Biology Laboratory Manual 12th edition Vodopich Test Bank

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***Biology Laboratory Manual, 12e* (Vodopich)**
Exercise 01 - Scientific Method

1) What is true about science? Check all statements that apply.
A) It is a single entity.
B) It generally contains bias.
C) It is an orderly process.
D) It proceeds by posing and answering questions.
E) It results in scientific experiments are repeatable.

Answer: C, D, E
Explanation: Scientists are often people who retain the curiosity that they had as children. They observe the natural world, and ask questions about what they observe, and they conduct experiments to answer their questions. The experiments and process should be unbiased and orderly, and the results should be repeatable. Science cannot be considered a single entity, because there are many disciplines within the realm of science.
Section: Introduction
Topic: A View of Life; Scientific Method
Learning Objective: 01.01. Define science and understand the logic and sequence of the scientific method.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

2) Scientists are the only individuals who use the scientific method.

Answer: FALSE
Explanation: Anyone can use the scientific method. Using this method just requires a curious, observant person who uses a logical problem-solving approach.
Section: Introduction
Topic: A View of Life; Scientific Method
Learning Objective: 01.01. Define science and understand the logic and sequence of the scientific method.
Bloom's: 3. Apply
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3) Consider the following general observation:

Groups of tadpoles of the same species raised in the lab may have significantly different average weights.

Which is a more precise, insightful observation that could be tested?
A) Woodfrog tadpoles grow larger if fed a meat-based diet.
B) The average weight for groups of bullfrog tadpoles is higher if density of tadpoles per gallon of water is less than 1.
C) Green frog tadpoles grow larger if kept in water above 18°C.
D) All of the choices are correct.

Answer: D
Explanation: Each of these statements links a specific variable to tadpole size.
Section: Development of Observations, Questions, and Hypotheses
Topic: A View of Life; Scientific Method
Learning Objective: 01.02. Develop productive observations, questions, and hypotheses about the natural world.
Bloom's: 5. Evaluate
Accessibility: Keyboard Navigation

4) What should be considered in formulating a hypothesis? Check all that apply.
A) The possibility the hypothesis will not be supported by the experimental data
B) Prediction
C) The possibility the hypothesis will be proved true
D) The possibility the hypothesis will be supported by the experimental data

Answer: A, B, D
Explanation: Hypotheses should be falsifiable, which indicates that a hypothesis may not be supported by experimental data. A hypothesis may also be supported by experimental data, but it is never correct to say that a hypothesis has been proved true. Hypotheses can be predictive about the nature of the effect of a variable.
Section: Development of Observations, Questions, and Hypotheses
Topic: A View of Life; Scientific Method
Learning Objective: 01.02. Develop productive observations, questions, and hypotheses about the natural world.
Bloom's: 2. Understand
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5) The _____ hypothesis states there will be no difference between the control and experimental groups in an experiment.

Answer: null
Explanation: Null is generally defined as something that has no effect. A null hypothesis states that the variable that is being tested is not something that differs between the control and experimental groups.
Section: Development of Observations, Questions, and Hypotheses
Topic: A View of Life; Scientific Method
Learning Objective: 01.02. Develop productive observations, questions, and hypotheses about the natural world.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

6) In a well-designed experiment, only _____ treatment variable that differs between the control and experimental group is tested.

Answer: a single
1
one
Explanation: Only a single variable difference establishes a causal relationship between variable and effect.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 2. Understand
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7) Imagine that you wish to compare a new diet of a meat-based fish food for tadpoles that are raised in the laboratory to the traditional laboratory diet of boiled lettuce. You want to see if the new diet will be associated with an increase in the average weight of the tadpoles. In your experiment you keep all other factors, such as tadpole density per pan, temperature, pH, and the amount of food the same. The only difference between your control and experimental groups is the type of food the tadpoles receive.

Which is a null hypothesis for this tadpole experiment?
A) Tadpoles will be larger if fed a meat-based diet.
B) Tadpoles will be larger if fed boiled lettuce.
C) Diet will have no effect on tadpole size.
D) Tadpole size will be more variable if fed a meat-based diet.

Answer: C
Explanation: A null hypothesis states that the variable under examination does not cause a difference in what is being measured in the control and experimental groups. In this experiment the effect of different diets on tadpole size is being measured. A null hypothesis would state that different diets do not impact tadpole size.
Section: Development of Observations, Questions, and Hypotheses
Topic: A View of Life; Scientific Method
Learning Objective: 01.02. Develop productive observations, questions, and hypotheses about the natural world.
Bloom's: 5. Evaluate
Accessibility: Keyboard Navigation

8) Which is an alternate, nonpredictive hypothesis for the tadpole diet experiment?
A) Tadpole size will increase if they are fed a meat-based diet.
B) Tadpole size will decrease if they are fed lettuce.
C) Tadpole size will be unaffected by diet.
D) Tadpole size will differ if groups of tadpoles are fed different diets.

Answer: D
Explanation: An alternate, nonpredictive hypothesis would state that the tadpoles would differ, but would not state how the tadpoles would differ.
Section: Development of Observations, Questions, and Hypotheses
Topic: A View of Life; Scientific Method
Learning Objective: 01.02. Develop productive observations, questions, and hypotheses about the natural world.
Bloom's: 5. Evaluate
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9) What is the independent variable for the tadpole diet experiment?
A) Diet
B) Tadpole size
C) Species of tadpole
D) Lab conditions

Answer: A
Explanation: The independent variable is what would cause the potential change that is being examined.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 5. Evaluate
Accessibility: Keyboard Navigation

10) What is the dependent variable for the tadpole diet experiment?
A) Diet
B) Size of tadpoles
C) Tadpole species
D) Lab conditions

Answer: B
Explanation: The dependent variable is what will be measured.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 5. Evaluate
Accessibility: Keyboard Navigation

11) In the tadpole diet experiment, it would be sufficient to test only one single pan of tadpoles that were fed lettuce, and only one single pan of tadpoles fed meat.

Answer: FALSE
Explanation: Multiple replicates provide greater confidence that results are correct and that the experiment is repeatable.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 5. Evaluate
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12) After you weigh your tadpoles at the conclusion of the experiment, how would you determine if the type of diet significantly impacted tadpole size?
A) The final conclusion should be based on your impressions/opinions.
B) The data should undergo statistical analysis.
C) The average of the control group should be compared to the average of the experimental group.
D) You must meet with other scientists to discuss the results and form an opinion.

Answer: B
Explanation: The use of statistics makes the analysis objective.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

13) What is not a question that can be answered using the scientific method?
A) Does the amount of daylight have an effect on tadpole growth?
B) Is the length of the larval period variable for tadpoles within a species?
C) Are wood frog tadpoles cuter than bullfrog tadpoles?
D) Is adult frog size related to size as a tadpole?

Answer: C
Explanation: This cannot be answered in an objective manner; it is a matter of opinion.
Section: Introduction
Topic: A View of Life; Scientific Method
Learning Objective: 01.01. Define science and understand the logic and sequence of the scientific method.
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14) You have just finished weighing a pan of tadpoles at the conclusion of your experiment in which you sought to determine whether tadpoles that were fed the meat-based diet grew significantly larger than tadpoles that were fed boiled lettuce. This pan of tadpoles was fed the meat-based diet. You used an electronic balance to weigh your tadpoles, so you have not estimated the last digit of the measurements. For practical purposes, you will assess a small data set of eight tadpoles. The individual weights of the tadpoles were as follows:

- 55.99 mg
- 56.45 mg
- 58.67 mg
- 56.15 mg
- 58.56 mg
- 60.43 mg
- 59.11 mg
- 61.33 mg

What is the mean of this sample?

Answer: 58
Explanation: The mean is calculated by adding the individual measurements together and then dividing by the number of individuals in the sample.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 4. Analyze
Accessibility: Keyboard Navigation

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15) You have just finished weighing a pan of tadpoles at the conclusion of your experiment in which you sought to determine whether tadpoles that were fed the meat-based diet grew significantly larger than tadpoles that were fed boiled lettuce. This pan of tadpoles was fed the meat-based diet. You used an electronic balance to weigh your tadpoles, so you have not estimated the last digit of the measurements. For practical purposes, you will assess a small data set of eight tadpoles. The individual weights of the tadpoles were as follows:

- 55.99 mg
- 56.45 mg
- 58.67 mg
- 56.15 mg
- 58.56 mg
- 60.43 mg
- 59.11 mg
- 61.33 mg

What is the variance of this sample?

Answer: 4
Explanation: To calculate variance, divide the sum of deviations^2 by sample size -1.

Tadpole weight (mg)	Sample Mean	Deviation = Weight - mean	Deviation^2
55.99	58.34	-2.35	5.52
56.45	58.34	-1.89	3.57
58.67	58.34	0.33	0.11
56.15	58.34	-2.19	4.80
58.56	58.34	0.22	0.05
60.43	58.34	2.09	4.37
59.11	58.34	0.77	0.59
61.33	58.34	2.99	8.94
			Sum: 27.95

Sample size = 8
Variance = 27.95/7 = 3.99
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 4. Analyze
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16) You have just finished weighing a pan of tadpoles at the conclusion of your experiment in which you sought to determine whether tadpoles that were fed the meat-based diet grew significantly larger than tadpoles that were fed boiled lettuce. This pan of tadpoles was fed the meat-based diet. You used an electronic balance to weigh your tadpoles, so you have not estimated the last digit of the measurements. For practical purposes, you will assess a small data set of eight tadpoles. The individual weights of the tadpoles were as follows:

- 55.99 mg
- 56.45 mg
- 58.67 mg
- 56.15 mg
- 58.56 mg
- 60.43 mg
- 59.11 mg
- 61.33 mg

What is the standard deviation of this sample?

Answer: 2
Explanation: To calculate standard deviation, take the square root of the variance.

Tadpole weight (mg)	Sample Mean	Deviation = Weight - mean	Deviation^2
55.99	58.34	-2.35	5.52
56.45	58.34	-1.89	3.57
58.67	58.34	0.33	0.11
56.15	58.34	-2.19	4.80
58.56	58.34	0.22	0.05
60.43	58.34	2.09	4.37
59.11	58.34	0.77	0.59
61.33	58.34	2.99	8.94
			Sum: 27.95

Sample size = 8
Variance = 27.95/7 = 3.99
Standard deviation = 2.00
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 4. Analyze
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17) You have just finished weighing a pan of tadpoles at the conclusion of your experiment in which you sought to determine whether tadpoles that were fed the meat-based diet grew significantly larger than tadpoles that were fed boiled lettuce. The pan you weighed was fed boiled lettuce. You used an electronic balance to weigh your tadpoles, so you have not estimated the last digit of the measurements. For practical purposes, you will assess a small data set of eight tadpoles. The individual weights of the tadpoles were as follows:

- 35.24 mg
- 42.98 mg
- 43.44 mg
- 40.56 mg
- 40.87 mg
- 39.12 mg
- 39.15 mg
- 39.19 mg

What is the variance of this sample?

Answer: 7
Explanation: To calculate variance, divide the sum of deviations^2 by sample size -1.

Tadpole weight (mg)	Sample Mean	Deviation = Weight - mean	Deviation^2
35.24	40.07	-4.83	23.33
42.98	40.07	2.91	8.47
43.44	40.07	3.37	11.36
40.56	40.07	0.49	0.24
40.87	40.07	0.80	0.64
39.12	40.07	-0.95	0.90
39.15	40.07	-0.92	0.85
39.19	40.07	-0.82	0.77
			Sum: 46.56

Sample size = 8
Variance = 46.56/7 = 6.65
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 4. Analyze
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18) You have just finished weighing a pan of tadpoles at the conclusion of your experiment in which you sought to determine whether tadpoles that were fed the meat-based diet grew significantly larger than tadpoles that were fed boiled lettuce. You used an electronic balance to weigh your tadpoles, so you have not estimated the last digit of the measurements. The pan that you have just weighed contained tadpoles that were fed boiled lettuce. For practical purposes, you will assess a small data set of eight tadpoles. The individual weights of the tadpoles were as follows:

- 35.24 mg
- 42.98 mg
- 43.44 mg
- 40.56 mg
- 40.87 mg
- 39.12 mg
- 39.15 mg
- 39.19 mg

What is the mean of this sample?

Answer: 40
Explanation: The mean is calculated by adding the individual measurements together and then dividing by the number of individuals in the sample.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 4. Analyze
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19) You have just finished weighing a pan of tadpoles at the conclusion of your experiment in which you sought to determine whether tadpoles that were fed the meat-based diet grew significantly larger than tadpoles that were fed boiled lettuce. The pan you weighed was fed boiled lettuce. You used an electronic balance to weigh your tadpoles, so you have not estimated the last digit of the measurements. For practical purposes, you will assess a small data set of eight tadpoles. The individual weights of the tadpoles were as follows:

- 35.24 mg
- 42.98 mg
- 43.44 mg
- 40.56 mg
- 40.87 mg
- 39.12 mg
- 39.15 mg
- 39.19 mg

What is the standard deviation of this sample?

Answer: 3
Explanation: To calculate standard deviation, take the square root of the variance.

Tadpole weight (mg)	Sample Mean	Deviation = Weight - mean	Deviation^2
35.24	40.07	-4.83	23.33
42.98	40.07	2.91	8.47
43.44	40.07	3.37	11.36
40.56	40.07	0.49	0.24
40.87	40.07	0.80	0.64
39.12	40.07	-0.95	0.90
39.15	40.07	-0.92	0.85
39.19	40.07	-0.82	0.77
			Sum: 46.56

Sample size = 8
Variance = 46.56/7 = 6.65
Standard deviation = 2.58
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 5. Evaluate
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20) What does the range of a sample represent?
A) The difference between the treatment types
B) The difference between the smallest and largest data
C) The difference between the null and alternate hypotheses
D) The geographic location in which the experiment was conducted

Answer: B
Explanation: The range is represented by the difference between the smallest measurement and the largest measurement.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

21) What does it mean if two treatments are said to be "significantly different"? Check all that apply.
A) The difference was very likely not due to natural variation.
B) The means of each sample plus or minus half the variance do not overlap.
C) The means of each sample plus or minus half the standard deviation do not overlap.
D) The ranges overlap.

Answer: A, C
Explanation: A significant difference refers to a difference between a control group and an experimental group that is not the result of natural variation. Numerically this means that the means of each sample plus or minus half the standard deviation do not overlap.
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 2. Understand
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22) What makes a theory different from a hypothesis? Check all that apply.
A) A theory has a greater range of experimental support.
B) A theory has stood the test of time.
C) A theory can be a guess.
D) A theory cannot be used to make predictions.

Answer: A, B
Explanation: Theories are synthesized as the result of multiple experiments over time that suggest the same result.
Section: Experimentation and Data Analysis: Food Preference by Pillbugs
Topic: A View of Life; Scientific Method
Learning Objective: 01.05. Understand the difference between a hypothesis and a scientific theory.
Bloom's: 2. Understand
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23) While a _____ accounts for a single observation, a _____ accounts for a group of observations.
A) hypothesis; null hypothesis
B) null hypothesis; hypothesis
C) hypothesis; theory
D) theory; hypothesis

Answer: C
Explanation: A hypothesis accounts for one observation, while a theory is constructed from multiple observations.
Section: Experimentation and Data Analysis: Food Preference by Pillbugs
Topic: A View of Life; Scientific Method
Learning Objective: 01.05. Understand the difference between a hypothesis and a scientific theory.
Bloom's: 2. Understand
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24) 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: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 1. Remember
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Match each term to the correct definition.

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

25) N
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

26) Standard deviation
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

27) Mean
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

28) Variance
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 2. Understand
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29) ∑
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

Answers: 25) E 26) B 27) D 28) C 29) A

30) 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: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 3. Apply
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31) 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: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 3. Apply
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32) 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: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

33) What advantage does a graph have over a data table?
A) A graph includes more data.
B) A graph allows for greater statistical analysis of data.
C) A graph readily reveals trends.
D) A graph allows data to be interpreted.

Answer: C
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
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34) What are the necessary components of a graph? Check all that apply.
A) *x*-axis and *y*-axis
B) Labels with units of measure
C) Values on each axis
D) Data curve
E) Title
F) Statistical analysis

Answer: A, B, C, D, E
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 1. Remember
Accessibility: Keyboard Navigation

35) You are conducting an experiment in which you are measuring the effect of nutritional status on reaction time. What is your independent variable?
A) Reaction time
B) Nutritional status
C) Number of subjects in the study
D) The location of the study

Answer: B
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

36) Which variable should be placed on the *x*-axis?
A) Independent variable
B) Dependent variable
C) Responding variable
D) Controlled variable
E) Independent variable, which is also known as the controlled variable
F) Dependent, which is also known as the responding variable

Answer: E
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
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37) A student has plotted the data from his experiment on a graph. Instead of connecting the data points, he draws a straight line that comes as close to each data point as is possible. What is the line called?
A) Standard fit
B) Best fit
C) Average fit
D) Interpretive fit

Answer: B
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.03. Calculate the range, mean, and standard deviation for a set of replicate measurements.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

38) You are conducting an experiment in which you are measuring the effect of nutritional status on reaction time. What is your independent variable?
A) Reaction time
B) Nutritional status
C) Number of subjects in the study
D) The location of the study

Answer: B
Section: Experimentation and Data Analysis: Yeast Nutrition
Topic: A View of Life; Scientific Method; Measurement
Learning Objective: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 3. Apply
Accessibility: Keyboard Navigation

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39) 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; Scientific Method; Measurement; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; 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: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 3. Apply
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40) 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; Scientific Method; Measurement; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; 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: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 2. Understand
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41) 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; Scientific Method; Measurement; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; 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: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

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42) 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: Scientific Method; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; 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: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 2. Understand
Accessibility: Keyboard Navigation

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43) 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: Scientific Method; Measurement; Solutions, Acids, and Bases; Enzymes; Respiration; Community Ecology; Diffusion and Osmosis; Cellular Membranes; Photosynthesis; Separating Organic Compounds; Introduction; 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: 01.04. Design and conduct a controlled experiment to test a null hypothesis.
Bloom's: 3. Apply
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