

Honors Biology Final Exam

Study Guide Answers - 2016

1

- Both deal with data.
- Accuracy deals with being “on-target”. Getting what you are “supposed to get”.
- Precision deals with how close the data points are to each other. You can be precise without being accurate.

1 continued...



High accuracy, but low precision



High precision, but low accuracy.

1 continued...

- With measurements, the more decimal places you measure, the more precise the measurement will be.
- “2.9” is less precise than “2.93”

2

- 1.) observe
- 2.) state the problem
- 3.) form a hypothesis
- 4.) test the hypothesis
- 5.) collect and analyze data
- 6.) make conclusion
- 7.) repeat and report results

3

- **Chloroplast** – makes food for plants using sunlight
- **Mitochondria** – makes ATP energy for eukaryotes by breaking down sugar.
- **Lysosome** – cleans up animal cells.
- **Ribosome** – produces proteins in both prokaryotes and eukaryotes.

4

- **PROKARYOTES:**

- Have DNA
- No nucleus
- No organelles (except ribosomes)
- Only single celled.
- Have cell membranes and cell walls
- Have cytoplasm
- Ex: Bacteria

- **EUKARYOTES:**

- Have DNA
- Have a nucleus
- Have organelles
- Some can be multi-celled
- Have cell membranes and some have cell walls.
- Have cytoplasm
- Ex: Protists, Fungi, Plants, Animals

5

- **PLANTS:**

- Are eukaryotes
- Have chloroplasts
- Have cell-walls
- Have a large central vacuole.

- **ANIMALS:**

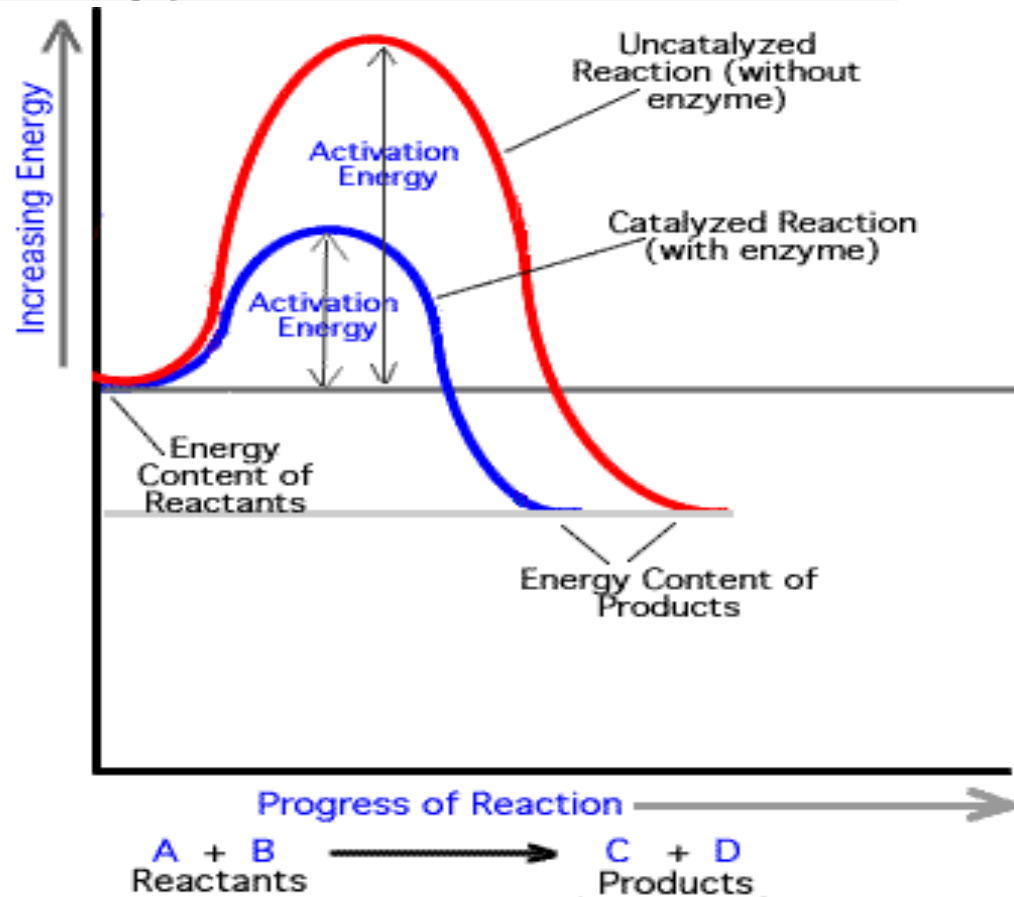
- Are eukaryotes
- DO NOT have chloroplasts
- DO NOT have cell walls.
- DO NOT have a large central vacuole.
- HAVE lysosomes
- HAVE centrioles

6

- Enzymes speed up chemical reactions.

7

- Enzymes speed up reactions by lowering the activation energy needed to start the reaction.



8

<u>Macromolecule</u>	<u>Monomer</u>	<u>Examples</u>	<u>Functions</u>
Carbohydrate	Monosaccharide	Sugars	Give Energy & make cell walls
Lipid	N/A	Fats, oils, cholesterol	Storage of Energy, make cell membranes; insulation
Protein	Amino acid	Muscle, bone, antibodies	Form muscle & bone; move substances across the cell membrane.
Nucleic Acid	Nucleotide	DNA, RNA	Store genetic information; help make proteins

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- Active transport requires ATP energy.
 - It moves substances from low concentration to high (uphill; **against the concentration gradient**)
- Passive transport does not require ATP energy.
 - It moves substances from high concentration to low (downhill; **with the concentration gradient**).

10

- Osmosis

SB2

11

- C-T-A-A-T-G-T

12

- Original strand was G-A-T-T-A-C-A
- mRNA = C-U-A-A-U-G-U

13

- Sexual reproduction provides **genetic variation** among offspring.
 - Really important if the environment is constantly changing.

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- Sexual reproduction is an advantage when the environment is changing.

15

- Meiosis produces variation among sexually reproducing organisms (**INCLUDING HUMANS**).

16

- Artificial selection is a process where people choose which male and females of a species mate.
- This is done to improve agriculture, produce new varieties of animals (think dog breeds).

17

- $ee \times Ee$

	E	e
e	Ee	ee
e	Ee	ee

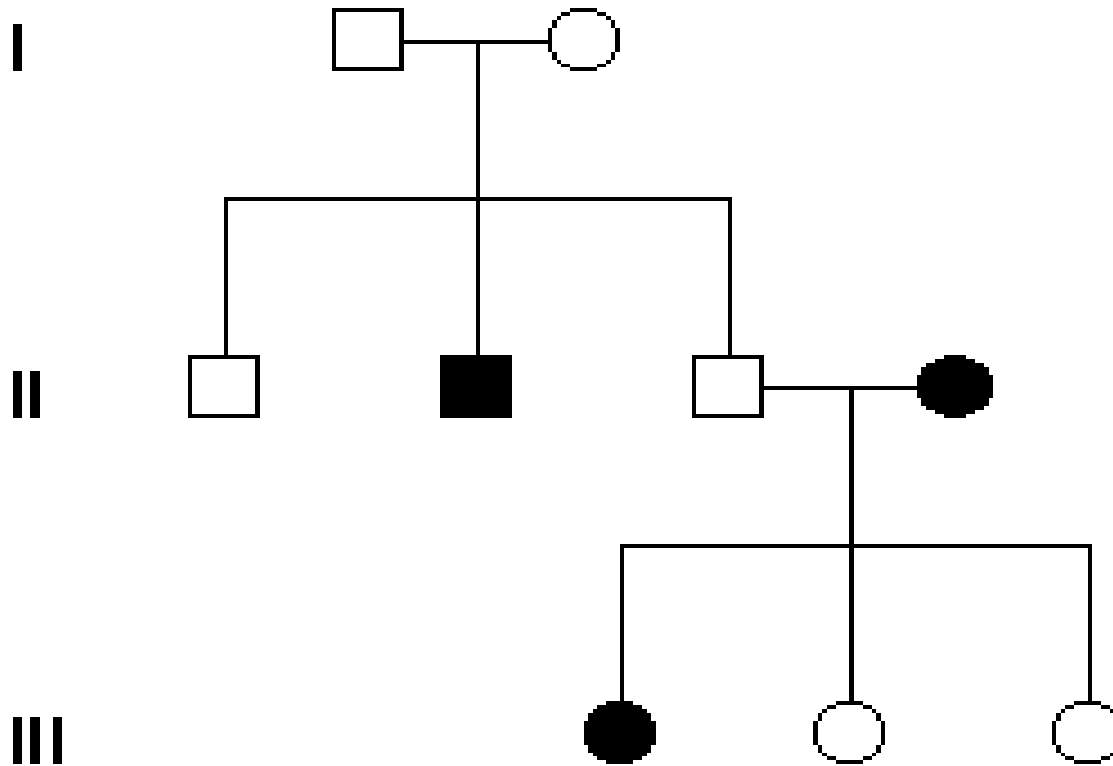
- 50% pointy ears (Ee);
- 50% droopy ears (ee)

18

- A mutation is any change in the DNA of an organism.

19

Recessive Pedigree



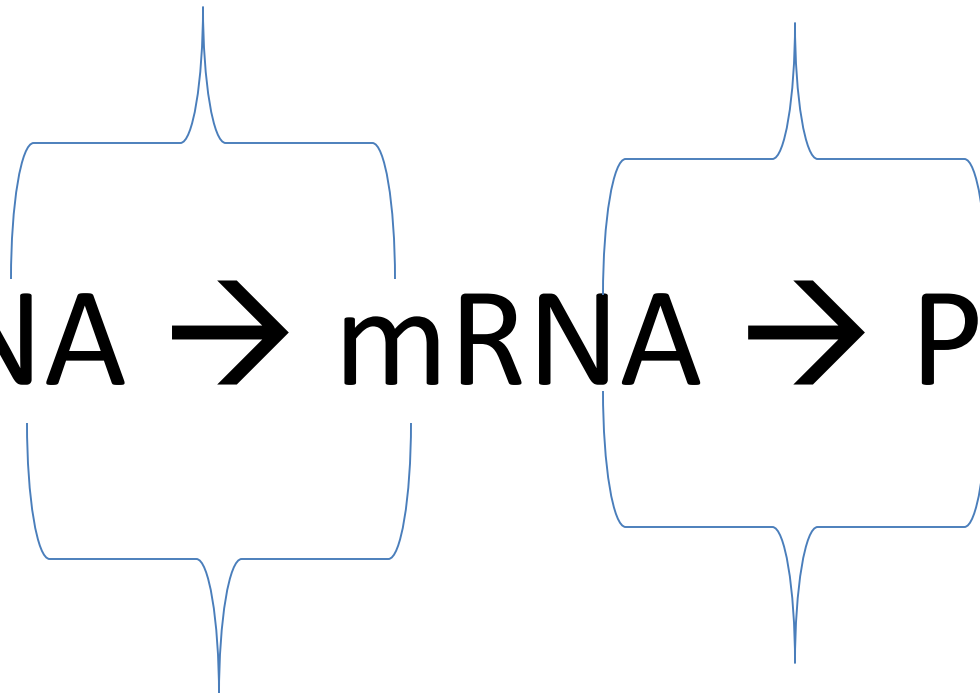
Transcription

Translation

• DNA → mRNA → Protein

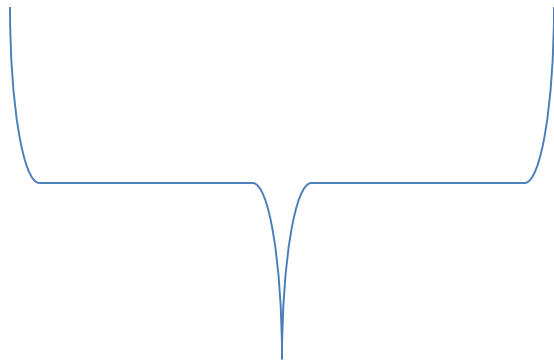
In the nucleus

At a ribosome

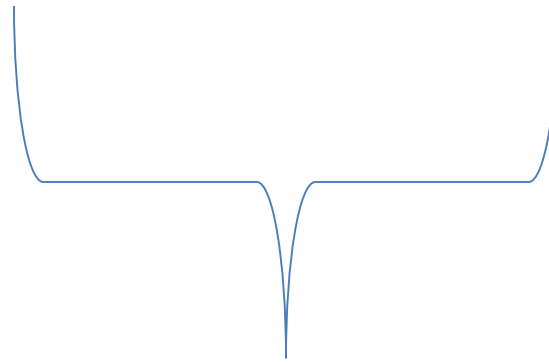


SB3

21, 22 & 23



REACTANTS



PRODUCTS

24

- Light Dependent Reactions happen in the thylakoids

25

- Light Independent Reactions occur in the stroma.

26

- Chlorophyll is used to absorb sunlight during photosynthesis.

27

- Step 1 : Glycolysis (2 ATP)
- Step 2: Krebs Cycle (2 ATP)
- Step 3: Electron Transport (32 ATP)

28

- When muscles lack oxygen, fermentation occurs.
- Lactic acid is produced in muscles when you lack oxygen.
- Lactic acid makes muscles sore.

29

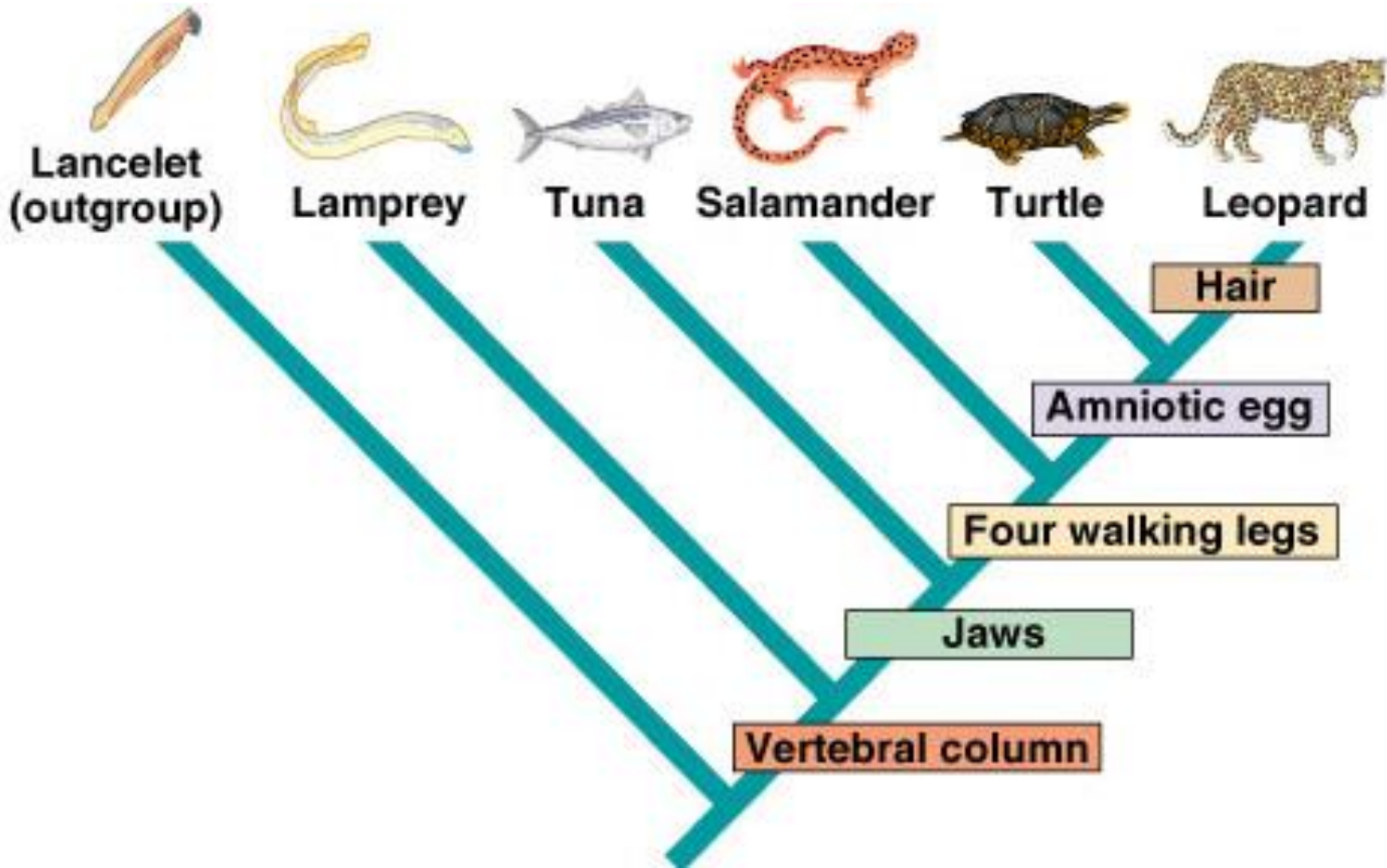
- Both fungi and plants grow in the ground and have cell walls.

30

- Plants use photosynthesis to make food.
- Fungi eat things to get food.

31

- Viruses cannot reproduce without a host.
- Viruses do not have cells.



SB4

33

- Invasive species (AKA: “Introduced Species”) are not native to the environment where they now exist.
 - Example: Fire ants and kudzu (GA), mongoose (in Hawaii)
- They are a problem because:
 - They have no natural predators in their new environment.
 - The species in the area have no natural defenses against the invasive species.

34

- **Innate behavior** = you are born knowing how to do it.
 - Babies knowing how to suck from a breast.
 - Baby turtles knowing to head to the ocean.
- **Learned Behavior** = you have to learn how to do it.
 - Plenty of examples exist.

35

- Grass → cricket → rat → Hawk
- Producer = Grass
- Primary Consumer = Cricket
- Secondary Consumer = Rat
- Tertiary (3rd level) Consumer = Hawk

Identify which level of a food chain the following species occupies.

- In an (unidentified) biome there is a (non-specific) ecosystem with many species. One of the species hunts and eats insects (grasshoppers, crickets, caterpillars, beetles, etc.). To which level of the food chain would this organism belong?
 - A.) primary consumer
 - B.) secondary consumer
 - C.) top-level consumer
 - D.) None of the above.

Answer

- B...it is a secondary consumer, because the animals listed are all plant eaters (primary consumers).

36

- **Abiotic** = non-living (weather, climate, precipitation, temperature, soil, terrain)
- **Biotic** = living organisms

37

- **Primary Succession**

- Begins with rock.
- Occurs after volcanoes erupt and after glaciers melt.
- Pioneer species = lichen
- Soil is formed by erosion and the actions of lichens.
- Takes 200+ years to go from rock to established forest.

- **Secondary Succession**

- Begins with soil.
- Occurs after farmers abandon fields, people clear land and then leave it, forest fires, natural disasters.
- Pioneer species = grass
- Takes 75-100 years to go from dirt to established forest.

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- Communities only discuss living things.
- Ecosystems discuss BOTH living and non-living things.

Practice: Which of the following is describing an ecosystem?

- A.) In costal regions in the panhandle of Florida, the dominant species (top-level predator) include alligators, eagles, and coyotes. They feed on species such as rats, rabbits, mice, snakes and some species of freshwater fish and crustaceans. The dominant plant species include scrub pines, marsh grass and invasive weeds. Many species of birds travel through as they migrate north and south during the year in response to the seasons. Predominant decomposers are fungi and soil bacteria.
- B.) The rainforests of southeastern Ecuador are some of the most biodiverse areas on Earth. More species live in this area than in all other land biomes. Species include hundreds of species of mammals, birds and reptiles, thousands of species of plants, and hundreds of thousands of species of insects. The climate of the region has been identified as a primary source of this biodiversity. High amounts of rain support the lush plant life, which in turn supports the animals. Ironically, however, the soil in these forests is very nutrient poor, with a topsoil layer only 1-2 inches deep.

Answer

- B.

- Antibiotics

40

- Resistance is when a species develops a tolerance to a toxin in the environment.
- Pathway:
 - You get sick. Doc confirms it's a bacterial infection. Doc prescribes a 10 day cycle of antibiotics. You take them and feel better after 5 days, so you stop. You get sick again two weeks later. This time you're sick for a month.

What happened?

- Some bacteria died immediately. Some lived for a couple of days in the presence of the medicine before dying. Some are still alive after 5 days.
- If you stop the medicine early, the bacteria that were able to survive for 5 days or more are the ones that reproduce, passing this resistance on to their offspring.

41

- Gradualism = Earth and its features were created by slow natural processes, but not by natural disasters.
- Catastrophism = Earth and its features were created by natural disasters (like a big flood for instance), but not at all by normal changes over time.
- Both of these have been shown to be inaccurate.
- The current idea of how the Earth's features developed is called **uniformitarianism**.
 - Natural processes (including disasters) helped shape the Earth in the past and are still at work shaping the Earth now.
 - Erosion and Mountain building occurred in the past...they still occurs now.

42

- Any inherited trait that improves an organism's chances of survival and reproduction.

43.

- The study of fossils allowed Darwin to realize the Earth was older than 6000 years, which was the accepted age of the Earth at the time.

44

- 1.) Overproduction of offspring
- 2.) Variation
- 3.) Adaptation
- 4.) Survival of the fittest

45

- Fitness is a measure of an organism's ability to survive and reproduce.

46

- Common embryological structures give evidence of common ancestry.

47

- $4/100 = 0.04 = rr$ (the recessive condition)
- $q^2 = 0.04$
- $q = \sqrt{0.04} = 0.2$
- $p = 1 - q$ So, $p = 1.0 - 0.2 = 0.8$

47 continued...

- a.) $q = 0.2$
- b.) $p = 0.8$
- c.) $Rr = 2pq = 2(0.8)(0.2) = 0.32$
- d.) $RR = p^2 = (0.8)^2 = 0.64$
- e.) $rr = q^2 = (0.2)^2 = 0.04$