONLY** have **ONE** digit to the **LEFT** of the **DECIMAL**. (the **4** is the only # to the left of the decimal.)

2. All exponents above the 10 must be whole numbers.

3. The exponent above the 10 is equal to the number of spaces you moved the decimal to satisfy rule # 1.

4. If the original number is less than 1, then the exponent must be a negative number. (like 10^{-4})

* Otherwise, the exponent must be a positive number.

SIMPLE RULES doing CALCULATING with scientific notation numbers:

1. When adding or subtracting two scientific notation numbers that have the **SAME** exponent above their 10, you simply add or subtract the two coefficients and then **KEEP** the same exponent above the 10.

* **Example:** $5.0 \times 10^7 + 3.0 \times 10^7 = (5 + 3) \times 10^7$ (just keep the 7 same) = 8×10^7

BUT if the two numbers you want to add or subtract have **DIFFERENT** exponents above their 10, then it becomes more complicated. In middle school life science, you will NOT have to do those kinds of problems.

2. When multiplying two scientific notation numbers, you multiply the two coefficients and **ADD** the two exponents.

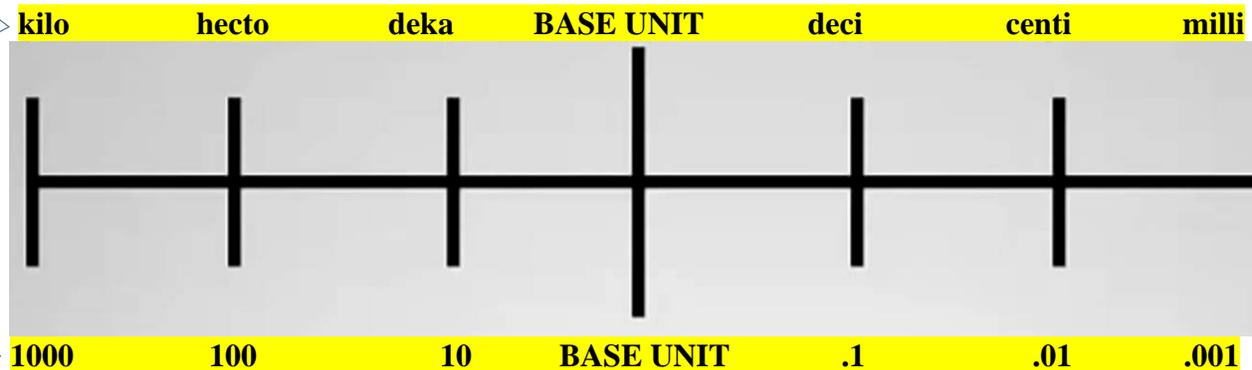
* **Example:** $5.0 \times 10^7 \times 3.0 \times 10^4 = (5 \times 3) \times 10^{7+4=11} = 15 \times 10^{11}$

3. When dividing two scientific notation numbers, you divide the two coefficients and **SUBTRACT** the two exponents.

* **Example:** $6.0 \times 10^7 \div 2.0 \times 10^4 = (6 \div 2) \times 10^{7-4=3} = 3 \times 10^3$

REVIEW SCIENCE MATH - METRIC MEASUREMENT / SI UNITS:

BE ABLE TO write the six metric prefixes on top of a slider **IN THE CORRECT ORDER**



BE ABLE TO write what AMOUNT of the BASE UNIT is represented by each metric prefix at the bottom of a slider.

KNOW THAT

The base unit for **LENGTH** is **METER**

The base unit for **VOLUME** is **LITER**

The base unit for **MASS** is **GRAM**

BE ABLE TO CONVERT UNITS like the following examples by using the slider diagram above:

$$4000 \text{ mg} = \underline{4} \text{ g}$$

$$2 \text{ L} = \underline{2000} \text{ mL}$$

$$18 \text{ cm} = \underline{180} \text{ mm}$$

Compare amounts like these examples by using either: = or > or <

**** REMEMBER, you FIRST need to convert ONE of the numbers in each pair to MATCH the SAME UNIT as the other.**

You must compare apples to apples, not apples to oranges.

That means g to g OR mg to mg, mL to mL OR L to L, cm to cm OR m to m.

NOT g to mg, etc.

$$8 \text{ g} > 710 \text{ mg}$$

$$2,500 \text{ mL} = 2.5\text{L}$$

$$74 \text{ cm} < 5 \text{ m}$$

YOU MUST KNOW THE FOLLOWING BASIC TERMS/CONCEPTS

Measurement - a uniform system to record observations
Physicians - professionals who examine patients and diagnose diseases
Safety - the most important principle in every experiment
Science - the study of observable facts or events in the physical universe.
Inference - is an **interpretation** of an observation.

What is a hypothesis? *A testable prediction. Literally an underlying belief.*
What is the most important way scientists test hypotheses? *conducting a controlled experiment*

Microscope - An instrument to discover unicellular creatures
Cell theory - States that cells always come from cells
HOMEOSTASIS refers to what? *Organisms' ability to maintain stable internal conditions like temperature and water balance*
Magnification - Measures how large an object appears
Resolution - Measures how clear an object can be seen

What is the most abundant chemical found in living cells? *WATER*
What is the source of energy for most autotrophs such as plants? *SUN/LIGHT*

Atom - the smallest unit of an element
Cells - the basic building blocks of living things
Organic - compounds that do contain the element carbon
Osmosis - diffusion of **water** molecules through a membrane
Passive Transport - molecule movement across a membrane **WITHOUT** using energy

How are photosynthesis and respiration related? *They have opposite equations.*
How do respiration and photosynthesis affect carbon dioxide and oxygen in the air? *keep amounts balanced*
What kind of organic compounds are DNA and RNA? *nucleic acids*
During DNA replication how do the A,T,C,G genetic letters bond? *(A-T and C-G)*

Alleles - different forms of a gene
Genes - factors that control traits
Meiosis - the process by which sex cells are formed
Mendel - father of genetics
Mitosis - the process of normal cell division for body cells
Punnett Square - chart showing all the possible combinations of alleles

You will have a Punnett Square similar to this one.

Cross the (Tt) plant and the (tt) plant below:

(Tt) x (tt) – T = Tall is dominant

(Fill in the boxes of the chart at the right) →

Offspring = 50% Tall (Tt), 50% short (tt)

	T	t
t	Tt	tt
t	Tt	tt

Carrier - A person who has one recessive allele for a trait and one dominant
Cloning - copying one organism to make another, that has identical genes
Genetic Disorder - an abnormal condition caused by a MUTATION that a person inherits
Hybridization - crossing two genetically DIFFERENT individuals
Pedigree - a chart that tracks which members of a family have a particular trait

What is a karyotype? *a picture of the chromosomes in a cell*
A male human being has what combination of sex chromosomes? *XY (Female is XX)*

Changes Over Time (ORIGINS: Creation vs. Macroevolution)

BIBLE scholars show that the Bible says God created all things about 6,000 years ago, because the genealogies from Adam to Jesus add up to about 4,000 years, then from Jesus to now as about 2,000 years.

BIBLICAL CREATION says the origin of the universe and life occurred in six 24-hour days, about 6,000 years ago, that there was no death before sin, and a global flood with earthquakes formed most fossils, rock layers, etc.

IS GOD A MONSTER? Some macroevolutionists do believe in God. So they actually teach God designed the violent process of macroevolution (survival of the fittest, predators, parasites, disease, suffering and death). So they claim that He created man from microbes, and that the six “days” of Genesis were really long periods of thousands or millions of years, death before human sin, and no global flood. Sadly, this is a wrong, UNBIBLICAL belief makes God seem like a MONSTER.

YOM = DAY: Hebrew term for the six days of creation (“yom”) in Gen. 1 clearly was intended to mean natural 24 hour days because “yom” always means a 24 hour day when it is used with a **qualifier** (a number, or the terms “evening” or “morning”).

DNA: Mr. Galloway’s phrase = **DESIGNED NOT ACCIDENTAL**. chemical name = **Deoxyribonucleic Acid**

DNA = INFORMATION which always comes from an INTELLIGENCE, not natural chemical reactions.

BIOGENESIS LAW (that life comes only from life) contradicts evolution’s claim that the first cell came from non-living chemicals because living cells could never have arisen from non-living chemicals.

MUTATIONS: according to Dr. Sanford @ Cornell Univ. are a serious challenge to evolution instead of a support for it, because mutations cannot create the new genetic information necessary to have made all of the new structures for all of the different creatures on Earth. Mutations over time destroy genetic information and lead to mutation meltdown and extinction.

DIRECT science is what scientists do when they apply the results of experimental science in the PRESENT to improve technology, etc.

INDIRECT Science is what scientists do when they make educated guesses (beliefs) about when & how PAST processes (biological or physical) occurred, based on old evidence (fossils, rock layers).

MACRO-evolutionary theory is FALSE since it claims that mutational changes produced men from microbes by creating new genetic coding over millions of years.

MICRO-evolution is a form of change that we all agree is TRUE and is simply adaptation by natural-selection, which involves only the sorting or losing of already existing genes without creating any new genetic information.

Breeding different variations of canines (dogs) is a ONLY a demonstration of MICRO-evolution because it is only the sorting of existing genes and NOT the creation of NEW genetic information.

HOMOLOGOUS PARTS: The best explanation for many “Homologous” (similar) structures among different animals is that they were designed by a common designer as efficient engineering, NOT evolved from a common ancestor. For example, the best engineering design to TWIST A WRIST is TWO bones, not one or three. So God gave two lower arm bones to bats, rats, birds, lizards, dogs, and people to allow the twist the wrist of their lower limbs.

CLASSIFICATION LEVELS:

Mr. G’s biblical sentence to help learn classification levels in order.

“KINGS PLACE CROWNS ON FAITHFUL GODLY SERVANTS”

The SIX scientific levels of classification:

KINGDOM PHYLUM CLASS ORDER FAMILY GENESIS SPECIES

NOAH’S ARK/FLOOD/FOSSILS – The internal volume of Noah’s Ark was 1.5 million cubic feet.

FAMILY level of classification most likely represents the biblical “Kind” for the pairs of animals taken on the ark. (Only 2 canines)

NOSTRIL-ANIMALS: God commanded Noah to take on the Ark, ONLY NOSTRIL breathing animals, so a pair of each “kind” at the family level (not species or genus) could easily have fit on the ark.

DINO-TISSUE: Many examples of soft tissue and blood cells have been found in T-Rex bone fossils, plus ancient cultures, have dragon stories, drawings, and carvings are found that fit known dinosaurs, and this is strong support creationists’ claim that people and dinosaurs lived together after Noah’s flood.

DINO-EGGS: The approximate egg size of the largest dinosaurs was as small as a football, and Noah would have taken young animals as breeders, not old adult large animals.

TREE-SIZED TAIL: Job 40:15 indicates that Job described what seems to be a dinosaur living during Job’s time, because it had a tail like a CEDAR TREE. No other large land animal has ever had a tail like a cedar tree, surely not an elephant, hippo, or rhino.

“LIVING” FOSSILS show that macroevolution is a false theory because Living Fossils are creatures that are found BOTH alive today and dead in fossils yet WITHOUT any big changes. This shows that those fossils could not be millions of years old. If they were, then the creatures would have changed a lot over supposed millions of years.

TREE-TRUNK-FOSSILS stuck through many layers contradict the assumed ages of rock layers, because no tree could stand for millions of years, while sediment slowly accumulated around it.

DIAMONDS & AGE OF THE EARTH? Diamonds were formed when the earth was formed. Radioactive carbon 14 (C-14) has been found in diamonds, yet C-14 can only last thousands of years. This shows Earth cannot be billions of years old.

APE-MEN? Macroevolutionists claim to have found “ape-men” ancestors of humans, but according the medical school human anatomy professor Dr. Menton, they have only found fossilized skeletons of extinct apes and of dead humans but no ape-men.