Bio 11
Lab Quizzes
&
Answer Key

Fall 2008

Heyer

Bio 11 Lab [Heyer] Name___________________________________

Quiz for **Exercise 1**: Metrics & the Scientific Method

Read the following description of an experiment:

Twelve rats of the same breed and identical weight are trained to solve a maze with three trials for each rat. The next day, four of these rats are fed 50g of standard rat chow, four of the rats are fed 50g of rat chow containing 50mg of marijuana, and four rats are fed 50g of rat chow containing 100mg of marijuana. All twelve rats are then given three more trials to solve the same maze as on the previous day. The elapsed time to solve the maze is recorded for each rat and each trial.

Match the terms below with the items on the right:

___ 1. Dependent variable

___ 2. Independent variable

___ 3. Standard variable

___ 4. Control condition

___ 5. X (horizontal)-axis of the results graph

___ 6. Y (vertical)-axis of the results graph

A) Breed of rat

B) Time taken to solve the maze on the second day

C) Rats fed chow **without** marijuana

D) Rats fed chow **with** marijuana

E) Amount of marijuana in the chow.

___ 7. Our class room temperature is approximately

A) 10–15°C.
B) 20–25°C.
C) 30–35°C.
D) 40–45°C.
E) 50–55°C.

___ 8. A typical human skin cell is ~0.05 mm in diameter. How big is that cell in µm?

A) 0.00005
B) 0.05
C) 0.5
D) 50
E) 50,000

___ 9. How much does a half-liter of water weigh?

A) 50 g
B) 379 g
C) 500 g
D) 1 kg
E) 5 kg

___ 10. About how far is it from a typical doorknob to the floor?

A) 1,000 mm
B) 100 cm
C) 1 m
D) 0.001 km
E) all of the above

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Quiz for **Exercise 3**: Chemical Composition of Cells

___ 1. What type of reaction converts polymers into monomers?

A) condensation
B) hydrolysis
C) photosynthesis
D) dehydration synthesis
E) hydrophilic

___ 2. The reaction that produces fat is

A) 2 glycerols + 2 fatty acids → 2 fats
B) 3 fatty acids + 3 waters → 1 glycerol + 1 fat
C) 3 glucose + 1 glycerol → 1 fat
D) 3 fatty acids + 1 glycerol → 1 fat + 3 waters
E) 3 fatty acids + 1 glycerol + 3 waters → 1 fat

Matching:

___ 3. enzyme	A) water
___ 4. monosaccharide	B) fat
___ 5. blue-black with iodine reagent	C) glucose
___ 6. purple with Biuret reagent	D) starch
___ 7. negative control with Biuret reagent	E) protein
___ 8. orange with Benedicts reagent	
___ 9. nonpolar molecule	
___ 10.inorganic molecule (= <u>not</u> organic)	
___ 11.granules in potato cells	
___ 12.energy storage in human cells	

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Quiz for Exercise 2: Microscopes; and Exercises 3 + 4: Cells & Function

Match the description below with the organelle or cell component on the right:

___ 1. stack of saccules for processing molecules	A) Golgi appartatus
___ 2. small sac transporting substances among organelles	B) rough endoplasmic reticulum
___ 3. a site of protein synthesis	C) lysosome
___ 4. contains digestive enzymes	D) nucleus
___ 5. the only organelle visible in your cheek cells on the stained slide you made	E) vesicle

___ 6. Which type of macromolecule forms the gates and channels regulating materials crossing the cell membrane?
- A) triglyceride
- B) phospholipid
- C) carbohydrate
- D) protein
- E) nucleic acid

___ 7. When you soaked the strip of potato in 2.5% salt solution,
- A) the potato cells lost water and the strip became turgid (stiff).
- B) the potato cells gained water and the strip became turgid (stiff).
- C) the potato cells lost water and the strip became flaccid (limp).
- D) the potato cells gained water and the strip became flaccid (limp).
- E) the potato cells gained and lost water equally and the strip was the experimental control.

___ 8. Define **magnification** of a microscope.
- A) The power to distinguish between two points on the object.
- B) The ratio of the apparent size of an object to its actual size.
- C) The area of an object visible through the lenses.
- D) The thickness of an object in focus at the same time.
- E) The brightness of the object relative to the surrounding light.

___ 9. You should always start observing an object using the lowest power of the microscope. Which of the following is **NOT** a reason.
- A) Greater field of view makes it easier to locate the subject.
- B) Greater working distance makes it safer to course focus.
- C) Greater depth of field makes it easier to focus on the object
- D) Greater resolution makes it easier to distinguish the subject from the background.

___ 10. If you are viewing an object magnified 400x through 10x oculars, the objective must be
- A) 4x
- B) 10x
- C) 40x
- D) 100x
- E) 400x

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Quiz for **Exercise 5**: Human Body Tissues

Matching:

Primary Tissue Type	Characteristic
___ 1. muscle	**A)** Solid barrier of cells
___ 2. connective	**B)** No organelles
___ 3. nervous	**C)** Suspended in extracellular matrix
___ 4. epithelial	**D)** Generates force of contraction
	E) Conducts electrochemical signals

Primary Tissue Type	Possible feature
___ 5. muscle	**A)** Striated
___ 6. connective	**B)** Axon
___ 7. nervous	**C)** Cell wall
___ 8. epithelial	**D)** Ciliated
	E) Collagen fibers

Primary Tissue Type	Example
___ 9. muscle	**A)** Neuroglia
___ 10. connective	**B)** Bone
___ 11. nervous	**C)** Squamous
___ 12. epithelial	**D)** Cardiac
	E) Saliva

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Quiz for **Exercise 8**: Features of the Cardiovascular System

___ 1. Which chamber of the heart is the most muscular and pumps blood to the entire body?
a. right ventricle b. left atrium c. left ventricle d. right atrium e. aorta

___ 2. Which vessel carries oxygenated blood from the lungs to the heart?
a. aorta b. pulmonary vein c. pulmonary artery d. vena cava e. carotid artery

___ 3. How does the heart muscle receive its oxygen for its own metabolism?
a. the atria
b. branches of the pulmonary artery
c. coronary arteries
d. none; it respires anaerobically

___ 4. The "lub-dup" heart sounds are produced by
a. the valves opening
b. the chambers contracting
c. the arteries expanding
d. turbulence of blood against valves as they close

___ 5. A *resting* pulse rate for a 20 year old person in good cardiovascular shape would most likely be about
a. 15 bpm b. 70 bpm c. 95 bpm d. 160 bpm e. 220 bpm

___ 6. The *target* heart rate for cardiovascular exercise conditioning in this 20-year-old person would be
a. 15 bpm b. 70 bpm c. 95 bpm d. 160 bpm e. 220 bpm

___ 7. As blood flows through the heart, it follows the path:
a. pulmonary vein → right ventricle → AV valve → left ventricle
b. right atrium → SL valve → right ventricle → aorta
c. vena cava → left atrium → AV valve → carotid artery
d. left atrium → AV valve → left ventricle → SL valve
e. pulmonary artery → right atrium → AV valve → left atrium

___ 8. When taking your blood pressure you are measuring :
a. the speed at which blood flows through your heart.
b. the number of contractions of your ventricles per minute.
c. the force of blood against your artery walls.
d. your cardiovascular exercise response.
e. the minimum and maximum amount of blood in your veins.

___ 9. Which might be considered a "normal" blood pressure for an average healthy 20-year old?
a. 80/120 b. 180/20 c. 120/80 d. 180/120 e. 20/180

___ 10. What is the *diastolic* pressure for this average healthy 20-year old in the previous question?
a. 20 b. 40 c. 60 d. 80 e. 120

___ 11. Which of these blood cells is ***not*** a leukocyte (WBC)?
a. erythrocyte b. monocyte c. basophil d. lymphocyte e. neutrophil

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Quiz for **Exercise 10**: Energy Requirements & Ideal Weight

1. The "Calorie" on a food label equals the energy of
   a. 1 "real" calorie
   b. 10 "real" calories
   c. 100 "real" calories
   d. 1,000 "real" calories
   e. 1,000,000 "real" calories
2. According to the food label on a small 1-oz. (28.3g) package of *Cheetos*®, this one serving contains 10g of fat, 15g of carbohydrates, and 2g of protein. How many Calories are in this 1-oz. package of *Cheetos*®?
   a. 27
   b. 90
   c. 108
   d. 158
   e. 270
3. Which of the following is part of your Basal Metabolic Rate?
   a. contractions of skeletal muscles used to stand still.
   b. contractions of skeletal muscles within aerobic limits.
   c. contractions of smooth muscle lining the gut for segmentation of chyme.
   d. contractions of cardiac muscle to maintain the resting heart rate.
   e. contractions of cardiac muscle to maintain the target heart rate.
4. Which of the following is part of your Specific Dynamic Action?
   a. contractions of skeletal muscles used to stand still.
   b. contractions of skeletal muscles within aerobic limits.
   c. contractions of smooth muscle lining the gut for segmentation of chyme.
   d. contractions of cardiac muscle to maintain the resting heart rate.
   e. contractions of cardiac muscle to maintain the target heart rate.
5. Which of these is **<u>not</u>** a source of food energy?
   a. oils
   b. vitamins
   c. sugars
   d. proteins
   e. fats
6. What does "ideal weight" mean?
   a. the optimal amount of weight to lose per week.
   b. the average weight for all people of your age and height.
   c. the minimum body weight needed to sustain bodily functions.
   d. the aesthetic standard set by a national survey of cosmeticians.
   e. the average weight for people of your age and height with the greatest health and longevity.

7. If you consume 600 more Calories per day than your body spends, about how much weight would you gain in one month?
   a. 1 lb
   b. 2 lbs
   c. 3 lbs
   d. 5 lbs
   e. 6 lbs
8. Assume you've had a very consistent routine of diet and activity with no change in body weight. From your diary you calculate that you expend 1000 kcal/day in physical activity and consume 2800 kcal/day of food. You estimate your specific dynamic activity to be ~300 kcal/day. What is your basal metabolic rate?
   a. 1000 kcal/day
   b. 1200 kcal/day
   c. 1300 kcal/day
   d. 1500 kcal/day
   e. 1800 kcal/day
9. What is the Lean Body Weight of a 160-lb person with 25% body fat?
   a. 40 lbs
   b. 80 lbs
   c. 100 lbs
   d. 120 lbs
   e. 140 lbs
10. Which of the following is **<u>not</u>** part of your Lean Body Weight?
    a. muscle mass
    b. body water weight
    c. adipose mass
    d. skeletal mass
    e. weight of body hair
11. [**3-point Extra-Extra-Credit Question!**]
    Say you're advising that 160-lb guy with 25% body fat. His routine and body weight have been stable for a long time, but now he wants to get down to the "ideal" 16% body fat by reducing his food consumption by 500 Calories per day. If he sticks to this new diet, how long will it take him to achieve 16% body fat?
    a. a week
    b. a month
    c. two months
    d. four months
    e. six months

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Quiz for **Exercises 13 & 14**

___1. What is the longest & strongest bone in the human body?

A) humerus
B) fibula
C) femur
D) sacrum
E) ulna

___2. What muscle attaches to this bone in Question #1 and causes extension of the thigh at the hip?

A) extensor digitorium
B) gastronemius
C) gluteus maximus
D) quadriceps femoris
E) triceps brachii

___3. What muscle attaches to this bone in Question #1 and causes extension of the leg at the knee?

A) extensor digitorium
B) gastronemius
C) gluteus maximus
D) quadriceps femoris
E) triceps brachii

___4. What muscle is antogonistic to the muscle described in Question #3?

A) extensor digitorium
B) gastronemius
C) gluteus maximus
D) quadriceps femoris
E) triceps brachii

___5. What bone forms the human lower jaw?

A) cranium
B) patella
C) sternum
D) carpal
E) mandible

___6. What muscle attaches to this bone in Question #5 and creates the bite force?

A) deltoid
B) external oblique
C) masseter
D) hamstring
E) trapezius

___7. To what other bone does this muscle in Question #6 attach?

A) cranium
B) patella
C) sternum
D) carpal
E) mandible

___8. Are the bones in Questions #1 & #5 part of the appendicular or axial skeleton?

A) Both bones #1 & #5 are part of the appendicular skeleton.
B) Both bones #1 & #5 are part of the axial skeleton.
C) Bone #1 is part of the appendicular skeleton; but bone #5 is part of the axial skeleton.
D) Bone #5 is part of the appendicular skeleton; but bone #1 is part of the axial skeleton.
E) No.

___9. The neural pathway for a spinal reflex is

A) sensor to motor neuron to interneuron to effector to sensory neuron
B) sensor to sensory neuron to interneuron to motor neuron to effector
C) effector to sensory neuron to motor neuron to interneuron to sensor
D) effector to motor neuron to interneuron to sensory neuron to sensor
E) sensor to interneuron to sensory neuron to motor neuron to effector

___10. The two-point discrimination test measured the skin's

A) sensitivity to hot or cold
B) sensitivity to pain
C) sensitivity to touch
D) acuity of touch
E) acuity of hot versus cold

___11. The pathway for light to be conducted in the eye is

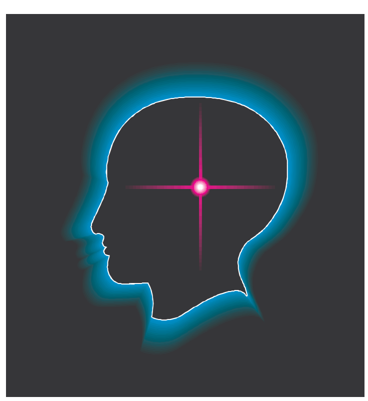
A) cornea → pupil → lens → posterior compartment → retina
B) lens → retina → pupil → posterior compartment → cornea
C) sclera → iris → lens → posterior compartment → retina
D) lens → iris → retina → posterior compartment → sclera
E) cornea → lens → retina → posterior compartment → iris

___12. The ability of the eyes' lenses to change shape to maintain an object in focus is called

A) accommodation
B) presbyopia
C) refraction
D) habituation
E) peripheral vision

___13. The part of the brain responsible for conscious thought and higher mental capabilities is the

A) cerebrum.
B) cerebellum.
C) pons.
D) medulla oblogata.
E) thalamus.



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Quiz for **Exercises 18+20**: Human Genetics

___ **1.** Chromosome 1 inherited from your mother and Chromosome 1 inherited from your father are
- **a)** homologous
- **b)** homozygous
- **c)** heterozygous
- **d)** analogous
- **e)** antagonostic

___ **2.** A variation of a gene is called
- **a)** sister chromatid
- **b)** chromosome
- **c)** complementary
- **d)** allele
- **e)** linked

___ **3.** Freckles is dominant over no freckles. With respect to the freckles gene, a woman with no freckles is
- **a)** homozygous dominant
- **b)** homozygous recessive
- **c)** heterozygous
- **d)** either homozygous dominant or heterozygous
- **e)** either homozygous recessive or heterozygous

___ **4.** If a monogamous woman with no freckles has two children with freckles and one child with no freckles, her mate was
- **a)** homozygous dominant
- **b)** homozygous recessive
- **c)** heterozygous
- **d)** either homozygous dominant or heterozygous
- **e)** either homozygous recessive or heterozygous

___ **5.** The presence or absence of freckles is part of the child's
- **a)** allelotype
- **b)** genotype
- **c)** linotype
- **d)** phenotype
- **e)** karyotype

___ **6.** Having dimples is a genetic trait dominant over not having dimples. If you do not have dimples, but both of your parents have dimples …
- **a)** at least one parent must be homozygous dominant
- **b)** at least one parent must be homozygous recessive
- **c)** both parents must be heterozygous
- **d)** one parent must be homozygous dominant and the other parent must be homozygous recessive
- **e)** one parent must be homozygous dominant and the other parent must be heterozygous

___ **7.** Marfan syndrome is an autosomal dominant disease. If a woman has the disease, but neither her father nor her husband have Marfan syndrome, what is the probability that her son will get the disease.
- **a)** 0%
- **b)** 25%
- **c)** 50%
- **d)** 75%
- **e)** 100%

___ **8.** A person with only homologous sex chromosomes
- **a)** has Down syndrome.
- **b)** has Kleinfelter syndrome.
- **c)** has poly-X syndrome.
- **d)** is male.
- **e)** is female.

___ **9.** A person with an autosomal trisomy

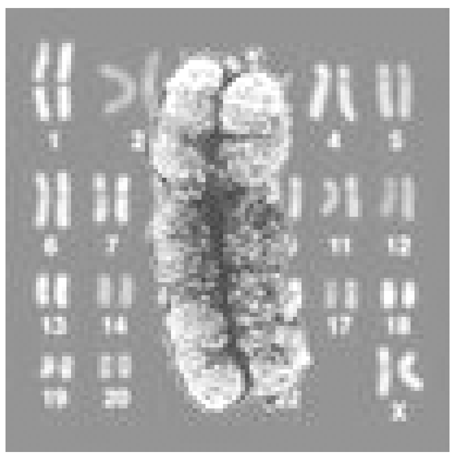
a) has Down syndrome.
b) has Kleinfelter syndrome.
c) has poly-X syndrome.
d) is male.
e) is female.

___ **10.** What is the genotype of the **gametes** from a healthy woman carrying the hemophilia disease.

a) $X^H X^H$
b) $X^H X^h$
c) X^H or X^h
d) X^H only
e) X^h or Y

___ **11.** If this woman mates with a healthy man, what is the probability that their **son** will develop the disease?

a) 0%
b) 25%
c) 50%
d) 75%
e) 100%



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Quiz for **Exercise 19**: DNA & Biotechnology

___ **1.** The monomer of a DNA molecule is called a(n)
- **a)** gene
- **b)** nucleotide
- **c)** nucleic acid
- **d)** nitrogenous base
- **e)** pentose sugar

___ **2.** The *different* monomers of DNA have a *different*
- **a)** gene
- **b)** nucleotide
- **c)** nucleic acid
- **d)** nitrogenous base
- **e)** pentose sugar

___ **3.** The pentose sugars of the DNA polymer are linked together by
- **a)** phosphates
- **b)** nitrogenous bases
- **c)** water
- **d)** hydrogen bonds
- **e)** peptide bonds

___ **4.** The base pairs that hold together the complementary strands of DNA are linked together by
- **a)** phosphates
- **b)** nitrogenous bases
- **c)** water
- **d)** hydrogen bonds
- **e)** peptide bonds

___ **5.** According to the rules of base pairing between complementary strands of DNA,
- **a)** A pairs with G; and C pairs with T
- **b)** A pairs with C; and G pairs with U
- **c)** A pairs with G; and U pairs with T
- **d)** A pairs with T; and C pairs with G
- **e)** A pairs with U; and T pairs with G

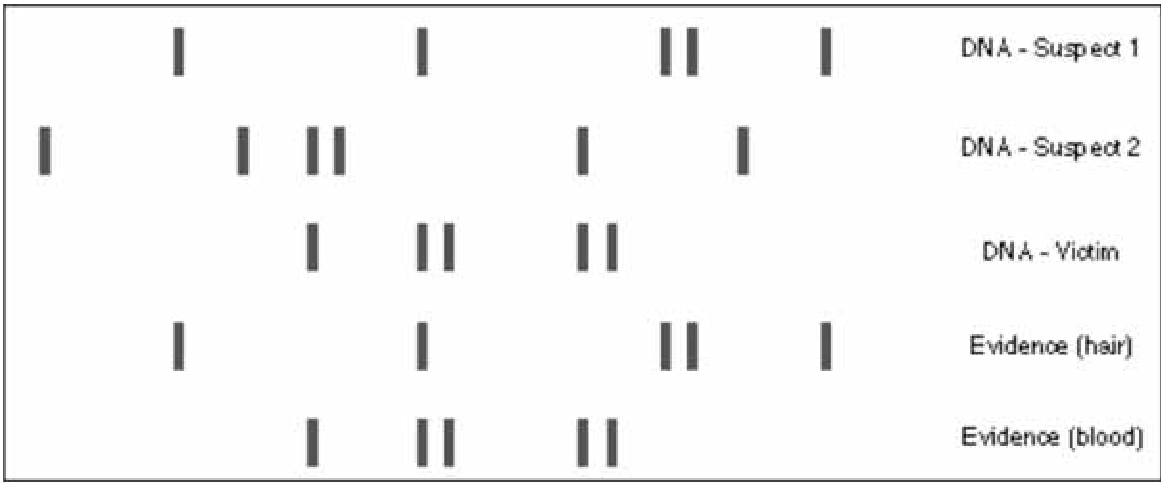
___ **6.** Restriction enzymes will cut DNA from different people into different patterns of fragments because
- **a)** the restriction enzyme cuts DNA randomly.
- **b)** once a fragment is cut once, it is more likely to be cut again.
- **c)** genetic differences between individuals' DNA will add or remove sites for the enzyme to cut.
- **d)** the restriction enzymes cut DNA into fragments of all equal length.
- **e)** all human DNA is identical.

___ **7.** Restriction fragments cut from DNA by restriction enzymes separate during electrophoresis because
- **a)** shorter fragments travel faster.
- **b)** longer fragments travel faster.
- **c)** polar fragments travel faster.
- **d)** nonpolar fragments travel faster.
- **e)** uncut fragments travel faster.

For Questions 8–11, consider the following scenario:

A 23 year old male was found murdered in the hallway of his apartment building. Investigators collected many samples of evidence including blood found on a knife near the body and hair from the victim's shirt. Police had two suspects due to eye-witness accounts. Both suspects, the victim and the evidence were analyzed using DNA fingerprinting.

DNA fingerprint: electrophoresis of restriction fragments



___ **8.** Who does the blood evidence found at the crime scene most likely belong to?
a) the victim
b) suspect #1
c) suspect #2
d) both the victim and suspect #1
e) both the victim and suspect #2

___ **9.** Who does the hair evidence found at the crime scene most likely belong to?
a) the victim
b) suspect #1
c) suspect #2
d) both the victim and suspect #1
e) both the victim and suspect #2

___ **10.** What does the forensic DNA analysis say most clearly about Suspect #1?
a) She's innocent.
b) She's guilty.
c) She was at the scene at the time of the crime.
d) Someone matching her genetic fingerprint was at the crime scene.
e) There is no direct DNA evidence that she was at the crime scene.

___ **11.** What does the forensic DNA analysis say most clearly about Suspect #2?
a) He's innocent.
b) He's guilty.
c) He was at the scene at the time of the crime.
d) Someone matching his genetic fingerprint was at the crime scene.
e) There is no direct DNA evidence that he was at the crime scene.

Answer Key

Quiz for **Exercise 1**: Metrics & the Scientific Method 1. B 2. E 3. A 4. C 5. E 6. B 7. B 8. D 9. C 10. E	Quiz for **Exercise 3**: Chemical Composition of Cells 1. B 2. D 3. E 4. C 5. D 6. E 7. A 8. C 9. B 10. A 11. D 12. B	Quiz for **Exercise 2**: Microscopes; and **Exercises 3+4**: Cells & Function 1. A 2. E 3. B 4. C 5. D 6. D 7. C 8. B 9. D 10. C
Quiz for **Exercise 5**: Human Body Tissues 1. D 2. C 3. E 4. A 5. A 6. E 7. B 8. D 9. D 10. B 11. A 12. C	Quiz for **Exercise 8**: Features of the Cardiovascular System 1. C 2. B 3. C 4. D 5. B 6. D 7. D 8. C 9. C 10. D 11. A	Quiz for **Exercise 10**: Energy Requirements & Ideal Weight 1. D 2. D 3. D 4. C 5. B 6. E 7. D 8. D 9. D 10. C 11. D
Quiz for **Exercises 13+14:** Musculoskeletal & Sensory Systems 1. C 2. C 3. D 4. B 5. E 6. C 7. A 8. C 9. B 10. D 11. A 12. A 13. A	Quiz for **Exercises 18+20**: Human Genetics 1. A 2. D 3. B 4. C 5. D 6. C 7. C 8. E 9. A 10. C 11. C	Quiz for **Exercise 19**: DNA & Biotechnology 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. Discuss/Turn in before Lab Exam