Date: _____

- Name: _
- 1. A slide of the letters F and R is placed on the stage of a microscope in the position shown in the diagram. How would the image of the letters appear when the slide is viewed under the low power of a compound light microscope?
 - A.
 RF
 B.
 LB

 C.
 78
 D.
 NJ



- 2. While a student is heating a liquid in a test tube, the mouth of the tube should always be
 - A. corked with a rubber stopper
 - B. pointed toward the student
 - C. allowed to cool
 - D. aimed away from everybody
- 3. Which piece of equipment could be used to determine the mass of an earthworm?



4. Which substance, when added to a wet mount containing starch grains, would react with the starch grains and make them more visible?

A. litmus so	lution B.	iodine	solution
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- C. distilled water
- D. bromthymol blue

- 5. A student tested a food for sugar using Benedict's solution. Which piece of laboratory apparatus would help the student perform this test?
 - A. hot plate B. dissecting microscope
 - C. triple-beam balance D. ultracentrifuge
- 6. Of the following, which piece of laboratory equipment would be used to most accurately measure the volume of a liquid?
 - A. beaker B. flask
 - C. test tube D. graduated cylinder
- 7. Base your answer(s) to the following question(s) on the diagram below and on your knowledge of biology. The diagram shows the results of a technique used to analyze DNA.



This technique used to analyze DNA directly results in

- A. synthesizing large fragments of DNA
- B. separating DNA fragments on the basis of size
- C. producing genetically engineered DNA molecules
- D. removing the larger DNA fragments from the samples

- 8. Which task is correctly matched with a safety procedure to be followed while performing that task?
 - A. dissect a bone do not use an open flame
 - B. pour acid into a beaker wear safety goggles
 - C. clean up broken glass wear a vinyl apron
 - D. heat a solution in a test tube stopper the test tube
- 9. A student measured a larva using a metric ruler, as represented in the diagram shown. What is the length of the larva?

A.	25 cm	COLLECTION D		
B.	25 mm			
C.	15 cm	cm		
D.	15 mm			

- 10. To observe the chloroplasts of a living elodea, a student would use
 - A. an ultracentrifuge
 - B. a compound light microscope
 - C. a dissecting microscope
 - D. an electron microscope
- 11. When heating liquid materials in laboratory glassware, a student should always
 - A. wear safety goggles
 - B. use Benedict's solution
 - C. stopper the test tube
 - D. record the temperature of the liquid
- 12. Zebra finches are small black-and-white birds that lay eggs about the size of a bean seed. Which unit of measurement is best for accurately measuring the length of these eggs?

meters

- A. millimeters B. micrometers
- C. feet D.

- 13. A student needs 20 milliliters of water for an experiment. How much additional water must the student add to the graduated cylinder shown to reach 20 milliliters?
 - A. 6.0 mL
 - B. 6.5 mL
 - C. 7.0 mL
 - D. 13.0 mL



- 14. Which substance is a suitable indicator for detecting the presence of starch in a plant cell?
 - A. Fehling's solution B. pH paper
 - C. bromthymol blue D. iodine solution
- 15. A student measured an earthworm using a metric ruler, as shown in the diagram.



What is the length of section A?

A. 7.6 cm B. 11.6 cm C. 46 mm D. 23 mm

16. A student prepares a wet mount of an onion epidermis and observes it under three powers of magnification of a compound light microscope $(40 \times , 100 \times , 400 \times)$.

A specimen that is suitable for observation under this microscope should be

- A. stained with Benedict's solution
- B. moving and respiring
- C. alive and reproducing
- D. thin and transparent

- 17. While focusing a microscope on high power, a student crushed the cover slip. The student probably
 - A. closed the diaphragm
 - B. turned up the light intensity
 - C. rotated the eyepiece
 - D. used the coarse adjustment
- 18. The diagram below represents a laboratory process.



The substance represented by the scissors shown cutting the DNA is

- A. an enzyme B. a starch molecule
- C. a carbohydrate D. a fat molecule
- 19. A student wishes to compare the image of a letter seen through a compound light microscope with the actual orientation of the letter on the slide. Which of the following would be the most suitable letter to use?
 - A. F B. I C. O D. Z
- 20. A student viewing a specimen under low power of a compound light microscope switched to high power and noticed that the field of view darkened considerably. Which microscope part should the student adjust to brighten the field of view?
 - A. diaphragm B. coarse adjustment
 - C. fine adjustment D. eyepiece

- 21. The total magnification of an image formed by a compound light microscope is a result of the combined magnification of the
 - A. eyepiece and diaphragm
 - B. objective and mirror
 - C. eyepiece and objective
 - D. low-power objective and high-power objective
- 22. During the preparation of a wet mount of an elodea leaf, a student dropped a plastic cover slip directly on top of the drop of water containing the specimen on the slide. This slide preparation technique most probably
 - A. caused the cover slip to shatter
 - B. crushed the specimen
 - C. trapped air bubbles under the coverslip
 - D. scratched the surface of the slide
- 23. Base your answer to the following question on the results of an experiment using plant pigments represented below and on your knowledge of biology.



Which phrase could be used to describe this technique?

- A. the use of chromatography to separate molecules in a mixture
- B. the use of cut leaves to observe certain colors
- C. using indicators to determine pH
- D. using dichotomous keys to identify plants

- 24. A student observing a cheek cell with the low power of a compound microscope switched to high power, and the cell was no longer in view. What did the student most likely fail to do before switching to high power that resulted in the cell's disappearance?
 - A. change the ocular
 - B. clean the low-power objective
 - C. measure the cell
 - D. center the specimen
- 25. A slide of human blood cells was observed in focus under the low-power objective of a compound light microscope that had clean lenses. When the microscope was switched to high power, the image was dark and fuzzy. Which parts of the microscope should be used to correct this situation?
 - A. nosepiece and coarse adjustment
 - B. diaphragm and ocular
 - C. objective and fine adjustment
 - D. diaphragm and fine adjustment
- 26. Base your answers to the questions on the information below and on your knowledge of biology.

A student designed an experiment to determine if air temperature had an effect on the rate of photosynthesis in corn plants.

Which tool is correctly paired with a procedure that could be used during this experiment?

- A. an electronic balance to measure the volume of soil in which each corn plant is grown
- B. a graduated cylinder to measure 30 mL of water for each plant daily
- C. a metric ruler to determine the mass of each plant each week
- D. a Celsius thermometer to determine the pH of the soil

27. A student is viewing a plant stem cross section using a compound light microscope.



What parts of the microscope should the student use to bring the image into focus?

- A. A and F B. B and E
- C. C and D D. D and F
- 28. Which group of materials would be most useful to a student planning to separate a mixture of leaf pigments using paper chromatography?
 - A. filter paper, dropper, solvent, beaker
 - B. enzymes, beaker, goggles, compound microscope
 - C. compound microscope, filter paper, coverslip, glass slide
 - D. meterstick, thermometer, solvent, enzymes

29. Base your answers to the questions on the information and diagram below and on your knowledge of biology.

An investigation was conducted to compare two different types of plants. A student used a microscope to observe the cells in a cross section of a lilac leaf (diagram A) and a cell from the leaf of a freshwater plant (diagram B).



(Not drawn to scale)

Which technique could be used to make the structures in the cells more visible when using a compound light microscope?

- A. paper chromatography B. staining
- C. electrophoresis D. gene manipulation

30. A procedure used in paper chromatography is represented below:



Source: www.sciencebuddies.org/ sciencefair

The student is preparing two strips of paper for a chromatography activity. After adding a dot of the ink from the marker pen to the line on the paper on the right, the next step should be to place the strips in a beaker of solvent with the solvent level

- A. between the bottom of the paper and the dot of ink
- B. even with the dot of ink on the paper
- C. just below the bottom edge of the paper
- D. slightly above the dot of ink on the paper

31.



The diagram shows a student conducting a laboratory experiment. Using one or more complete sentences, describe one safety procedure the student should be following that is *not* represented in the diagram.

32. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

As part of a laboratory technique, DNA samples taken from four plants were separated. The results are represented in the diagram below.



Identify the technique used to obtain the results represented in the diagram.

33. Base your answers to the questions on the information and data table below and on your knowledge of biology.

Invasive species have damaged agricultural crops all over the world. One study, completed in Japan, calculated the number of invasive insect species present in Japan from 1880 to 1990. Some of the data are recorded in the table below.

Number of Invasive Insect Species per Decade

Year	Number of Invasive Insect Species
1880	3
1900	3
1920	7
1940	10
1960	13
1980	41
1990	25

Adapted from "Invasive Insect Pests and Plant Quarantine." 1998

Mark an appropriate scale, without any breaks in the data, on each labeled axis.

34. Plot the data on the grid. Connect the points and surround each point with a small circle.



Number of Invasive Insect Species per Decade



Years

Base your answers to the questions on the information below and on your knowledge of biology.

As part of an experiment, a bacterial culture was grown in a lab for two days. No additional nutrients were added to the culture after the initial set-up. As the bacteria reproduced asexually, the population of the culture was measured every six hours. Some of the data related to the bacterial growth are shown in the data table below.

Time (hrs)	Population (millions)
0	2.0
6	4.5
18	16.0
30	28.0
48	37.0

Bacterial Growth

- 35. a) Mark an appropriate scale, without any breaks in the data, on each labeled axis.
 - b) Plot the data on the grid provided. Connect the points and surround each point with a small circle.



Time (hrs)

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Test 1 9/26/2019

1. Answer: Points:	D 1	15. Answer: Points:	C 1
2. Answer: Points:	D 1	16. Answer: Points:	D 1
3. Answer: Points:	A 1	17. Answer: Points:	D 1
4. Answer: Points:	В 1	18. Answer: Points:	A 1
5. Answer: Points:	A 1	19. Answer: Points:	A 1
6. Answer: Points:	D 1	20. Answer: Points:	A 1
7. Answer:	B	21. Answer: Points:	C 1
8. Answer:	B	22. Answer: Points:	C 1
Points: 9. Answer:	l D	23. Answer: Points:	A 1
Points: 10. Answer:	1 B	24. Answer: Points:	D 1
Points: 11. Answer:	1	25. Answer: Points:	D 1
Points: 12.	1	26. Answer: Points:	В 1
Points: 13.	A 1	27. Answer: Points:	B 1
Answer: Points: 14.	C 1	28. Answer: Points:	A 1
Answer: Points:	D 1	29. Answer: Points:	в 1



18

12

6

1

- 1900 - 1910 - 1920

1890 1880

- 1990 - 1980 - 1970 - 1960 - 1950 - 1930

Years

Points:

35. Answer:

Points:

