

Honors Biology Summer Assignment

Directions : Over the summer, we would like you to prepare for the science course you are taking next school year. There are TWO parts to this assignment. Try to pace yourself; there is quite a bit of work!

Part 1. Understand the Methods of Science – Summer Reading

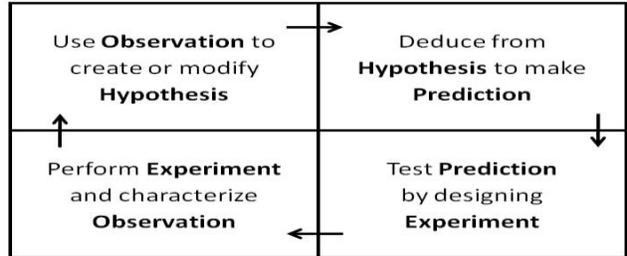
- Many times, the scientific process is perceived as a strict set of steps that must be followed. In reality, the process of science is very messy! The purpose of this summer reading assignment is to allow the student to experience the scientific process as it applies to a particular scientific issue. Students will then respond to ALL SIX of the prompts below.
- Read: *The Double Helix: A Personal Account of the Discovery of the Structure of DNA* by James D. Watson
 - New Paper back version can be purchased on Amazon for approximately \$10 (used copies as low as \$1 !)
 - Kindle version can be purchased on Kindle for \$12.99
 - FREE audible version with a trial of Audible.com
 - Available at the Zachary Public Library
 - Borrow from Mrs. Harvey (there are ten copies available). **Must email Mrs. Harvey to set up a time to pick up the book.** Books will be available June 11, 2018 to borrow.
- Respond Once finished reading, students need to respond thoughtfully and thoroughly to all the prompts. Responses need to be supported with examples and quotes from the chosen book. ***All responses need to be typed.*** Summer work will be **DUE AUGUST 10, 2018.**
 - Prompt responses will be worth 30pts. See rubric for scoring guide.

Part 2. Prepare for the language of Biology (well, science!).

- ✓ This list of Greek or Latin **words** and **roots of words** most commonly used in Biology will help you speak comfortably and understand terms and ideas related to Biology and in science in general. We would like you to be able to *recognize* and *use comfortably* most these terms.
 - Study the document entitled, "Scientific Root Words, Prefixes, And Suffixes".
 - Use index cards (recommended: with diagrams!), a Quizlet, or another tool or app to study them.
 - Many of us are visual learners so drawings will help you learn.
 - During the summer, there will be biweekly practice quizzes posted on Moodle for you to use to gauge your progress. **These are not worth points but are HIGHLY encouraged.**
 - You will have a **50-pt. test** on these roots, prefixes, and suffixes on **Friday, August 17, 2018.**

Summer Reading Prompts :

1. Introduction: Write a one-paragraph summary (please do not copy the summary from the publisher!) of this book. The summary needs to include the main problem/discovery/issue of the book. *(One paragraph minimum.)*
2. Science often builds upon the work of others. Describe *two* instances when the knowledge base developed by someone else further advanced the main problem/discovery/issue of this book. *(Two paragraph minimum.)*
3. The scientific process can be distilled into four parts (see diagram below). Write AT LEAST one paragraph for each part describing how the scientific process proceeded in the book (i.e. write at least one paragraph about each of the four parts of the scientific process). *(Four paragraph minimum.)*



4. Give a full description of how bias was experienced/treated during the scientific process. *(One paragraph minimum.)*
5. All scientific research has setbacks; scientists need to have the perseverance to be successful. A) Describe *two* setbacks faced by researchers and B) how each setback was overcome. *(Two paragraph minimum.)*
6. Scientists are not always altruistic. Describe a situation in which a researcher behaved in an unethical way. *(One paragraph minimum.)*

Essay Grading Rubric:

Each prompt is graded using this rubric for a total of **30 points**.

SCORE	TRAITS
5 (EXCELLENT)	CLEAR, WELL ORGANIZED, WELL DEVELOPED IDEAS Main idea (thesis) is clear.
4 (ACCEPTABLE)	Topic sentences and concluding sentences are used effectively in body paragraphs.
3 (BELOW AVERAGE)	Supporting details strongly support topic sentences; concrete detail/commentary used effectively when appropriate.
2 (COMPLETE BUT UNACCEPTABLE)	Transitions are used to connect ideas between paragraphs. Introduction, body, conclusion provide logical sequencing of ideas, leading to clear analysis or interpretation.
1 (INCOMPLETE)	
0 (NOT PRESENT)	

Scientific Root Words, Prefixes, And Suffixes

Word Part	Meaning	Example	Meaning of Example
a-, an-, non-, un-	Without, Not	Aphotic, Anaerobic, Nonrenewable	<i>Without</i> light, <i>without</i> air or oxygen, <i>Not</i> able to replenish naturally
adi-, lip-	Fat	Adipose, Liposuction	<i>Fat</i> tissue, Removing <i>fat</i> tissue
aero-	Air, Oxygen	Anaerobic	Without <i>oxygen</i>
ana-	Up	Anabolic	Build <i>up</i> of larger molecules from smaller molecules
angio-	Vessel, Container	Angiosperm, Angiogram	<i>Container</i> for seed, Picture of a blood <i>vessel</i>
anti-, contra-	Opposite, Against	Anticodon, Contraception	<i>Opposite</i> of codon, <i>Against</i> conception
aqua-, hydr-	Water	Aquatic, Hydration	Of <i>water</i> , With <i>water</i>
-ase	Enzyme	Amylase, Lipase	<i>Enzyme</i> that breaks down carbohydrates, <i>Enzyme</i> that breaks down lipids
auto-	self	autotroph	<i>self</i> feeder (can make their own energym usually through photosynthesis)
bi-, di-, diplo-	Two	Bipedal, Diploid, Diplococcus	<i>Two</i> feet, <i>Two</i> sets of chromosomes, <i>Two</i> round bacteria
bio-, vita-	Life	Biosphere, Vitamin	Where <i>life</i> exists on earth, Organic molecules necessary for <i>life</i>
blast-	Germinate, Sprout, Bud	Blastula	Single layer of cells surrounding a cavity formed by cleavage of the fertilized egg
card-	Heart	Cardiology	Study of the <i>heart</i>
cat-, de-	Down	Catabolic, Decomposer	Break <i>down</i> of big molecules into small molecules, Break <i>down</i> of dead organisms
ceph-	Head	Cephalization	Concentration of sense organs at the front of an animal's body, its <i>head</i>
cerv-	Neck	Cervical vertebrae	Bones of the <i>neck</i>
chloro-	Green	Chlorophyl	<i>Green</i> leaf
chrom-	Color	Chromosome	<i>Colored</i> body
co-, com-, con-	Together, Both, With	Codominance, Community, Conjugation	<i>Both</i> alleles (trait type – size, color) are dominant, Organisms living <i>together</i>
corp, som	Body	Corpse, Somatic cell	Dead <i>body</i> , <i>Body</i> cell (any cell that is not an egg or sperm)
-cyst	Capsule, Sac, Pouch	Nematocyst	A capsule within specialized cells of certain coelenterates (jellyfish) containing a barbed, threadlike tube that delivers a paralyzing sting
derm	Skin	Epidermis, Ectoderm	Top <i>skin</i> layer, Outer layer of tissue/skin during embryo development
deutero-	Second	Deuterostome	Mouth develops second (the anus develops first)
dia-, dif-, diss-	Through, Apart, Across	Diarrhea, Dissect, Diffusion	Flow <i>through</i> , Cut <i>apart</i> , <i>Across</i> (cell membrane)

ecto-, exo-	Out, Outside	Ectoderm, Exoskeleton	<i>Outer</i> layer of tissue during embryo development, Skeleton on <i>outside</i> of body
-emia	Blood Condition	Hyperglycemia, Sickle cell anemia	High blood sugar levels, Sickle shaped red blood cells (should be circular)
epi-	Upon, Over, Atop	Epidermis, Epicardium, Epiphytes	<i>Upon</i> the dermis (skin), <i>Over</i> the heart, <i>Atop</i> a plant
Equ-, iso-	Equal, Same	Isotonic, Equilibrium	Solute levels are <i>equal</i> on both sides of a membrane (inside & outside the cell)
erthr-	Red	Erythrocyte	<i>Red</i> blood cell
eu-	TRUE	Eukaryote, Eucoelomate	<i>True</i> nucleus (protective membrane around DNA), <i>True</i> body cavity
ex-, extra-, exo-	Out, Outside, Beyond	Extinct, Extracellular, Extrapolation	Died <i>out</i> , <i>Outside</i> the cell, <i>Beyond</i> known values (on a graph)
gastr-	Stomach	Gastrointestinal (GI)	<i>Stomach</i> and intestines
geo	Earth	Geotropism	A plant's response to the <i>earth's</i> gravity
hapl-, mono-, uni-	One	Haploid, Monosaccharide, Unicellular	<i>One</i> set of chromosomes, <i>One</i> unit of sugar (glucose), <i>one</i> celled organism
herb-, -phyte	Plant	Herbivore, Epiphyte	<i>Plant</i> eater, <i>Atop</i> a <i>plant</i>
homo (greek)	Same	Homozygous	Same alleles (form of a gene);
hyper-	More, Excessive	Hypertonic, Hypertension	<i>More</i> solute (something dissolved in water), <i>Excessive</i> blood pressure
hypo-, sub-	Less, Below	Hypotonic, Hypotension, Subatomic	<i>Less</i> solute, <i>Below</i> normal blood pressure, <i>Below</i> atoms (protons, neutrons, electrons)
lingu	Tongue	Sublingual	Under the <i>tongue</i>
gram, -graph	Written or Picture	Electrocardiogram, Sonography	<i>Print out</i> of the heart's electrical activity, Taking <i>pictures</i> using sound waves
helix	Spiral, Coil	Double helix	Two strands in a <i>spiraled</i> shape
hem-	Blood	Hemorrhage	<i>Bleed</i> heavily
hepato-	Liver	Hepatitis	Inflammation of the <i>liver</i>
hetero-	Different, Other	Heterozygous, Heterotroph	Offspring gets <i>different</i> forms of same trait (Tt), <i>Other</i> feeder (ex. herbivore)
inter-	Between	Intercellular	<i>Between</i> cells
intra-, endo-	Inside	Intracellular, Endoderm	<i>Inside</i> a cell, <i>Inside</i> layer of a developing embryo
karyo, caryo	Cell Nucleus	Prokaryote, Prokaryotic	Cells without a nucleus
leuco-, leuko-	White	Leucocyte	<i>White</i> blood cell
loc	Place	Locus	<i>Place</i> on a chromosome where a specific gene is found
lys-	To Loosen	Lyses, Cytolysis	Process of <i>loosening</i> up or digesting a cell membrane causing cell death

macro-, mega-	Large	Macromolecule, Megafauna	<i>Large</i> molecules (lipids, carbohydrates, proteins, nucleic acids), <i>Big</i> animals
Mal, dis, dys	Bad or Ill	Malnutrition, Disease, Dystrophy	The tumor was malignant.
medi-, meso-	Middle	Medial, Mesoderm	<i>Middle, Middle</i> layer of tissue during embryo development
meta-	Change	Metamorphosis, Metastasis	<i>Change</i> in shape or location; Cancer cells that change location (spread),
micro-	Small	Microsporangia, Microbiology	Small spore carriers (male), Study of microbes (bacteria, viruses, etc.)
morph	Shape, Form	Mesomorph, Metamorphosis	Middle <i>form</i> , Change in <i>shape</i> (tadpole to frog)
multi, myria, poly-	Many	Multicellular, Myriapod, Polysaccharide	Organism made of <i>many</i> cells, Organism w/ <i>many</i> feet, <i>Many</i> monosaccharides
muta-	Change	Mutation	<i>Change</i> in the # or sequence of DNA
myo-	Muscle	Myofibril, Fibromyalgia	<i>Muscle</i> cell, <i>Muscle</i> pain
nasal, rhin, probosc	Nose	Nasal septum, Rhinoplasty, Proboscis	Wall dividing <i>nasal</i> cavity, Surgery of reshaping the <i>nose</i> , Elephant's <i>trunk</i>
neo-	New	Neonatal	<i>Newborn</i>
nephr-, renal	Kidney	Nephron, Renal vein	Part of the <i>kidney</i> that filters/cleans blood, Vessel taking blood to the <i>kidney</i>
omni-, toti-	All	Omnivore, Totipotent	Eats <i>all</i> – plants & animals, <i>All</i> important cell (zygote) – becomes <i>all</i> cells
oo-, ov-	Egg	Oogonia, Oviduct, Oviparous, Ovum, Ootid	<i>Egg</i> stem cells, <i>Egg</i> carrying tube, <i>Eggs</i> that are hatched outside the mother
ose, gly, sacchar	Sugar	Glucose	A simple <i>sugar</i> or monosaccharide made by photosynthesis in autotrophs
-osis	Act, Condition	Acidosis	Too much acid in body fluids
oste-	Bone	Osteoarthritis, Osteocyte	Inflammation where <i>bones</i> meet (joint), <i>Bone</i> cell
paleo-, archeo-	Old, Ancient	Paleontology, Archeology	Study of fossils and the history of earth, Study of <i>ancient</i> civilizations
patho-	Disease	Pathogens	<i>Disease</i> -causing organisms (some bacteria, some viruses, etc.)
ped, pod	Feet, Foot	Centipede, Tetrapod	100 <i>feet</i> , 4 <i>feet</i>
peri-	Around	Pericardium	<i>Around</i> the heart
phago, troph, vore	To Feed or Eat	Phagocyte, Autotroph, Carnivore	<i>Eating</i> cell (white blood cells), Self- <i>Feeders</i> (photosynthesizers), Meat <i>eater</i>
photo-, lumin	Light	Photosynthesis, Bioluminescence	Using <i>light</i> to make glucose, Organisms that can create <i>light</i>
phyte, phyto	Plant	Epiphyte	A <i>plant</i> that grows atop of another <i>plant</i>

pinn-, plum-, -pter	Wing, Feather, Fin	Pinnepedia, Plummage, Hymenoptera	Using <i>fins</i> for feet (seals), <i>Feather</i> shape & patterns, Straight membraned <i>wings</i>
pino-	Drink	Pinocytosis	Process of a cell engulfing/ <i>drinking</i> liquids or dissolved substances
ploid	Chromosome	Haploid, Diploid	One set of <i>chromosomes</i> , Two sets of <i>chromosomes</i>
pneumo-, pulmo-	Lungs	Pneumonia, Pulmonary artery	Infection of the <i>lungs</i> , Vessel taking blood from the heart to the <i>lungs</i>
post-	After	Post mortem	<i>After</i> death
pre-, pro	Before, Forward	Prenatal	<i>Before</i> birth
prim-, prot-	First	Primary consumer, Protozoa	<i>1st</i> organisms to eat producers (herbivores), <i>1st</i> animal
pseudo-	FALSE	Pseudocoelomate, Pseudopodium	<i>False</i> body cavity (between ecto- & endoderm), <i>False</i> foot (found in amoeba's)
re-	Again	Reproduce	Produce <i>again</i>
sal	Salt	Saline	Full of salt or salt containing
sapr-	Rotten	Saprotroph	Feeds on <i>Rotting</i> organic matter/dead organisms (also called decomposers)
scope	View, See	Microscopic, Macroscopic	To <i>see or view</i> something small, To <i>see or view</i> something w/o using a scope
sect, -tom	Cut	Bisect, Anatomy	<i>Cut</i> in two, To <i>cut</i> up
semi-, hemi-	One-Half	Semipermeable, Hemisphere	Allows some (<i>1/2</i>), but not all things through, <i>One-half</i> a sphere (ball-shape)
sperm	Seed	Spermicide, Spermatid	<i>Sperm</i> killer, A small or immature <i>sperm</i>
spir	Breathe	Inspire, Spiracle	To <i>breathe</i> in, Hole found on insects for air to enter and leave (<i>breathing</i>)
stas, stat	Unchanging	Homeostasis	<i>Unchanging</i> chemical conditions in healthy organisms
stom-, ora	Mouth	Stomata, Oral cavity	Hole or <i>mouth</i> in leaves allowing gas exchange (O ₂ & CO ₂), <i>Mouth</i> space
sym-, syn-, sys	With, Together	Symbiosis, Synthesize, System	Organisms living <i>with</i> each other, Put <i>together</i> , Working <i>together</i>
telo-	End	Telophase, Telomeres	<i>End</i> of mitosis, <i>End</i> or tip of chromosomes
terr	Land	Terrestrial ecosystem	All living and nonliving things in a designated area on <i>land</i>
trans-, per-	Across, Through	Transport, Transdermal, Permeable	<i>Across</i> a cell membrane, <i>Through</i> the skin, <i>Through</i> a cell membrane
trop, volv	Turn, Change	Phototropism, Evolution	Plant's response of <i>turning</i> toward light, How organisms <i>change</i> over time
ventr-	Belly	Ventral	Belly portion of an organism (portion of a worm that touches the ground)
zyg	Yoke (egg + sperm)	Zygote, Homozygous	Union of <i>egg & sperm</i> , Zygote receives the same genes from both <i>egg & sperm</i>