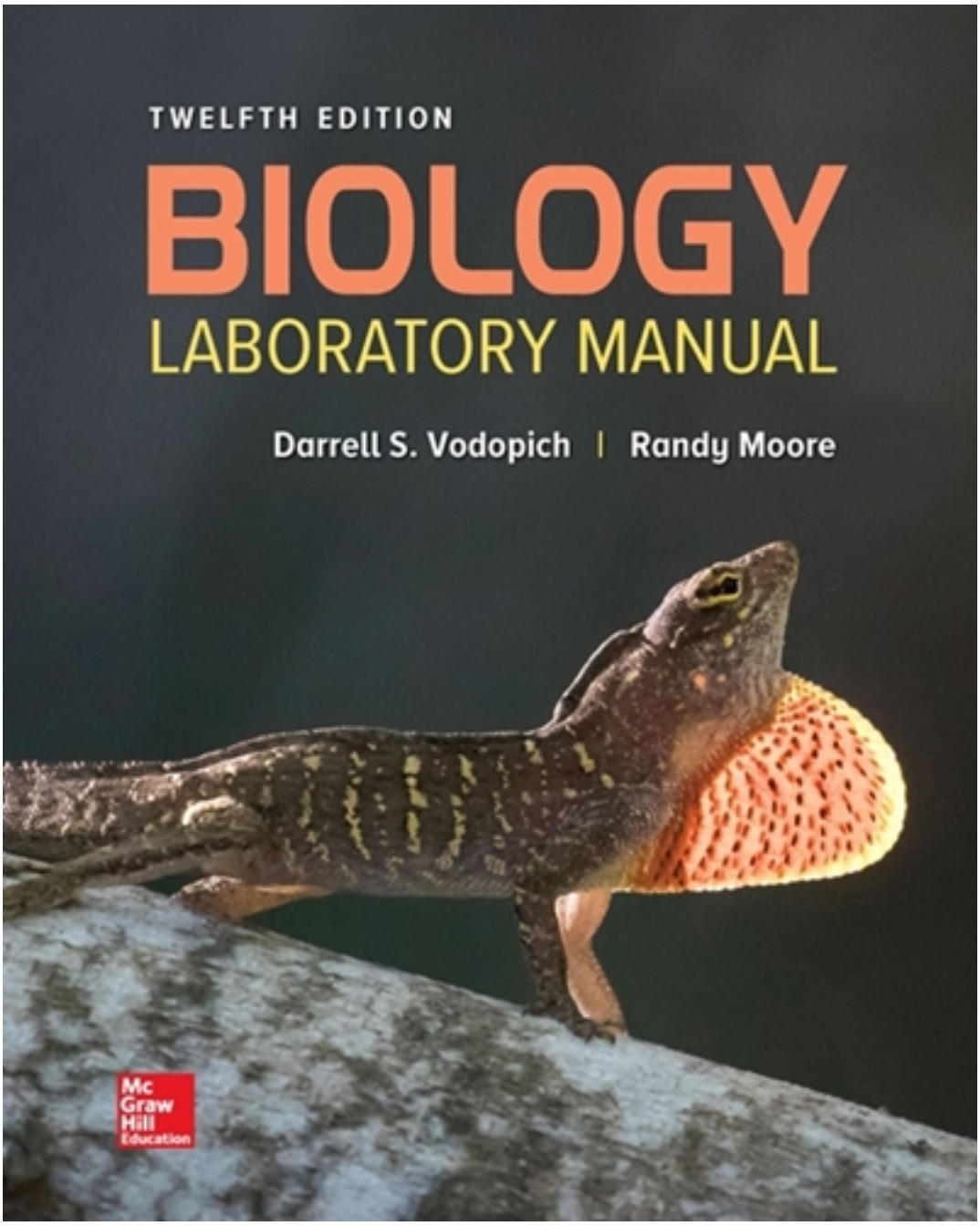
BIOLOGY LABORATORY MANUAL 12TH EDITION VODOPICH TEST BANK



TEST BANK

NURSING TEST BANKS

Biology Laboratory Manual, 12e **(Vodopich)**
Exercise 02 - Measurements in Biology

Match each prefix with its value.

A) 1×10^{-6}
B) 1×10^{-9}
C) 1×10^{-3}
D) 1×10^{-2}

1) Milli
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

2) Centi
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.

Bloom's: 1. Remember
Accessibility: Keyboard Navigation

3) Nano
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

4) Micro
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

Answers: 1) C 2) D 3) B 4) A

5) You walk 4.5 meters to reach the sink in lab. What is the equivalent number of centimeters?
A) 0.45
B) 4.5
C) 45.0
D) 450.0

Answer: D
Explanation: There are 100 centimeters per meter, so 4.5 meters = 450 centimeters.
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.04. Convert one metric unit to another (e.g., grams to kilograms).
Bloom's: 4. Analyze
Accessibility: Keyboard Navigation

Match each metric term with its base unit.

A) Celsius
B) Gram
C) Meter
D) Liter

6) Length
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

7) Mass
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

8) Volume
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

9) Temperature
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

Answers: 6) C 7) B 8) D 9) A

10)

If the bottom of the meniscus in a 10 ml pipet is at 3 ml, how many ml of liquid is in the pipet?

Answer: 7 (seven)
Explanation: If a 10 ml TD (to dispense) pipet is full, the meniscus of the fluid is at the zero line on the pipet, and the pipet contains 10 ml of fluid. If the bottom of the meniscus is at the 3 ml line, then 3 ml have been dispensed and the pipet contains 7 ml of fluid.

Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 4. Analyze
Accessibility: Keyboard Navigation

11) Rank the values of these metric prefixes from smallest to largest.

- Kilo
- Milli
- Deka
- Deci

Answer: Milli, Deci, Deka, Kilo
Explanation: The values of these prefixes are as follows:
Milli = 1×10^{-3}
Deci = 1×10^{-1}
Deka = 1×10^{1}
Kilo = 1×10^{3}
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.02. Identify the metric units used to measure length, volume, mass, and temperature.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

12) The linear space occupied on your lab tray by the pipets that you will use for lab measures 25 cm long and 5 cm wide. What is the correct way to refer to the area occupied by the pipets?

A) 5 cm
B) 5 cm^2
C) 125 cm
D) 125 cm^2
E) 0.04 cm^3
F) 0.04 cm^2

Answer: D
Explanation: Area is calculated by multiplying two linear measurements. The units of area are units of length squared. 5 cm × 25 cm = 125 cm^2 .
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 4. Analyze
Accessibility: Keyboard Navigation

13) Where should meniscus be read?
A) It makes no difference where meniscus is read.
B) From above
C) From below
D) At eye level

Answer: D
Explanation: Reading the meniscus other than at eye level leads to inaccurate measurement.
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

14) Given the following data set of measurements made in centimeters of the humerus (upper bone in the forelimb) lengths of a group of bats, what is the mean in cm of the data set?

2.51
1.10
5.35
0.79
4.95
1.32
1.82

A) 1.82
B) 2.51
C) 2.55
D) 4.56

Answer: C
Explanation: Mean, or average, is calculated by adding the individual measurements and dividing by the total number of measurements.
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 4. Analyze
Accessibility: Keyboard Navigation

15) Given the following data set of measurements made in centimeters of the humerus (upper bone in the forelimb) lengths of a group of bats, what is the median in cm of the data set?

2.51
1.10
5.35
0.79
4.95
1.32
1.82

A) 1.82
B) 2.51
C) 2.55
D) 4.53

Answer: A
Explanation: The median is the middle number if the data are put in numerical order.

0.79 1.10 1.32 **1.82** 2.51 4.95 5.35
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

16) Given the following data set of measurements made in centimeters of the humerus (upper bone in the forelimb) lengths of a group of bats, what is the range in cm of the data set?

2.51
1.10
5.35
0.79
4.95
1.32
1.82

A) 0.79
B) 2.55
C) 3.82
D) 4.56

Answer: D
Explanation: The range is the difference between the smallest and largest measurements. For this data set, range = 5.35 - 0.79.
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

17) Given the following data set of measurements made in centimeters of the humerus (upper bone in the forelimb) lengths of a group of bats, what is the variance of the data set?

2.51
1.10
5.35
0.79
4.95
1.32
1.82

A) 2.51
B) 3.47
C) 20.85
D) 7

Answer: B
Explanation: Variance = sum of squared deviations / sample size-1

Measurement	Average	Deviation	(Deviation)^2
2.51	2.55	-0.04	0.0016
1.10	2.55	-1.45	2.1025
5.35	2.55	2.80	7.8400
0.79	2.55	-1.76	3.0976
4.95	2.55	2.40	5.7600
1.32	2.55	-1.23	1.5129
1.82	2.55	-0.73	0.5329

Variance = 20.8475/6
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 4. Analyze
Accessibility: Keyboard Navigation

18) Given the following data set of measurements made in centimeters of the humerus (upper bone in the forelimb) lengths of a group of bats, what is the standard deviation of the data set?

2.51
1.10
5.35
0.79
4.95
1.32
1.82

A) 1.82
B) 5.35
C) 434.72
D) 1.86

Answer: D
Explanation: Standard deviation = square root of variance
Remember that variance = sum of squared deviations / sample size - 1
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

19) Keeping in mind what you read about significant figures and measurement and using the measurements below, what would be the smallest definite (not estimated) measurement that could be read from the standard metric ruler?
A) Nanometers
B) Micrometers
C) Centimeters
D) Millimeters

Answer: D
Explanation: Millimeters, shown in the tenth place, are typically the smallest definite gradation on a metric ruler.
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

20) Imagine that you are a biologist who needs to obtain fast, accurate measurements of tadpoles in a natural population. In the field you cannot access an electronic balance, but you do have a graduated cylinder. How could you measure the size of tadpoles in the field?
A) It would be impossible.
B) You would need to obtain a REALLY long extension cord.
C) You could just guess.
D) You could use volume displacement of tadpoles to obtain your data.

Answer: D
Explanation: Tadpoles could be measured by volume displacement.
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 5. Evaluate
Accessibility: Keyboard Navigation

21) _____ is defined as mass divided by volume.

Answer: Density
Explanation: The formula for density is mass divided by volume.
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.05. Use measures of volume and mass to calculate density.
Bloom's: 1. Remember

Accessibility: Keyboard Navigation

22) The mean and median of a data set are always identical.

Answer: FALSE
Explanation: Median is simply a middle number. The mean, also known as the average of a data set, may be very different from this middle number.
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 5. Evaluate
Accessibility: Keyboard Navigation

23) Keeping in mind what you read about significant figures, if you multiply 3.33928 × 9.8, which would be the correct way of representing the answer?
A) 32.724944
B) 32.725
C) 32.7
D) 33

Answer: C
Explanation: The default position is to use the same number of significant figures in the answer as you find in term with the smallest number of significant figures.
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

24) If an archer shoots arrows at a target, and all of his arrows hit very nearly the same spot, but the spot is not the bull's-eye he was aiming for, what can be concluded about his efforts?
A) He was precise and accurate.
B) He was neither precise nor accurate.
C) He was precise but not accurate.
D) He was accurate but not precise.

Answer: C
Explanation: Since his arrows hit the same spot or nearly so, he was precise. Since the spot was not the bull's-eye he was aiming for, he was not accurate.
Section: Accuracy and Precision
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.01. Understand the difference between accuracy and precision in measurements.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

25) You have a sample that contains 25 microliters of a solution. What is the equivalent number of milliliters?
A) 25×10^{-3}
B) 25×10^{-6}
C) 25×10^{-9}
D) 25×10^{-10}

Answer: A
Explanation: To convert 25 microliters into liters:

Multiply 25 microliters by the conversion factor (1 liter/1×10^{6} microliters) which equals 25×10^{-6} liters

Multiply 25×10^{-6} liters by the conversion factor (1 milliliter/1×10^{-3} liters) which equals 25×10^{-3} milliliters.
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.04. Convert one metric unit to another (e.g., grams to kilograms).
Bloom's: 4. Analyze
Accessibility: Keyboard Navigation

26) To allow for objective analysis of data, we must make measurements.

Answer: TRUE
Explanation: Numerical measurement allows us to make objective conclusions about data.
Section: Introduction
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.07. Analyze sample data using statistical tools.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

27) We are looking for sources of _____ when we analyze data.
A) variation
B) error
C) mutation
D) repetition

Answer: A
Explanation: Scientists look for sources of variation in experimental data, so the causes and effects of processes observed in living things can be identified.
Section: Introduction
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.07. Analyze sample data using statistical tools.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

28) What is the density of 100 ml of water if the mass is 99.5 g?
A) 0.995
B) 1.005
C) 0.5
D) 1.995

Answer: A
Explanation: Since density equals mass divided by volume, the density of the water in this question is 99.5 g/100 ml, which is 0.995.
Section: The Metric System
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.05. Use measures of volume and mass to calculate density.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

29) While making an initial measurement, a student came very close to the true value of the item being measured. The instructor then asked the student to measure the item three times. The second and third measurements were very different from each other and from the first measurement. In terms of these measurements, the student is
A) accurate but not precise.
B) precise but not accurate.
C) precise and accurate.
D) neither accurate nor precise.

Answer: A
Explanation: Since the student did come close to the true value, but the measurement was not repeatable, the student was accurate but not precise.
Section: Accuracy and Precision
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.01. Understand the difference between accuracy and precision in measurements.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

30) As you are working on your lab procedure with your lab partner, she hands you a beaker that contains a chemical. As you look at the beaker, you notice it is not labeled. When you ask your lab partner about this, she says she is sure it contains glucose, which is the chemical that is required for the next step in the procedure. What should you do?
A) You have to work as a team, so you should trust your lab partner and accept the chemical as glucose.
B) You should visually compare the chemical to a stock solution of glucose to be sure it is glucose.
C) You should visually compare the chemical to another group's glucose to be sure it is glucose.
D) You can assume that since the chemical was on your lab tray, it is ok to use the chemical.
E) You must inform your instructor and then dispose of the unlabeled chemical as instructed.

Answer: E
Explanation: Less than 100% certainty about a chemical means that you should not use the chemical. An unlabeled chemical cannot be visually identified. You should let your instructor know about the unlabeled chemical immediately and follow the instructor's disposal guidelines for the chemical.
Section: Introduction
Topic: A View of Life; Measurements in Biology; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; Scientific Method; Microscopy; The Cell; Spectrophotometry; Mitosis; Meiosis; Molecular Biology and Biotechnology; Genetics; Evolution; Human Evolution; Population Growth; Pollution; Prokaryotes; Protists-Algae; Protozoa and Slime Molds; Fungi; Plant Kingdom-Bryophytes; Plant Kingdom-Pterophytes and Lycophytes; Plant Kingdom-Gymnosperms; Plant Kingdom-Angiosperms; Plant Anatomy; Plant Physiology-Transpiration; Plant Physiology-Tropisms, Nutrition, and Growth Regulators; Bioassay; Animal Kingdom-Porifera and Cnidaria; Animal Kingdom-Flatworms and Roundworms; Animal Kingdom-Molluscs and Annelids; Animal Kingdom-Arthropods; Animal Kingdom-Echinoderms, Hemichordates, and Chordates; Vertebrate Animal Tissues; Human Biology-Human Skeletal System; Human Biology-Muscles and Muscle Contraction; Human Biology-Breathing; Human Biology-Circulation and Blood Pressure; Human Biology-Sensory Perception; Vertebrate Anatomy-External Features and Skeleton of Rats; Vertebrate Anatomy-Muscles and Internal Organs of Rats; Vertebrate Anatomy-Urogenital and Circulatory System of Rats; Embryology; Animal Behavior; Safety in the Laboratory Video
Learning Objective: 02.01. Understand the difference between accuracy and precision in measurements.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

31) Check any items that would not be appropriate for the laboratory.
A) A long necklace
B) Dangling jewelry
C) Sandals
D) Blue jeans
E) Long, braided hair

Answer: A, B, C
Explanation: Any jewelry that dangles can potentially be caught in equipment or exposed to chemicals. Closed-toed shoes are a requirement for lab.
Section: Introduction
Topic: A View of Life; Measurements in Biology; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; Scientific Method; Microscopy; The Cell; Spectrophotometry; Mitosis; Meiosis; Molecular Biology and Biotechnology; Genetics; Evolution; Human Evolution; Population Growth; Pollution; Prokaryotes; Protists-Algae; Protozoa and Slime Molds; Fungi; Plant Kingdom-Bryophytes; Plant Kingdom-Pterophytes and Lycophytes; Plant Kingdom-Gymnosperms; Plant Kingdom-Angiosperms; Plant Anatomy; Plant Physiology-Transpiration; Plant Physiology-Tropisms, Nutrition, and Growth Regulators; Bioassay; Animal Kingdom-Porifera and Cnidaria; Animal Kingdom-Flatworms and Roundworms; Animal Kingdom-Molluscs and Annelids; Animal Kingdom-Arthropods; Animal Kingdom-Echinoderms, Hemichordates, and Chordates; Vertebrate Animal Tissues; Human Biology-Human Skeletal System; Human Biology-Muscles and Muscle Contraction; Human Biology-Breathing; Human Biology-Circulation and Blood Pressure; Human Biology-Sensory Perception; Vertebrate Anatomy-External Features and Skeleton of Rats; Vertebrate Anatomy-Muscles and Internal Organs of Rats; Vertebrate Anatomy-Urogenital and Circulatory System of Rats; Embryology; Animal Behavior; Safety in the Laboratory Video
Learning Objective: 02.01. Understand the difference between accuracy and precision in measurements.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

32) Although food may not be consumed in the laboratory, the consumption items of necessity such as bottled water and cough drops is permitted.

Answer: FALSE
Explanation: Absolutely nothing can be consumed in the laboratory—not even cough drops or bottled water. If you need to take a break from lab to get a drink of water, etc., seek your instructor's permission.
Section: Introduction
Topic: A View of Life; Measurements in Biology; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; Scientific Method; Microscopy; The Cell; Spectrophotometry; Mitosis; Meiosis; Molecular Biology and Biotechnology; Genetics; Evolution; Human Evolution; Population Growth; Pollution; Prokaryotes; Protists-Algae; Protozoa and Slime Molds; Fungi; Plant Kingdom-Bryophytes; Plant Kingdom-Pterophytes and Lycophytes; Plant Kingdom-Gymnosperms; Plant Kingdom-Angiosperms; Plant Anatomy; Plant Physiology-Transpiration; Plant Physiology-Tropisms, Nutrition, and Growth Regulators; Bioassay; Animal Kingdom-Porifera and Cnidaria; Animal Kingdom-Flatworms and Roundworms; Animal Kingdom-Molluscs and Annelids; Animal Kingdom-Arthropods; Animal Kingdom-Echinoderms, Hemichordates, and Chordates; Vertebrate Animal Tissues; Human Biology-Human Skeletal System; Human Biology-Muscles and Muscle Contraction; Human Biology-Breathing; Human Biology-Circulation and Blood Pressure; Human Biology-Sensory Perception; Vertebrate Anatomy-External Features and Skeleton of Rats; Vertebrate Anatomy-Muscles and Internal Organs of Rats; Vertebrate Anatomy-Urogenital and Circulatory System of Rats; Embryology; Animal Behavior; Safety in the Laboratory Video

Learning Objective: 02.01. Understand the difference between accuracy and precision in measurements.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

33) What is expected of students before they enter the laboratory? Check all that apply.
A) Students will have thoroughly read the lab procedure.
B) Students will have memorized the lab procedure.
C) Students with long hair will have tied their hair back.
D) Students will wear appropriate lab attire.
E) Students will take special note of hazardous chemicals as indicated in the lab procedure.

Answer: A, C, D, E
Explanation: A thorough understanding of the lab procedure as well as appropriate attire and care are required of students before they set foot in the laboratory.
Section: Introduction
Topic: A View of Life; Measurements in Biology; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; Scientific Method; Microscopy; The Cell; Spectrophotometry; Mitosis; Meiosis; Molecular Biology and Biotechnology; Genetics; Evolution; Human Evolution; Population Growth; Pollution; Prokaryotes; Protists-Algae; Protozoa and Slime Molds; Fungi; Plant Kingdom-Bryophytes; Plant Kingdom-Pterophytes and Lycophytes; Plant Kingdom-Gymnosperms; Plant Kingdom-Angiosperms; Plant Anatomy; Plant Physiology-Transpiration; Plant Physiology-Tropisms, Nutrition, and Growth Regulators; Bioassay; Animal Kingdom-Porifera and Cnidaria; Animal Kingdom-Flatworms and Roundworms; Animal Kingdom-Molluscs and Annelids; Animal Kingdom-Arthropods; Animal Kingdom-Echinoderms, Hemichordates, and Chordates; Vertebrate Animal Tissues; Human Biology-Human Skeletal System; Human Biology-Muscles and Muscle Contraction; Human Biology-Breathing; Human Biology-Circulation and Blood Pressure; Human Biology-Sensory Perception; Vertebrate Anatomy-External Features and Skeleton of Rats; Vertebrate Anatomy-Muscles and Internal Organs of Rats; Vertebrate Anatomy-Urogenital and Circulatory System of Rats; Embryology; Animal Behavior; Safety in the Laboratory Video; Paper Chromatography Video
Learning Objective: 02.01. Understand the difference between accuracy and precision in measurements.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

34) As you are working through your lab procedure, an empty test tube rolls off of your lab table and shatters on the floor. Your lab partners want to pick up the broken glass and throw it away in a nearby waste bin. What should you tell them?
A) Go ahead with this methodology, but use extreme caution when touching the broken glass.
B) Use a broom and dust pan instead of handling the glass directly, and then dispose of it in the nearest waste bin.
C) Notify the instructor first, then use a broom and dust pan to dispose of the broken glass in the nearest waste bin.
D) Notify the instructor first, then use a broom and dust pan to dispose of the broken glass in the disposal box that is designated specifically for broken glass.

Answer: D
Explanation: Broken glass should not be touched. Ask your instructor for assistance in cleaning up the broken glass.
Section: Introduction
Topic: A View of Life; Measurements in Biology; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; Scientific Method; Microscopy; The Cell; Spectrophotometry; Mitosis; Meiosis; Molecular Biology and Biotechnology; Genetics; Evolution; Human Evolution; Population Growth; Pollution; Prokaryotes; Protists-Algae; Protozoa and Slime Molds; Fungi; Plant Kingdom-Bryophytes; Plant Kingdom-Pterophytes and Lycophytes; Plant Kingdom-Gymnosperms; Plant Kingdom-Angiosperms; Plant Anatomy; Plant Physiology-Transpiration; Plant Physiology-Tropisms, Nutrition, and Growth Regulators; Bioassay; Animal Kingdom-Porifera and Cnidaria; Animal Kingdom-Flatworms and Roundworms; Animal Kingdom-Molluscs and Annelids; Animal Kingdom-Arthropods; Animal Kingdom-Echinoderms, Hemichordates, and Chordates; Vertebrate Animal Tissues; Human Biology-Human Skeletal System; Human Biology-Muscles and Muscle Contraction; Human Biology-Breathing; Human Biology-Circulation and Blood Pressure; Human Biology-Sensory Perception; Vertebrate Anatomy-External Features and Skeleton of Rats; Vertebrate Anatomy-Muscles and Internal Organs of Rats; Vertebrate Anatomy-Urogenital and Circulatory System of Rats; Embryology; Animal Behavior; Safety in the Laboratory Video
Learning Objective: 02.01. Understand the difference between accuracy and precision in measurements.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

35) Of what is standard deviation a direct measure? Check all that apply.
A) The variation in a data set
B) Natural variations that occur throughout biology
C) The average value of a data set
D) Variation within an individual measurement
E) The number of individuals in a sample

Answer: A, B
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

Match each term to the correct definition.

A) Sample size
B) Average
C) Sum of squared deviations/N - 1
D) Sum
E) Square root of variance

36) N
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

37) Standard deviation
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

38) Mean
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

39) Variance
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

40) ∑
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

Answers: 36) A 37) E 38) B 39) C 40) D

41) Obtain the mean of this data set of frog snout-to-ischium measurements, which are recorded in centimeters.

- 2.00
- 3.60
- 1.90
- 2.40
- 2.00

A) 0.42
B) 2.10
C) 2.16
D) 2.38
E) 5.00
F) 11.9

Answer: D
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

42) Calculate the sum of squared deviations of this data set of frog snout-to-ischium measurements, which are recorded in centimeters.

- 2.00
- 3.60
- 1.90
- 2.40
- 2.00

A) 1.15
B) 1.45
C) 2.16
D) 2.38
E) 4.60
F) 5.00

Answer: E
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

43) Calculate the sum of squared deviations of this data set of frog snout-to-ischium measurements, which are recorded in centimeters.

- 2.00
- 3.60
- 1.90
- 2.40
- 2.00

A) 1.15
B) 1.45
C) 2.16
D) 2.38
E) 4.60
F) 5.00

Answer: A
Section: Understanding Numerical Data
Topic: A View of Life; Measurements in Biology
Learning Objective: 02.06. Practice the use of simple statistical calculations such as mean, median, range, and standard deviation.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

44) To weigh a chemical in dry powder form, a member of your lab group tares the top loading balance, then places a weighing dish on the balance. He then dispenses the chemical into the weighing dish until the balance shows the exact amount required for the experiment. Is there anything to be concerned about with this methodology?
A) No, this is exactly the right procedure for weighing a dry powder chemical.
B) Yes, by taring the scale before adding the weighing dish, he will have dispensed too much of the chemical.
C) Yes, by taring the scale before adding the weighing dish, he will have dispensed too little of the chemical.
D) Yes, a dry powder chemical cannot be accurately measured using a top loading balance.

Answer: C
Explanation: One should tare the balance after the weighing dish is on the balance. This way the balance will not include the weight of the dish in what it is measuring—you will measure only the chemical of interest.
Section: The Metric System
Topic: Measurements in Biology; Diffusion and Osmosis; Cellular Membranes; Top Loading Balance Video
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 5. Evaluate
Accessibility: Keyboard Navigation

45) To weigh a chemical in dry powder form, a member of your lab group tared the top loading balance before adding the weighing dish, and the final mass of the weighing dish and chemical was 23.5 g. Is there a way to find the final mass of the chemical alone without starting the procedure over?
A) Yes, you could weigh the weighing dish by itself, and subtract that from the mass of the chemical and the weighing dish.
B) Yes, you could weigh the weighing dish by itself, and add that to the mass of the chemical and the weighing dish.
C) Yes, you could calculate the molarity of the chemical, which would exclude the mass of the weighing dish.
D) No, there is no choice but to start the procedure again.

Answer: A
Explanation: Ideally you would want to weight the chemical properly by taring the balance AFTER the weighing dish is on the balance. However, subtracting the weight of the weighing dish from the mass of the chemical and the weighing dish should give you the mass of the chemical.
Section: The Metric System
Topic: Measurements in Biology; Diffusion and Osmosis; Cellular Membranes; Top Loading Balance Video
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 4. Analyze
Accessibility: Keyboard Navigation

46) Over which desired mass should a weighing dish be used instead of weighing paper?
A) 1 g
B) 2 g
C) 3 g
D) 4 g

Answer: C
Explanation: Generally a weighing dish is used if more than 3 g of a chemical is being sought.
Section: The Metric System
Topic: Measurements in Biology; Diffusion and Osmosis; Cellular Membranes; Top Loading Balance Video
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

47) Why is it important to wait 20 minutes or so after a top-loading balance is turned on before beginning to use it to measure chemicals?
A) This gives the electronic circuitry a chance to stabilize and insure accuracy.
B) This gives the chemical a chance to reach room temperature and humidity before it is weighed.
C) This prevents the student from being in too much of a rush to weigh their chemicals.
D) This 20-minute waiting period is only necessary for older equipment, so this rule can be disregarded.

Answer: A
Explanation: The top loading balance does require this time to "warm up," which is really a time for its electronic circuitry to stabilize.
Section: The Metric System
Topic: Measurements in Biology; Diffusion and Osmosis; Cellular Membranes; Top Loading Balance Video
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

48) In your lab procedure, you are directed to measure 90 g of glucose. Your lab partner takes the initiative and begins to make this measurement. She places a weighing dish on the top-loading balance, then she tares the scale. To dispense the glucose, she digs her spatula directly into the glucose stock container, and continues to add glucose to the weighing dish until she reaches 90 g. Should you have any concerns with this methodology?

A) No, this is a great example of how a chemical should be weighed.
B) Yes, dispensing directly from the stock container might cause an inaccurate final weight.
C) Yes, digging a spatula directly into a stock jar could contaminate the glucose.

Answer: C
Explanation: When measuring a chemical, some of the stock chemical should be dispensed into a dish, and then the chemical can be added to the weighing dish on the balance. Digging directly into the stock jar can cause contamination of the chemical.
Section: The Metric System
Topic: Measurements in Biology; Diffusion and Osmosis; Cellular Membranes; Top Loading Balance Video
Learning Objective: 02.03. Measure length, volume, mass, and temperature in metric units.
Bloom's: 5. Evaluate
Accessibility: Keyboard Navigation