Midterm Lab Tests

Basic Principles:

* You must give students a short exam early in the semester (after two labs) so they learn how to handle this type of testing.
* The first short midterm will take more time than a quiz. This test could easily require 45 minutes with a few memory and skill questions included. The midterm and final will take nearly 2 hours for students to complete. Obviously, this means that the midterm will require an entire lab period. If teachers are using this testing approach, the lab coordinator should schedule a less critical or “optional” topic in the middle of the semester.
* Most questions should be open lab book. Use targeted skill and memory questions to distinguish A & B graded from C grade.
* Most teachers used a “check-off” of lab book each week as a means to insure that the hard-working but lower-scoring student would be able to get a C grade. The points that you give for each type of student evaluation is necessary whatever testing method you use in lab.

Although most professors prefer the weekly quiz method, those who use the midterm method love it. These midterm tests are focused on the student being required to do experiments, understand them, and answer all questions. Since any lab drawings can also be included on a test, a student who takes a little careful time during lab will be able to copy this picture onto the lab test. Lab teachers drill their students to complete all lab activities and write whatever notes (in the lab book) that would be needed in an open book exam.

We strongly recommend that you include a method for giving points for the “check-off” of lab book each week. You can learn to do this very fast. Write your initials on the first page of the lab. This is evidence that they attended lab if you accidentally forget to mark them on the roll sheet.

**Lab Test #1**

***Open Book Questions***

(Please Don’t Write On This Test)

**1.** 9/20 = (decimal fraction).  
 **a.** 0.1  
 **b.** 0.045  
 **c.** 0.25  
 **d.** 0.50  
 **e.** none of the above

**2.** Which decimal fraction is larger than the comparative simple fraction?  
 **a.** 0.5 vs. 500/1000  
 **b.** 0.79 vs. 4/5  
 **c.** 0.80 vs. 79/100  
 **d.** 0.63 vs. 16/25  
 **e.** 0.20 vs. 3/10

**3.** 0.001 = %.  
 **a.** 10  
 **b.** 1  
 **c.** 0.1  
 **d.** 0.01  
 **e.** none of the above

**4.** 0.002507 x 100,000 = .  
 **a.** 0.2507  
 **b.** 250,700  
 **c.** 25070  
 **d.** 250.7  
 **e.** 25.07

**5.** 2.576 ÷ 1000 =  
 **a.** 257.6  
 **b.** 25.76  
 **c.** 0.001  
 **d.** 0.02576  
 **e.** 0.002576

**6.** How many decimal positions would you move for a conversion from centi to milli?  
 **a.** 0  
 **b.** 1  
 **c.** 2  
 **d.** 3  
 **e.** 4

**7.** Converting from centi to milli, you would move the decimal position to the  
 **a.** left  
 **b.** right  
 **c.** either left or right

**8.** 53 millimeters = centimeters.  
 **a.** 0.053  
 **b.** 0.53  
 **c.** 5.3  
 **d.** 53  
 **e.** none of the above

**9.** How many meters are in 1.5 kilometers?  
 **a.** 0.0015  
 **b.** 150  
 **c.** 1500  
 **d.** 15000  
 **e.** 15,000,000

**10.** 30 cm is what fraction of a meter?  
 **a.** 0.3%  
 **b.** 3%  
 **c.** 13%  
 **d.** 33%  
 **e.** none of the above

**11.** 32 m/10 cm =  
 **a.** 3.2  
 **b.** 32  
 **c.** 320  
 **d.** 3200  
 **e.** 32,000

**12.** 600 ml = l  
 **a.** 0.006  
 **b.** 0.06  
 **c.** 0.6  
 **d.** 6  
 **e.** 60

**13.** What % of a liter is 15 ml?  
 **a.** 0.0015  
 **b.** 0.015  
 **c.** 0.15  
 **d.** 1.5  
 **e.** 15

**14.** What % of a kilogram is 454g?  
 **a.** 4.454  
 **b.** 45.4  
 **c.** 454  
 **d.** none of the above

**15.** 2.265 kg is the weight of a small bag of sugar. You are baking cupcakes for a special fund drive. It takes 100 g of sugar to make one batch of cupcakes. How many batches of cupcakes can you make with one small bag of sugar?  
 **a.** about 2  
 **b.** about 2265  
 **c.** about 226  
 **d.** about 22  
 **e.** about 100

**16.** Which is the greater volume?  
 **a.** 4 liters  
 **b.** 1 gallon  
 **c.** both a and b are exactly equal volumes

**17.** 1 ml = \_\_\_\_\_ drops?  
 **a.** 1  
 **b.** 2  
 **c.** 5  
 **d.** 8  
 **e.** 20

**18.** How many pounds are in one kilogram?  
 **a.** 100  
 **b.** 10  
 **c.** 2.2  
 **d.** 1.5  
 **e.** 0.6

**19.** How many 0F are there in one 0C?  
 **a.** 100  
 **b.** 10  
 **c.** 2.0  
 **d.** 1.8  
 **e.** 180

**20.** A kilometer is \_\_\_\_ of a mile.  
 **a.** 0.2  
 **b.** 0.5  
 **c.** 0.6  
 **d.** 0.9  
 **e.** 1.5

**21.** Which pennies are heavier?  
 **a.** 1975  
 **b.** 1985  
 **c.** both are the same weight

**22.** Which pennies are thicker?   
 **a.** 1975  
 **b.** 1985  
 **c.** all are the same thickness

**23.** What happens to a single ray of light when it passes through a lens?  
 **a.** it is blocked  
 **b.** it is magnified  
 **c.** it is bent  
 **d.** its color is changed

**24.** What happens to the size of the field of view when you switch from the 4x objective lens to the 43x lens?  
 **a.** increases  
 **b.** decreases  
 **c.** does not change

**25.** Which objective lens provides the greatest *depth of focus*?  
 **a.** 4x  
 **b.** 10x  
 **c.** 43x  
 **d.** basically the same at all of these magnifications

**26.** If the magnification of the ocular lens is 5x, and the objective lens is 43x, what is the total magnification of the object being viewed?  
 **a.** 38x  
 **b.** 48x  
 **c.** 215x  
 **d.** 430x

**27.** What quality of your vision has been improved by the pinhole paper?  
 **a.** brightness of the field of view  
 **b.** magnification  
 **c.** inverse proportionality  
 **d.** resolution  
 **e.** none of the above

**28.** When you move the slide to the right, in what direction does the “e” appear to move?  
 **a.** right  
 **b.** left  
 **c.** up  
 **d.** down

**29.** What happens to the light intensity as you switch from low to high magnification?  
 **a.** increases  
 **b.** decreases  
 **c.** does not change

**30.** The diameter of the field of view through the 4x objective lens is approximately?  
 **a.** 0.5 mm  
 **b.** 1.0 mm  
 **c.** 4.0 mm  
 **d.** 1.5 cm  
 **e.** 1.75 cm

**31.** The diameter of the field of view through the 10x objective lens is approximately?  
 **a.** 0.5 mm  
 **b.** 1.0 mm  
 **c.** 1.5 mm  
 **d.** 1.5 cm  
 **e.** 1.75 cm

**32.** The diameter of the field of view with the 43x objective lens is approximately .  
 **a.** 0.1 mm  
 **b.** 0.4 mm  
 **c.** 1.6 mm  
 **d.** 4 mm  
 **e.** 4.3 mm

**33.** If a cell being viewed extended halfway across the field of view of the 4x objective lens, then that object would be approximately?  
 **a.** 0.1 mm  
 **b.** 0.2 mm  
 **c.** 2.0 mm  
 **d.** 4.0 mm  
 **e.** 4.0 cm

**34.** The dot over the letter “i” is equal to approximately % of the 43x objective lens diameter of view.  
 **a.** 100  
 **b.** 50  
 **c.** 25  
 **d.** 10  
 **e.** 500 (5x bigger)

**OPEN BOOK TEST #2**

*200pts*

***Please Don’t Write On This Test***

**1.** Which structure of the human cheek cell stained the *darkest* with the methylene blue stain?  
 **a.** chloroplast  
 **b.** vacuole  
 **c.** cell membrane  
 **d.** cell wall  
 **e.** nucleus

**2.** How do you know that your cheek cells are eukaryotic?  
 **a.** cell membrane  
 **b.** cell wall  
 **c.** chloroplast  
 **d.** nucleus  
 **e.** they are not eukaryotic

**3.** Which cells were eukaryotic?  
 **a.** cheek cells  
 **b.** onion cells  
 **c.** *Elodea* cells  
 **d.** all of the above  
 **e.** none of the above

**4.** What difference between onion cells and cheek cells?  
 **a.** chloroplast  
 **b.** nucleus  
 **c.** cell wall  
 **d.** cell membrane  
 **e.** all of the above

**5.** How does the Paramecium eat?  
 **a.** cilia  
 **b.** flagella  
 **c.** chloroplast  
 **d.** funnel shape grove  
 **e.** all of the above

**6.** When you see the color of plants, what structures are you actually seeing?  
 **a.** nucleus  
 **b.** cell membranes  
 **c.** stomata  
 **d.** chloroplasts  
 **e.** vacuole

**7.** How do we know that there is a central vacuole inside the Elodea cell, even though we can’t actually see it?  
 **a.** there is no vacuole in Elodea  
 **b.** the nucleus is inside the vacuole  
 **c.** the vacuole has red color inside  
 **d.** the chloroplasts are pushed to the outside edges of the vacuole  
 **e.** the vacuole has plastids inside

**8.** Do the cells that you observed in the onion bulb perform photosynthesis?  
 **a.** yes  
 **b.** no

**9.** The orange(yellow) color of the orange(yellow) flower petal in lab was due to . . .   
 **a.** orange plastids  
 **b.** orange color throughout the cytoplasm water

**10.** The red color of a red onion skin is due to . . .  
 **a.** red plastids  
 **b.** a red color throughout the cytoplasm water

**11.** What is the specific function of stomata?  
 **a.** food production  
 **b.** control air flow  
 **c.** protection against disease  
 **d.** photosynthesis and respiration  
 **e.** all of the above

**12.** Which organelles do the guard cells have that are absent from the skin cells of the *Zebrina* leaf?  
 **a.** nucleus  
 **b.** cell wall  
 **c.** cell membrane  
 **d.** stomata  
 **e.** chloroplasts

**13.** If heat is required to evaporate water, then what is released when water condenses?  
 **a.** light  
 **b.** hydrogen bond  
 **c.** ions  
 **d.** heat  
 **e.** none of the above

**14.** On a calm but rainy day, the temperature rises slightly when it begins to rain.  
 **a.** hydrogen bonds are breaking  
 **b.** hydrogen bonds are forming  
 **c.** this phenomenon isn’t related to hydrogen bonds

**15.** How strong (compared to dry slides) is the force of attraction between two wet slides?  
 **a.** weak  
 **b.** moderately strong  
 **c.** extremely strong

**16.** What forces are important in creating capillarity?  
 **a.** water is attracted to the glass  
 **b.** water is attracted to itself  
 **c.** both a and b  
 **d.** water is pushed up the glass tube  
 **e.** all of the above

**17.** Which substance cooled the slowest?  
 **a.** water  
 **b.** steel  
 **c.** water and steel cooled at the same rate

**18.** Which substance requires more heat energy to heat it up?  
 **a.** water  
 **b.** steel  
 **c.** both are pretty close to the same

**19.** If you were made of steel, then it would be \_\_\_\_\_ chilling to sit in a cool room.  
 **a.** less  
 **b.** more  
 **c.** would not make a difference

**20.** What takes more energy?  
 **a.** to heat 10 ml of water from 0 to 100 °C.  
 **b.** to boil away 10 ml of water that is already at 100 °C

**21.** Which of the three beakers is used to measure the amount of heat energy coming from the hot plate?  
 **a.** A  
 **b.** B  
 **c.** C

**22.** We have assumed for this experiment that the amount of heat going from the hot plate into the beakers is  
 **a.** the same for each beaker  
 **b.** higher in beaker A  
 **c.** higher in beaker B  
 **d.** higher in beaker C  
 **e.** higher in beakers A and B, and lower in beaker C

**23.** What is happening in beaker C?  
 **a.** hydrogen bonds are being broken  
 **b.** hydrogen bonds are being formed  
 **c.** nothing related to hydrogen bonds

**24.** 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

**25.** Which solution would be the strongest acid?  
 **a.** pH 14  
 **b.** pH 7  
 **c.** pH 5  
 **d.** pH 3

**26.** 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

**27.** 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

**28.** Which solution was the strongest base?  
 **a.** A  
 **b.** B  
 **c.** C  
 **d.** all were equal

**29.** Which solution was neutral?  
 **a.** A  
 **b.** B  
 **c.** C  
 **d.** none were neutral

**e.** all were neutral

**30.** Which solution contained the buffer?  
 **a.** sample X  
 **b.** sample Y

**31.** How many more drops of acid did it take to change the buffered solution compared to the non-buffered solution?  
 **a.** 1–2  
 **b.** 4–5  
 **c.** 9–10  
 **d.** more than 10

**32.** When you watch Brownian motion, are you actually seeing molecules move?  
 **a.** yes  
 **b.** no

**33.** Which molecules move faster?  
 **a.** potassium permanganate  
 **b.** methylene blue  
 **c.** both move at about the same speed

**34.** Refer to the picture of the *Elodea* cell on p. 102 surrounded by salt water. Where is the water in high concentration?  
 **a.** inside of the cell  
 **b.** outside of the cell  
 **c.** water concentration is equal on both sides of the cell membrane

**35.** If you eat a lot of highly-salted food, then you tend to . . .  
 **a.** lose water  
 **b.** retain water  
 **c.** lower the blood pressure

**36.** 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

**37.** Most reactions in a cell are driven by heat energy and don’t require enzymes.  
 **a.** yes  
 **b.** no

**38.** 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

**39.** 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

**40.** A mutation of a gene can result in a change in the *shape* of an enzyme.  
 **a.** yes  
 **b.** no

**41.** There is about 4x more difference between humans and chimpanzees than there is among humans.  
 **a.** yes  
 **b.** no

**42.** When we compared the enzyme controlled reaction at room temperature and in ice water,  
 **a.** there was only a slight difference  
 **b.** the room temperature was much faster  
 **c.** the 5 °C experiment was much faster

**43.** Which factor had the greater influence on the speed of reaction?  
 **a.** amount of enzyme  
 **b.** amount of substrate  
 **c.** neither enzyme nor substrate had any effect

**44.** Did phenylthiourea inhibit the enzyme reaction?  
 **a.** there was a very minor inhibition  
 **b.** there was no inhibition at all  
 **c.** there was a major inhibition

**45.** Which pH created the greatest *inhibition* of the reaction?  
 **a.** 7  
 **b.** acid  
 **c.** base

**46.** The enzyme was 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

**47.** 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

**48.** Under normal conditions, plant cells convert activated electron energy into  
 **a.** red light  
 **b.** blue light  
 **c.** oxygen  
 **d.** carbon dioxide  
 **e.** sugar energy

**49.** How many different pigments did we separate from the spinach juice?  
 **a.** 1  
 **b.** 2  
 **c.** 3  
 **d.** 4  
 **e.** 5

**50.** Which of the following was a control for Exercise #3?  
 **a.** phenol red in a test tube left red and put in the light  
 **b.** phenol red saturated with CO2 and put in the dark  
 **c.** tube with no *Elodea* and put in the dark  
 **d.** phenol red saturated with CO2 and put in the light  
 **e.** none of the above

**51.** 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

**52.** 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

**53.** 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

**54.** 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

**55.** 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

**56.** 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

**57.** 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

**58.** 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

**59.** 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

**60.** 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

**61.** The metabolic rate of an endotherm increases with an increase in environmental temperature.  
 **a.** yes  
 **b.** no

**62.** The metabolic rate of an ectotherm increases with an increase in the environmental temperature.  
 **a.** yes  
 **b.** no

**63.** Which organism has the slowest rate of respiration?  
 **a.** ectotherm  
 **b.** endotherm  
 **c.** both are about the same

**64.** How much food does the ectotherm need compared to the endotherm?  
 **a.** 10x more  
 **b.** 20x more  
 **c.** 100x more%  
 **d.** 50%  
 **e.** 5%

**65.** Which organism would do better in cooler environments where the food is plentiful?  
 **a.** ectotherm  
 **b.** endotherm

**66.** 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

**67.** 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

***Lab Test #2 – Skill & Memory (50pts)***

1. (2 pt) 9/20 = \_\_\_\_\_\_\_\_\_\_ (decimal fraction)
2. (2 pt) 1/5 = \_\_\_\_\_\_\_\_%
3. (2 pt) 25 ÷ 1000 = \_\_\_\_\_\_\_\_\_\_
4. (2 pt) The diameter of the field of view of your microscope at low magnification (4x objective) is \_\_\_\_\_\_\_\_\_\_ mm.

**5**. (5pts) Go to one of the microscopes and determine the location of the threads.

**Microscope # \_\_\_\_\_\_\_\_\_\_**

**Top Thread \_\_\_\_\_\_\_\_\_\_**

**Middle Thread \_\_\_\_\_\_\_\_\_\_**

**Bottom Thread \_\_\_\_\_\_\_\_\_\_**

**6**. (5pts) Make a leaf peel of the stomata of a *Zebrina* leaf. You have only 10 minutes, and you must show me a single-cell layer peel in order to get full credit.

**\_\_\_\_\_\_\_\_\_\_points**

**7**. (5pts) Next, what is the size of the stomata from the outside of one guard cell to the outside edge of the other guard cell? State your answer as percent of the diameter of the dot over the letter “i”.

**\_\_\_\_\_%**

**8** (3pts) On a calm but rainy day, the temperature rises slightly when it starts to rain. Explain specifically what is happening.

1. (2pts) pH is a measure of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ion concentration.
2. (2pts) A pH of 11 would be (acid, base, or neutral)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. (2pts) How much more H is in water at a pH of 3 when compared to a pH of 6?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (2pts) Diffusion is the movement of molecules from where they are in \_\_\_\_\_\_\_concentration to an area where they are in \_\_\_\_\_\_\_concentration.
2. (2pts) What do enzymes change about the amount of energy required to make chemical reactions occur?
3. don’t change it
4. increase it
5. decrease it
6. (2pts) What is another term for a substance that speeds a reaction but is not part of the end product? (not enzyme) \_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. (2pts) What kind of molecule is an enzyme? \_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. (5pts) Write the formula for the size of plant needed to keep you alive as stated in our lab book.
9. (5pts) Present and label a graph of metabolic rate vs environmental temperature and show which line is the endotherm (mouse) and which is the ectotherm (frog).

**Final Lab Test (open book)**

**Microbes, Mosses & Ferns, Land Plants, and Human Evolution (100pts)**

Questions 1-50 are 5pts each.

1. The onion cells that you saw earlier in the semester are
   1. prokaryotic
   2. eukaroytic
   3. none of the above
2. Bacteria are
   1. Phototrophic
   2. Heterotrophic
   3. None of the above
3. True Algae are
   1. Phototrophic
   2. Heterotrophic
   3. None of the above
4. True Algae are
   1. unicellular
   2. multicellular
   3. None of the above
5. True Algae are
   1. eukaryotic
   2. prokaryotic
   3. None of the above
6. Cyanobacteria are
   1. Phototrophic
   2. Heterotrophic
   3. None of the above
7. Cyanobacteria are
   1. eukaryotic
   2. prokaryotic
   3. None of the above
8. Cyanobacteria have \_\_\_ cells compared to True Algae.
   1. small
   2. large
   3. same size
9. Cyanobacteria have chloroplasts.
   1. yes
   2. no
10. Protozoans are
    1. Phototrophic
    2. Heterotrophic
    3. None of the above
11. Protozoans are
    1. eukaryotic
    2. prokaryotic
    3. None of the above
12. Bread Mold are
    1. Phototrophic
    2. Heterotrophic
    3. None of the above
13. Bread Mold are
    1. eukaryotic
    2. prokaryotic
    3. None of the above
14. Which cell type is the most complex?
    1. eukaryotic
    2. prokaryotic
    3. None of the above
15. The two subgroups of Monera are
    1. True algae and bread mold
    2. Protozoans and true algae
    3. Bread mold and mushrooms
    4. Bacteria and cyanobacteria
    5. Bacteria and protozoans
16. The two subgroups of Protista are
    1. True algae and bread mold
    2. Protozoans and true algae
    3. Bread mold and mushrooms
    4. Bacteria and cyanobacteria
    5. Bacteria and protozoans
17. Which stage in plant life cycle produces eggs and sperm?
    1. sporophyte
    2. gametophyte
    3. both sporophyte
    4. neither sporophyte nor gametophyte
18. How many sets of chromosomes does an egg have?
    1. 0
    2. 1
    3. 2
    4. 4
    5. 23
19. The fertilized egg will grow into one
    1. Gametophyte plant
    2. Sporophyte plant
    3. None of the above
20. Mutations are almost always a
    1. Good thing
    2. Bad thing
21. Question #1 on p. 245.
    1. 1000
    2. more than 1000
    3. less than 1000
22. Question #5 on p. 245.
    1. Simple plants (few structures).
    2. Complex plants (many structures).
23. Question #2 on p. 246.
    1. Less than 1 in 1000
    2. 1 in 1000
    3. 1 in 2000
    4. 1 in 10000
    5. 1 in more than 10000
24. Question #3 on p. 246.
    1. About the same number as a haploid plant
    2. Fewer genes than a haploid plant.
    3. Many more genes than a haploid plant
25. Question #4 on p. 246.
    1. You are a complex plant.
    2. You are a simple plant.
26. Question #1 on p. 247.
    1. A complex plant
    2. A simple plant
27. Question #3 on p. 247.
    1. Sporophyte generation
    2. Gametophyte generation
28. Question #4 on p. 247.
    1. Eggs and sperm
    2. spores
29. Question #2 on p. 250.
    1. Gametophyte stage
    2. Sporophyte stage
30. Question #1 on p. 251.
    1. Simple
    2. complex
31. Question #1 on p. 251.
    1. diploid
    2. haploid
32. Question #1 on p. 252.
    1. sporophyte
    2. gametophyte
33. The fern prothalium is the
    1. sporophyte
    2. gametophyte
34. Question #4 on p. 258.
    1. sporophyte
    2. gametophyte
35. Question #3 on p. 260.
    1. gametophyte
    2. sporophyte
36. Procedure #2 on p. 2261.
    1. white
    2. red
    3. brown
    4. green
    5. black
37. Where are the vascular bundles of the stem? (p. 264)
    1. Center of stem
    2. Towards the outside of the stem
38. Where are the vascular bundles of the root?
    1. Center of the root
    2. Towards the outside of the root
39. Question #1 on p. 268.
    1. mallow
    2. pine
    3. jojoba
    4. buckwheat
40. What part of the day do the jojoba leaves absorb *less* light and heat?
    1. morning
    2. noon
    3. afternoon
41. Which two groups are most similar with respect to comparisons of DNA?
    1. african and northern asian
    2. african and native american
    3. northern asian and native American
42. Which group has been separated from the others for the longest time (according to DNA comparison)?
    1. african
    2. northern asian
    3. native American
43. 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.)
    1. 500000 years
    2. 250000 years
    3. 200000 years
    4. 100000 years
    5. 20000 years
44. 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?
    1. 7000
    2. 70000
    3. 700000
    4. 35000
    5. none of the above
45. 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.
    1. 12000
    2. 120000
    3. 600000
    4. 6000
    5. none of the above
46. What is the way that mitochondrial DNA is passed from one generation to the next?
    1. sperm
    2. egg
    3. both egg and sperm
    4. in the nucleus only
    5. by mutation
47. The longer is the amount of time that the two groups have been separated from each other, the \_\_\_\_ the number of different mutations.
    1. same
    2. more
    3. less
48. How many years have the “Altitudinals” been separated from the “Basinals”? (p.209).
    1. 5000
    2. 50000
    3. 6000
    4. 25000
    5. none of the above
49. Based on available fossil evidence, where did the various old human-like people originate?
    1. China
    2. Southeast Asia
    3. Germany
    4. Africa
    5. Java
50. Which human group first migrated out of the continent of origin?
    1. Homo sapiens
    2. Homo erectus
    3. Homo habilis
    4. Ardipithecus ramidus
    5. Australopithecus afarensis

**Drawings for Lab Test**

1. (10pt) Draw the tree tobacco pistil.
2. (10pt) Draw a cross-section of the root showing vascular tissue..
3. (10pt) 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.
4. (10pt) Draw a leaf cross section showing where the stomata is located relative to leaf air cavities, and show where the vein is located.

5. (20pts) Copy p. 223 (Time Trails of Modern Humans) onto this page.