1 Which of the following safety practices prevents damage to a microscope?

A swinging the microscope from the arm

B storing the microscope with the high power objective in place

C leaving the lamp on for the next class

D using lens paper to clean the objective lenses

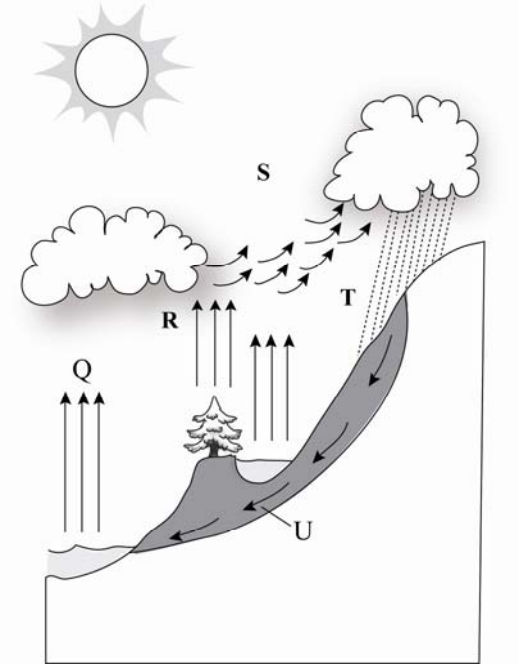
2 Which of the following theories explains how mitochondria and chloroplasts evolved from early prokaryotes?

A Theory of Evolution

B Theory of Relativity

C Quantum Theory

D Endosymbiotic Theory



3 The diagram shows the physical changes that occur in the water cycle. Which of these shows transpiration?

A Q

B R

C S

D T

Characteristics of Life	Bacteria	Yeast	Mold	Virus
contains genetic material	yes	yes	yes	yes
metabolizes	yes	yes	yes	in host
reproduces	yes	yes	yes	in host
evolves	yes	yes	yes	yes
made of cells	yes	yes	yes	no

4 The organism that scientists are unlikely to classify as living is a –

A virus

B mold

C yeast

D bacteria

5 Which macromolecule is most responsible for storing genetic information?

A nucleic acids

B carbohydrates

C lipids

D proteins

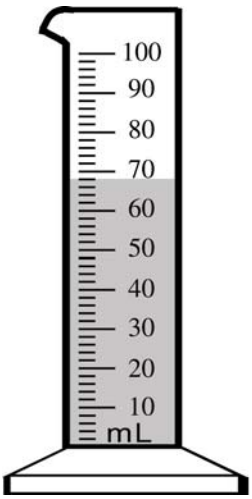
6 Which property of water holds rain drops together in clouds?

A adhesion

B cohesion

C solubility

D capillarity



7 The graduated cylinder is filled with a 70% solution of isopropyl alcohol. The solution is at 20 ^{o}C and has a density of .785 g/mL. According to this information, what is the mass of the isopropyl alcohol solution? (Formula for Density is D = M/V)

A .012 g

B .549 g

C 47.6 g

D 53.38 g

---

8 Which of the following best explains why a floating layer of ice on a lake in winter is advantageous to the aquatic organisms that live there?

A Freezing water temperatures increases metabolism in aquatic organisms.

B Prey is easier to capture.

C Dissolved O_2 does not escape.

D The lower density of ice provides an insulating layer on a lake.

9 Radioactive dating is more accurate than relative dating because –

A radioactive isotopes break down at a steady rate

B a meteorite's age can be compared to Earth

C carbon-14 is used for dating living organisms

D fossils and rocks are not made of the same material

10 Which of these characteristics prevents fire from being classified as living?

A response to stimulus

B produces energy

C made of one or more cells

D movement

11 The defining characteristic of a theory is that it is –

A always proven correct

B supported by extensive experimental research

C able to support many hypotheses

D created by one scientist

12 Amino acids are the building blocks for –

A carbohydrates

B lipids

C proteins

D nucleic acids

13 Which statement best explains how the Miller and Urey experiment supports Alexander Oparin's hypothesis about the origin of life on earth?

A Lightning storms provide energy for chemical reactions.

B Amino acids form after proper conditions are created.

C Atoms of elements bond naturally.

D Collected fluids simulate the ocean environment.

14 In which lab setting should goggles be required as a safety precaution?

A Students examine pond water using microscopes in order to identify organisms.

B Students determine traits of an organism by flipping a penny.

C Students identify unknown chemicals using specific indicators.

D Students identify and classify organisms preserved and stored in jars.

Percival Lowell, an astronomer from the 1890s, believed that intelligent life forms were able to grow vegetation on Mars. He thought canals on the surface of the planet were used to transport water from the polar ice caps to areas used for farming. More recently, scientists discovered that the atmospheric gas composition on Mars is mostly CO_2 with traces of water. Consequently, this data disproved Lowell's idea.

Mars Exploration Data

Characteristic	Earth	Mars
Polar Ice Caps	present	present
Volcanoes	present	present
Deserts	present	present
Mountains, Canyons, Flatlands	present	present
Atmospheric Gases	N_2, O_2, CO_2, H_2O, CH_4	×

15 In order to support Lowell's hypothesis, which gas would scientists expect to find in the atmosphere on Mars?

A CO_2

B H_2O

C O_2

D CH_4

Use the information below and your knowledge of science to answer questions 16–17.

In the 1970s, NASA sent *Viking 1* and *Viking 2* spacecraft to different areas of Mars to search for signs of life. The mission objectives for both spacecraft included acquiring data through photographs, soil samples, surface temperature readings, and atmospheric samples. Each spacecraft recorded data and took samples repeatedly in several areas and performed the same tests on all the samples. Prior to the soil tests, an equal portion of each sample was heated to a temperature high enough to kill any microorganisms that may have been present. Then three separate experiments were performed on both heat-treated and untreated soil samples. Data from each experiment are shown below.

Mars Soil Sample Results

Experiments	Untreated	Heat-treated
Gas Exchange Test	O_2 released	O_2 released
Carbon Assimilation Test	carbon detected	carbon detected
Labeled Release Test	labeled gas produced	none detected

16 Which characteristic of life were the scientists most likely looking for when designing the *Viking* soil experiments?

A metabolic activity

B adaptation

C reproduction

D growth and development

17 Scientists record both qualitative and quantitative data while making observations before and during experimental tests. Which type of data listed below best represents qualitative data?

A surface temperature

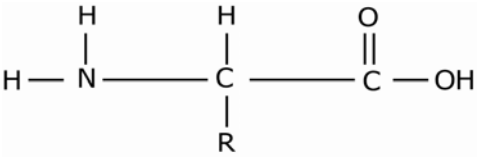
B types of minerals in soil

C types of gases in atmosphere

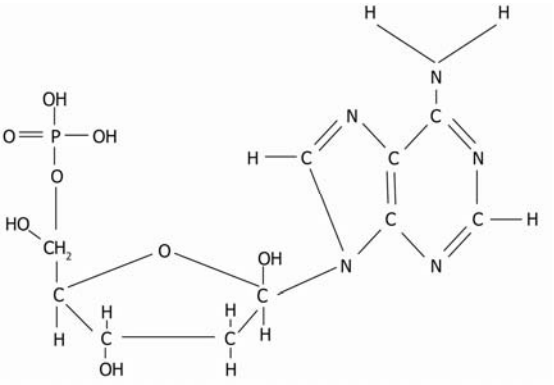
D photographs

18 Which diagram represents a monomer of a carbohydrate?

A



B



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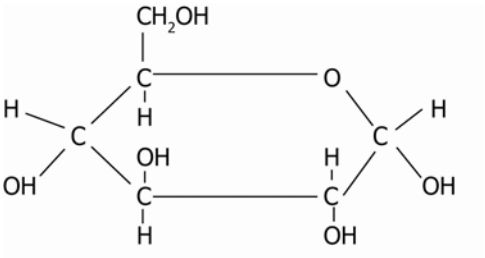

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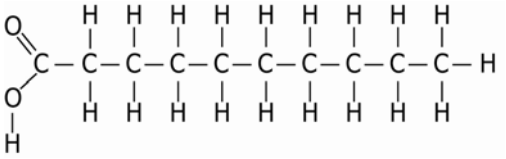

Students are interested in comparing the effects of pollution around refineries located near a city. They design an experiment to compare the H^+ ion concentration of acid rain at several locations. Samples are collected from all the designated areas, tested in the lab, and then compared to the pH of distilled water.

19 Which data help students identify the area that has the strongest concentration of acid rain?

A The pH reading is 6.

B The pH reading is 2.

C The pH reading is 9.

D The pH reading is the same as distilled water.

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20 Scientists examining steam vents deep in the ocean for signs of primitive life identify an organism similar to prokaryotes. Which characteristic would most likely support this identification?

A formation of colonies

B a cell wall

C a single-celled organism

D lack of a nucleus

21 A biologist discovers a fossil next to a stream bed. Which scientist should be contacted for information about the specimen?

A chemist

B paleontologist

C physicist

D environmentalist

22 Which reason best explains why water is known as the universal solvent?

A Oil and water do not mix.

B Water goes through phase changes in the hydrologic cycle.

C Nonpolar molecules are hydrophilic.

D Many compounds dissolve in water due to its polarity.

23 An experiment is performed to determine the density of two unknown liquids. Liquid A floats when it is added to 25 mL of distilled water in a graduated cylinder. Liquid B sinks when it is added to 25 mL of distilled water in a separate graduated cylinder. Students record the volume of each liquid. Which measurement is needed to determine the density of each liquid?

A temperature

B pH

C mass

D viscosity

Name of Food	Type of Nutrient	Macromolecule
Butter	Fats & Oils	Lipid
Pasta	Starch	Carbohydrate
Ribs	Fat & Protein	Protein
Glucose	Sugar	Carbohydrate

24 Which of the following foods listed in the table above is an example of a polysaccharide?

A butter

B pasta

C ribs

D glucose

Students in lab discuss whether or not a seed is a living organism. Their teacher asks them to place a few seeds in a moist paper towel and then to observe them in three days. After three days, the students observe that the seeds are larger and have each sprouted a root and stem. They conclude that seeds are alive but are in a dormant stage before germination.

25 Which of the following characteristics of living things did the students most likely observe?

A evolution

B growth and development

C reproduction

D homeostasis

