Weekly Quizzes

Basic Principles:

* Make sure that the quiz questions directly relate to the particular lab behaviors that you want from students. Warning: If your quizzes only require the student to review certain printed information already in the lab book, why would you expect them to be overly concerned with lab activities?
* The quiz must be quick to administer, and not interfere with valuable lab time.
* Master methods to prevent any cheating.

We compared lab sections to test if classes would show a normal grade distribution whether using CLOSED BOOK or OPEN BOOK tests. They were the same. Both methods work well. With the open book approach we could ask harder questions. We also tried a combination of open and closed book questions, but concluded that it was technically not worth the effort with weekly quizzes but was an excellent option with lab the midterm testing method.

Measurement Quiz (open book)

***Don’t write on this test. Use the answer form.***

1. 9/20 = ? (decimal fraction)
2. 0.809 = ? %
3. 0.002507 x 100000 = ?
4. 2.5 divided by 1000 = ?
5. 53 millimeters = ? centimeters
6. 40cm is what fraction of a meter?
7. 750ml = ? l
8. How many grams are in a kilogram?
9. 454g = ? kg
10. How many centimeters are in one inch?
11. Which is the greater volume? (4 liters or 1 gallon)
12. How many pounds are in one kilogram?
13. How many degrees F are there between the 0 degree C mark and the 100 degree C mark?
14. Therefore, how many degrees F are there in one degree C?
15. Are the post-1982 pennies lighter or heavier?
16. Are the post-1982 and the pre-1982 pennies made of the same metal?(yes or no)
17. Which of the pennies are thicker? (post-1982 or pre-1982)
18. (closed book question)
19. (closed book question)
20. (closed book question)

Microscope Quiz (open book)

1. What happens to a single ray of light when it passes through a lens?
2. The closer you move an object to your eye, the \_\_\_\_\_\_\_ (smaller or larger) the angle of light from that object entering your eye.
3. The magnifying lens \_\_\_\_\_ (increases or decreases) the angle of light coming from the object viewed.
4. When you move the slide to the right, in what direction does the “e” appear to move?
5. What microscope part is used to change the light intensity?
6. When you switch to higher magnification, what should you do to the light intensity?
7. The diameter of the 4x field of view =
8. The diameter of the 10x field of view =
9. The diameter of the 43x field of view =
10. The dot over the letter “i” is approximately what size?

# Closed Book-Microscope Quiz

1. (2pts) Which thread is on the bottom?
2. (2pts) The clarity of the image you see in; the microscope is called \_\_\_\_\_(not magnification).
3. (2pts)If the magnification of the occular lens is 10x and the magnification of the objective lens is 25x, what is the total magnification?
4. (2pts)What happens to the size of the Field of View when you switch from low power to high power?
5. (2pts)What happens to the “thickness” of the Depth of Focus when you switch from low power to high power?

**Cell Quiz (open book)**

1. How do you know that your cheek cells are eukaryotic cells?
2. What was the most obvious difference between the structure of the onion cell and the cheek cell?
3. When you see the color of plants, what structures are you actually seeing?
4. If you can’t actually see the central vacuole inside the Elodea cell, then how do you know that it is there?
5. Elodea leaves are two cells thick. Which layer has the thick cell walls.(top layer or bottom layer)?
6. What is the most obvious difference you observed between the Elodea cell and the onion cell?
7. Where is food produced in the onion plant?
8. Where is the red color in the red-onion skin cells? (In plastids or in the water of the central vacuole.)
9. Where is the yellow color in the yellow flower petal cells? (In plastids or in the water of the central vacuole.)
10. Why would the guard cells have chloroplasts when the other skin cells of the leaf don’t have chloroplasts?
11. (5pts) Draw a picture of an Elodea cell showing the dominant structures that can be seen, and draw them in such a way that demonstrates that the central vacuole is present even though you can’t see it (because it is clear). Label your drawing.
12. (5pts) Draw a picture of the stomata showing guard cells, chloroplasts, and opening for air flow. Label your drawing.

**-CELL LAB QUIZ-**

1. All of the cells that you looked at in the lab were…
2. eucaryotic
3. procaryotic
4. both eucaryotic and procaryotic
5. What is the most visible organelle of a human cheek cell?
6. What structure do onion cells of a bulb have that is absent in human cheek cells?
7. What are the green organelles called in the cells of *Elodea*?
8. *Elodea* leaves are 2-cells thick. One of the layers has thick cell wall and are big. Those cells are in the… (circle you choice)

Top layer or Bottom layer

1. Do the cells of the red onion bulb produce their own food?

7. The red pigment of the red onion skin was found the the…

1. fat of the plastids
2. water of central vacuole
3. The yellow pigment of the flower petal was found in the…
4. fat of the plastids
5. water of the central vacuole
6. Which organelle do the guard cells of a stomata have that are absent from the skin cells of the *Zabrina* leaf?
7. What is the function of the stomata?
8. (5 Points) Draw a *Zabrina* leaf stomata with the surrounding skin cells, and label the two guard cells, opening, skin cells and chloroplasts.
9. (2 Bonus Points) If the diameter of your field of view is 4.2 mm, and a cell takes up 1/5th of that diameter, how big is the cell? (SHOW YOUR WORK)

**Chemistry of Water Quiz (open book)**

1. (2pts) On a calm but rainy day, the temperature rises slightly when it starts to rain. Explain specifically what is happening.
2. (2pts) How many calories would be required to evaporate 1 ml of water?
3. (2pts) Which solution was the closest to being a neutral pH? (A,B, or C)
4. (2pts) Which solution contained the buffer? (Sample X or Sample Y)
5. (2pts) Which molecules move faster? (Potassium Permanganate or Methylene Blue)
6. (5pts) On the back side of your answer sheet draw two pictures. Show a normal Elodea cell, and show an Elodea cell that has been put into salt water. Be sure to label the central vacuole , cell membrane, chloroplasts, and cell wall in each drawing.

**Closed Book**

1. pH is a measure of \_\_\_\_\_\_\_\_\_\_ ion concentration.
2. A pH of 11 would be (acid, base, or neutral)?
3. What is the relationship in concentration between H and OH at a pH of 7?
4. How much more H is in water at a pH of 3 when compared to a pH of 6?
5. How much more OH is in water at a pH of 11 when compared to a pH of 5?

**Quiz – Chemistry of Water and Enzymes (closed book)**

1. Approximately how many calories of heat would be required to evaporate only 1 ml of water?  
    **a.** 0.6  
    **b.** 6  
    **c.** 60  
    **d.** 600  
    **e.** 6000
2. Which solution would be the strongest acid?  
    **a.** pH 14  
    **b.** pH 7  
    **c.** pH 5  
    **d.** pH 3
3. How much more H+ is in water at a pH of 4 compared to a pH of 7?  
    **a.** 3x more  
    **b.** 30x more  
    **c.** 100x more  
    **d.** 1000x more  
    **e.** 3000x more
4. How much more OH- is in water at a pH of 7 compared to a pH of 11?  
    **a.** 4x  
    **b.** 40x  
    **c.** 400x  
    **d.** 40,000x  
    **e.** actually, there is less
5. When you watch Brownian motion, are you actually seeing molecules move?  
    **a.** yes  
    **b.** no
6. Which molecules move faster?  
    **a.** potassium permanganate  
    **b.** methylene blue  
    **c.** both move at about the same speed
7. If you eat a lot of highly-salted food, then you tend to...  
    **a.** lose water  
    **b.** retain water  
    **c.** lower the blood pressure
8. What would happen to the water movement between plant roots and the soil if you put salt or a lot of fertilizer in the soil?  
    **a.** water would enter the roots  
    **b.** would leave the roots  
    **c.** the water exchange would not change
9. Most reactions in a cell are driven by heat energy and don’t require enzymes.  
    **a.** yes  
    **b.** no
10. Enzymes  
     **a.** decrease the energy of activation (energy to start a reaction)  
     **b.** increase the energy of activation  
     **c.** are not related to the energy of activation
11. What kind of molecule is an enzyme?  
     **a.** nucleic acid  
     **b.** carbohydrate  
     **c.** protein  
     **d.** lipid  
     **e.** all of the above form parts of the enzyme
12. A mutation of a gene can result in a change in the *shape* of an enzyme.  
     **a.** yes  
     **b.** no
13. There is about 4x more difference between humans and chimpanzees than there is among humans.  
     **a.** yes  
     **b.** no
14. When we compare the enzyme-controlled reaction at room temperature and the one in the ice water,  
     **a.** there is only a slight difference  
     **b.** the room temperature is much faster  
     **c.** the 5 °C experiment is much faster
15. Which factor has the greater influence on the speed of reaction?  
     **a.** amount of enzyme  
     **b.** amount of substrate  
     **c.** neither enzyme nor substrate had any effect
16. Does phenylthiourea inhibit the enzyme reaction?  
     **a.** there is a very minor inhibition  
     **b.** there is no inhibition at all  
     **c.** there is a major inhibition
17. Which pH creates the greatest *inhibition* of the enzyme reaction?  
     **a.** 7  
     **b.** acid  
     **c.** base
18. An enzyme is heated to steaming and then cooled off. What happened to the speed of reaction when this enzyme was used?  
     **a.** about the same as normal  
     **b.** faster than normal  
     **c.** no reaction

**Photosynthesis Quiz (open book)**

1. (2pts) On p. 132, question #3, what did you write in the empty box?
2. (2pts) Plant cells, under normal conditions, convert activated electron energy into what?
3. (4pts) How many pigments did we separate from the spinach leaves, and what colors did we see?
4. (continued)
5. (4pts) In exercise #3 there were two controls. Describe them.
6. (continued)
7. (2pts) How many ml of O2 were produced by the plant in one hour?
8. (2pts) How many ml of O2 are used by a human in one hour?
9. (2pts) The answer to question #3 on p. 138 is \_\_\_\_m.
10. (2pts) Assume that the answer to the first question #1 on p. 138 is 1000000 cm2. What would the answer be for the second question #2 on p. 138? \_\_\_m2

**Quiz – Respiration and Photosynthesis (open book)**

1. At the beginning of the Photosynthesis lab we saw that blue light —> electron energy —> \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  
    **a.** heat  
    **b.** food energy  
    **c.** ATP  
    **d.** red light  
    **e.** enzymes
2. Under normal conditions, plant cells convert activated electron energy into  
    **a.** red light  
    **b.** blue light  
    **c.** oxygen  
    **d.** carbon dioxide  
    **e.** sugar energy
3. How many different pigments did we separate from the spinach juice?  
    **a.** 1  
    **b.** 2  
    **c.** 3  
    **d.** 4  
    **e.** 5
4. If we designed our experiment correctly and the *Elodea* was doing photosynthesis, then the phenol red  
    **a.** would start red and stay red  
    **b.** would change from red to yellow  
    **c.** would start yellow and stay yellow  
    **d.** all of the above  
    **e.** none of the above
5. The ml of O2 produced by the plant in one hour was about  
    **a.** 0.001 ml  
    **b.** 0.01 ml  
    **c.** 0.1 ml  
    **d.** 1 ml  
    **e.** 10 ml
6. The oxygen demand for an average person during one hour of biology lab is . . .  
    **a.** 2.4 ml  
    **b.** 24 ml  
    **c.** 240 ml  
    **d.** 24000 ml  
    **e.** 0.4 liters
7. How much light catching surface did our plants have?  
    **a.** about 5 cm2  
    **b.** about 50 cm2  
    **c.** about 75 cm2  
    **d.** about 100 cm2  
    **e.** about 0.5 m2
8. About what size of plant does it take to keep you alive during the day?  
    **a.** 1 m2  
    **b.** 10 m2  
    **c.** 400 m2  
    **d.** 10,000 m2  
    **e.** 40,000 m2
9. If a human oxygen demand was 100 liters of O2 per hour, and the plant production was 0.5 liters of O2 per m2 of plant surface per hour, then how big a plant would be required to keep that person alive?  
    **a.** 5 m2  
    **b.** 20 m2  
    **c.** 50 m2  
    **d.** 200 m2  
    **e.** 500 m2
10. If the size of the plant required was 144 m2, then the side measurement of a square shape representing that plant surface area would be  
     **a.** 144 m  
     **b.** 144 cm  
     **c.** 72 m  
     **d.** 12 m  
     **e.** 14.4 m
11. In the Respiration Lab, the temperature of the live seeds was closest to  
     **a.** 10 °C  
     **b.** 15 °C  
     **c.** 20 °C  
     **d.** 26 °C  
     **e.** 40 °C
12. If all the oxygen were pumped out of the container of live seeds, then the temperature in the container would then  
     **a.** increase  
     **b.** decrease  
     **c.** stay the same
13. If *no* CO2 absorber had been put into the metabolic chamber, then what would have happened to the air volume during the experiment?  
     **a.** no change  
     **b.** increased  
     **c.** decreased
14. The metabolic rate of an endotherm increases with an increase in environmental temperature.  
     **a.** yes  
     **b.** no
15. The metabolic rate of an ectotherm increases with an increase in the environmental temperature.  
     **a.** yes  
     **b.** no
16. Which organism has the slowest rate of respiration?  
     **a.** ectotherm  
     **b.** endotherm  
     **c.** both are about the same
17. How much food does the ectotherm need compared to the endotherm?  
     **a.** 10x more  
     **b.** 20x more  
     **c.** 100x more%  
     **d.** 50%  
     **e.** 5%
18. Which organism would do better in cooler environments where the food is plentiful?  
     **a.** ectotherm  
     **b.** endotherm
19. How many grams of sugar are used in one hour by an average student?  
     **a.** 3.85  
     **b.** 100  
     **c.** 26  
     **d.** 385  
     **e.** 3600
20. What color change happened to the phenol red one day after the plants were put in the dark?  
     **a.** turned green  
     **b.** turned yellow  
     **c.** stayed red

**Respiration Quiz**

**Open Book**

1. (2pts) What was the temperature of the live seeds?
2. (2pts) What was the temperature of the dead seeds?
3. (2pts) If the oxygen was pumped out of the live seed container, what would then happen to the temperature in that container?
4. (2pts) If no CO2 absorber was used in the mouse experiment, then the volume of the air in the metabolic rate chamber would have (increased, decreased or stayed the same).
5. (4pts) On the back side of your answer paper, draw a graph of Metabolic Rate vs Environmental Temperature and show the lines for an ectotherm and for an endotherm.

**Closed Book – Respiration Quiz**

1. (2pts)Which organism needs less food to survive? (endotherm or ectotherm)
2. (2pts)How much food does the ectotherm need compared the endotherm?\_\_\_%
3. (2pts)Which organism would do better if the amount of food is very limited, but the environment is fairly warm? (endotherm or ectotherm)
4. (2pts)Which organism would do better in cooler environments where the food is plentiful? (endotherm or ectotherm)

**Sameness & Variety Quiz** (closed book)

1. (1pt) What is the correct pairing of nucleotides: Adenine pairs with \_\_\_\_(A,G,C, or T)?
2. (1pt) Guanine pairs with \_\_\_\_(A,G,C, or T)?
3. (3pts) Put the phases of mitosis into correct order:
4. prophase, anaphase, telophase, metaphase
5. prophase, metaphase, telophase, anaphase
6. telophase, metaphase, prophase, anaphase
7. anaphase, telophase, metaphase, prophase
8. none of the above
9. (2pts) What type of cell division reduces the set number?
10. (2pts) What process takes this reduced set number and returns it to match the original set number of the parent cell?
11. (2pts) How many sets of chromosomes are in a human egg?
12. (1pts) How many chromosomes are in a human egg?
13. (1pts) When a human egg and sperm fuse, how many sets of chromosomes are there?
14. (1pts) When a human egg and sperm fuse, how many chromosomes are there?
15. (3pts) Synapsis
16. happens during mitosis
17. pairing of non-homologous chromosomes
18. creates sameness
19. is during telophase
20. none of the above
21. (3pts) List the three events during sexual reproduction that create genetic variety.

**Genetics Quiz (closed book)**

1. (1pt) How many sets of DNA molecules or chromosomes does a *diploid* organism have?
2. (1pt) How many sets of DNA molecules or chromosomes does a *haploid* organism have?
3. (1pt) Humans are \_\_\_\_. (haploid or diploid)
4. (1pt) How many homologous pairs of chromosomes does a human have?
5. (1pt) What process *creates* the various alleles in a species?
6. (1pt) How many different alleles for a single trait can a homozygous parent pass on to the next generation? (one or two)
7. (1pt) When a parent passes on its genes for a single trait, how many does it contribute to *each* of the offspring? (one or two)
8. (1pt) How many total genes for a single trait does each offspring receive from the parent generation? (one or two)
9. (2pt) What word is used to describe the genotype condition in which *two different alleles* occur together in the same organism?
10. (2pt) What word is used to describe the genotype condition in which *two of the same alleles* occur together in the same organism?
11. (2pt) A pure-breeding blue-eyed mouse with short whiskers mates with a pure-breeding brown-eyed mouse with long whiskers. All of their offspring have brown eyes and short whiskers. Which traits are the dominant traits?
12. (2pt) If you find that there are three phenotypes (black, white, and grey), what do you call this genetic pattern?
13. (5pt) On the back side of your answer sheet, draw a Punnett Square for a cross between *Bb* and *bb* genotype parents.

**Human Evolution Quiz** (open book)

1. Which two groups are most similar with respect to comparisons of DNA?

**a**. african and northern asian

**b**. african and native american

**c**. northern asian and native american

1. Which group has been separated from the others for the longest time (according to DNA comparison)?

**a**. african

**b**. northern asian

**c**. native american

1. A representative sample of different human geographical/racial DNA has been collected and analyzed. When all of the different mutations were counted, scientists found that only 0.4% of the DNA of modern humans has been mutated differently. How many years have modern humans been on this planet based on the last common ancestor? (It takes 500000 years for 1% of the DNA to be mutated.)
2. When genetic researchers compare the DNA of Northern Asian populations versus Native American populations, they find a 0.07% difference, The “DNA clock” formula tells us that there has been about \_\_\_\_ years since the separation of these two groups?
3. When comparing the DNA of Indonesian peoples to either the European group or the Northern Asians, they fined a 0.12% difference. The “DNA clock” formula tells us that there has been about \_\_\_\_ years since separation.
4. What is the way that mitochondrial DNA is passed from one generation to the next?

**a**. sperm

**b**. egg

**c**. both egg and sperm

**d**. in the nucleus only

**e**. by mutation

1. The longer is the amount of time that the two groups have been separated from each other, the \_\_\_\_ the number of different mutations.

**a**. same

**b**. more

**c**. less

1. How many years have the “Altitudinals” been separated from the “Basinals”? (p.215).
2. Based on available fossil evidence, where did the various old hominids originate?
3. Which human group first migrated out of the continent of origin?

**Microbes Quiz** (open book)

1. (lpt) The onion cells that you saw earlier in the semester are (prokaryotic or eukaryotic)?
2. (1pt) The 3 shapes of bacteria are ….?
3. (1pt) Cyanobacteria are (*unicellular* or *multicellular*)?
4. (1pt) The True Algae are (*prokaryotic* or *eukaryotic*)?
5. (1pt) Protozoans are (*prokaryotic* or *eukaryotic*)?
6. (1pt) Protozoans are (*phototrophic* or *heterotrophic*)?
7. (1pt) The Fungi that we saw were (*unicellular* or *multicellula*r)?
8. (2pt) List the three subgroups of Eukarya (p.238).
9. (continue your answer to #8)
10. (2pt) List the two subgroups of Eubacteria (p.238).
11. (continue your answer to #10)
12. (1pt) Which organism in the lichen makes the food?
13. (4pt) On the back side of your answer sheet draw the structure of the bread mold and label the structures we discussed in lab.
14. (4pt) On the back side of your answer sheet draw the structure of the entire mushroom organism and label the structures we discussed in lab.

**Moss and Fern Quiz** – Open Book

1. Which stage in the life cycle of algae produces eggs and sperm?
2. The fertilized egg will grow into a (gametophyte or sporophyte).
3. Are mutations almost always a good thing, or a bad thing?
4. Answer question #1 on p. 243.
5. Answer question #3 on p. 243.
6. Answer question #5 on p. 243.
7. Answer question #2 on p. 245.
8. Answer question #3 on p. 245.
9. (6pt) Draw the life cycle of the Moss Plant showing gametophyte, sporophyte, male and female reproductive structures, and where the spores are formed.
10. (6pt) Draw the life cycle of the Fern Plant showing gametophyte, sporophyte, male and female reproductive structures, and where the spores are formed.

**Dry Land Plants Quiz** (open book)

1. (6pts) Draw a simple sketch of pine pollen and tobacco tree pollen illustrating the primary structural difference.

PINE TOBACCO

1. (6pt) Draw a simple sketch of a cross section of a root and a stem illustrating where the vascular tissue is found in each.

ROOT STEM

1. (4pt) Draw a cross section of a stem showing what creates the *tree rings*. Label which parts are produced during the dry and wet parts of the year.
2. Draw a leaf cross section showing where the stomata is located relative to leaf air cavities, and show where the vein is located.