

SCIENCE
Exit Level

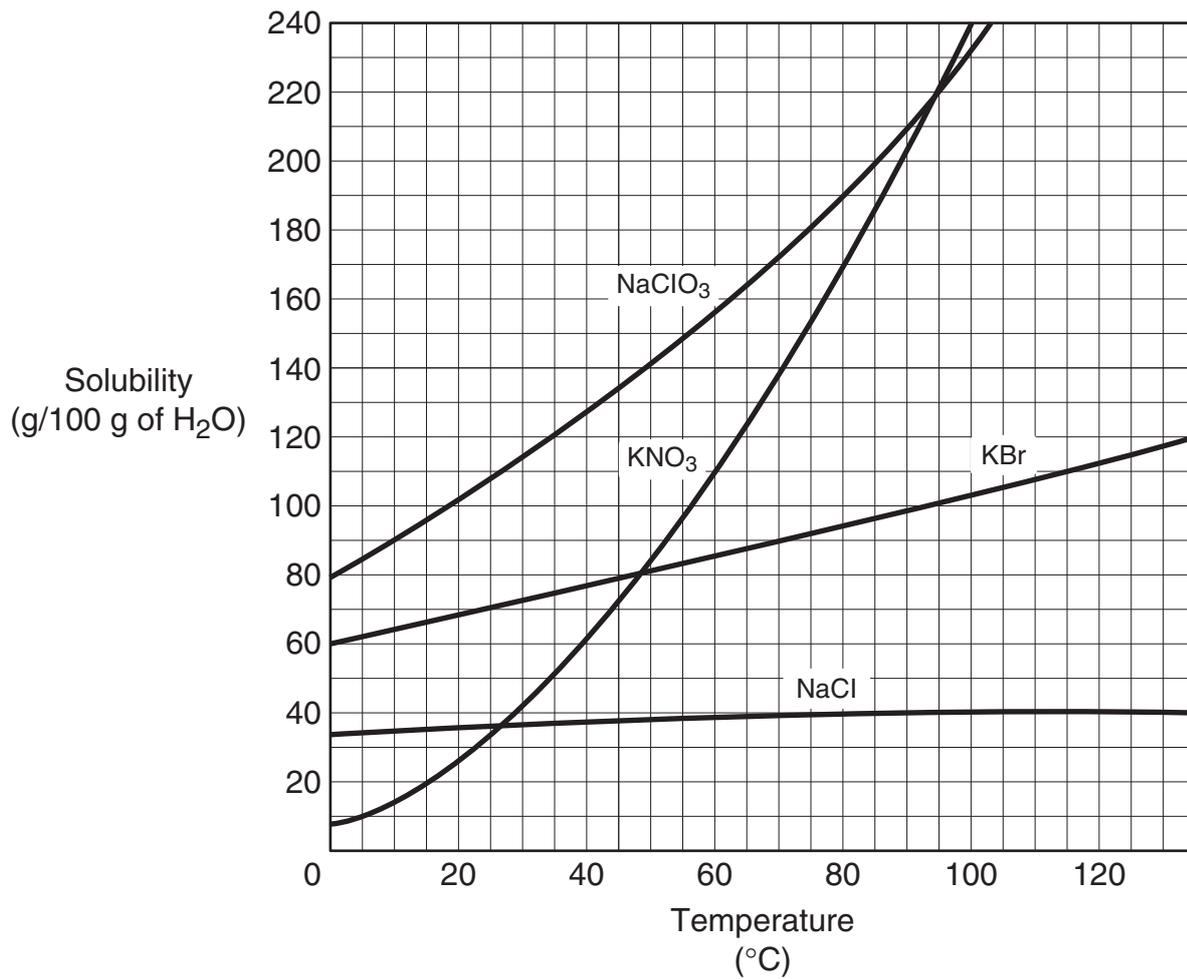
2008 Released Items

- 1 Which of these is the best reason to not eat or drink while in the laboratory?
- A Particles of food can contaminate chemical reagents.
 - B Spilled drinks can make cleanup of chemicals difficult.
 - C Some foods produce toxic gases when mixed with acids.
 - D Chemicals spilled on hands can be transferred to food.
- 2 Which of the following should be used to determine whether pond water is too acidic to support plant life?
- A Motion detector
 - B pH meter
 - C Geiger counter
 - D Voltmeter

A Few Organelles and Their Functions

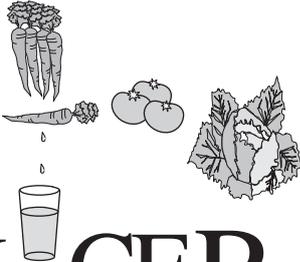
Organelle	Function
Lysosome	Contains enzymes used to break down organic molecules
Mitochondrion	Site of cellular respiration
Peroxisome	Produces and then breaks down hydrogen peroxide
Ribosome	Site of protein synthesis

- 3 The acrosome is an organelle in sperm cells that can dissolve the protective layers surrounding an egg cell. According to the chart, the acrosome is most likely a specialized —
- A lysosome
 - B mitochondrion
 - C peroxisome
 - D ribosome



- 4 What generalization can be made from the data in the solubility graph above?
- A The volume of a solvent affects the solubility of a solute.
 - B The volume of a solute affects its solubility.
 - C Increasing the temperature of a solution increases the solubility of a solute.
 - D Increasing the mass of a solute decreases its solubility.

A tasty way to good health.
Get one today !



Do the following simple experiment at home and you'll agree.

JU-CER

1. Use JU-CER to prepare a glass of freshly squeezed vegetable juice.
2. Take a sip of the fresh juice and record your impressions of its taste.
3. Wait two minutes.
4. Open a can of vegetable juice.
5. Take a sip of the canned juice and record your impressions of its taste.
6. Repeat Steps 2 through 5 three times at intervals of one to two minutes.

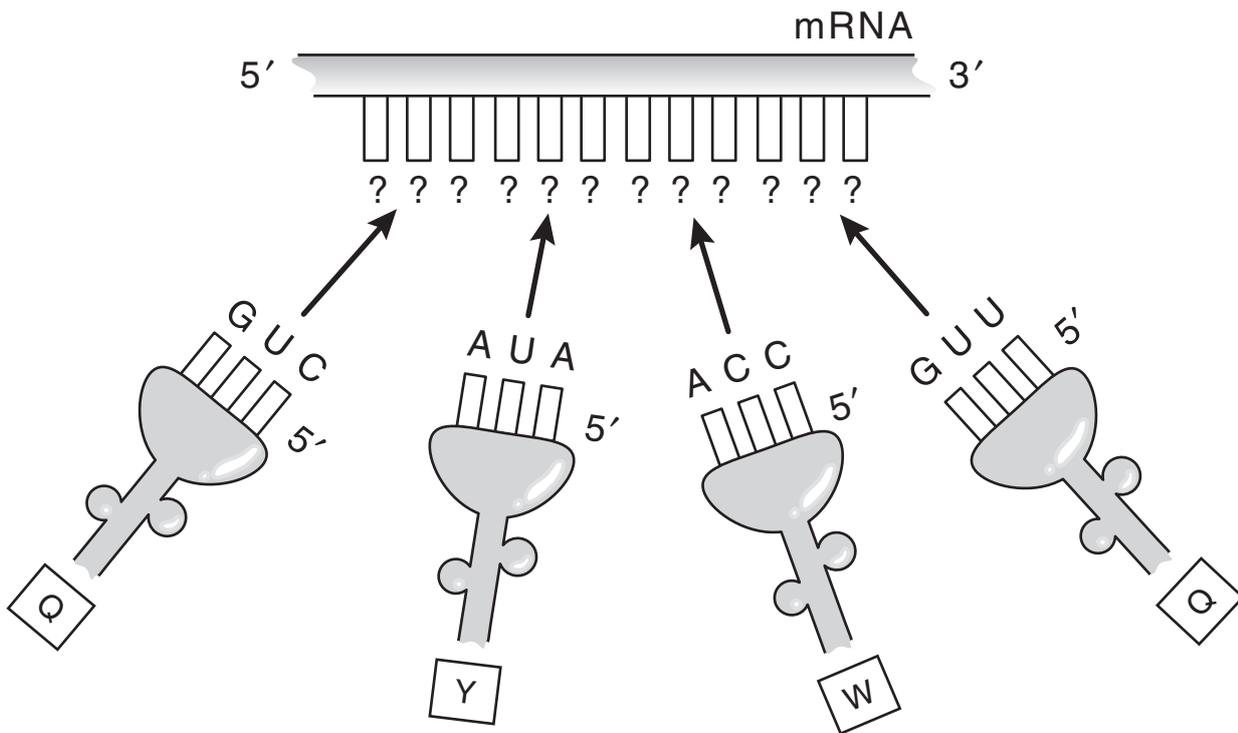
Our Results:

Taste Impression	Canned Juice	JU-CER Juice
Invigorating	× × ×	✓ ✓ ✓
Healthful	× × ×	✓ ✓ ✓
Fresh	× × ×	✓ ✓ ✓
Good	× × ×	✓ ✓ ✓
Tasteless	✓ ✓ ✓	× × ×
Flat	✓ ✓ ✓	× × ×
Stale	✓ ✓ ✓	× × ×

✓ = yes
× = no

Conclusion: We agree! JU-CER juice is healthier than canned juice. You'll love its taste.

- 5 On the basis of scientific considerations, which is the best reason to reject the advertisement's claim that the product provides a tasty way to good health?
- A Unclear instructions
 - B Poor experimental design
 - C Weak hypothesis
 - D Contradictory data



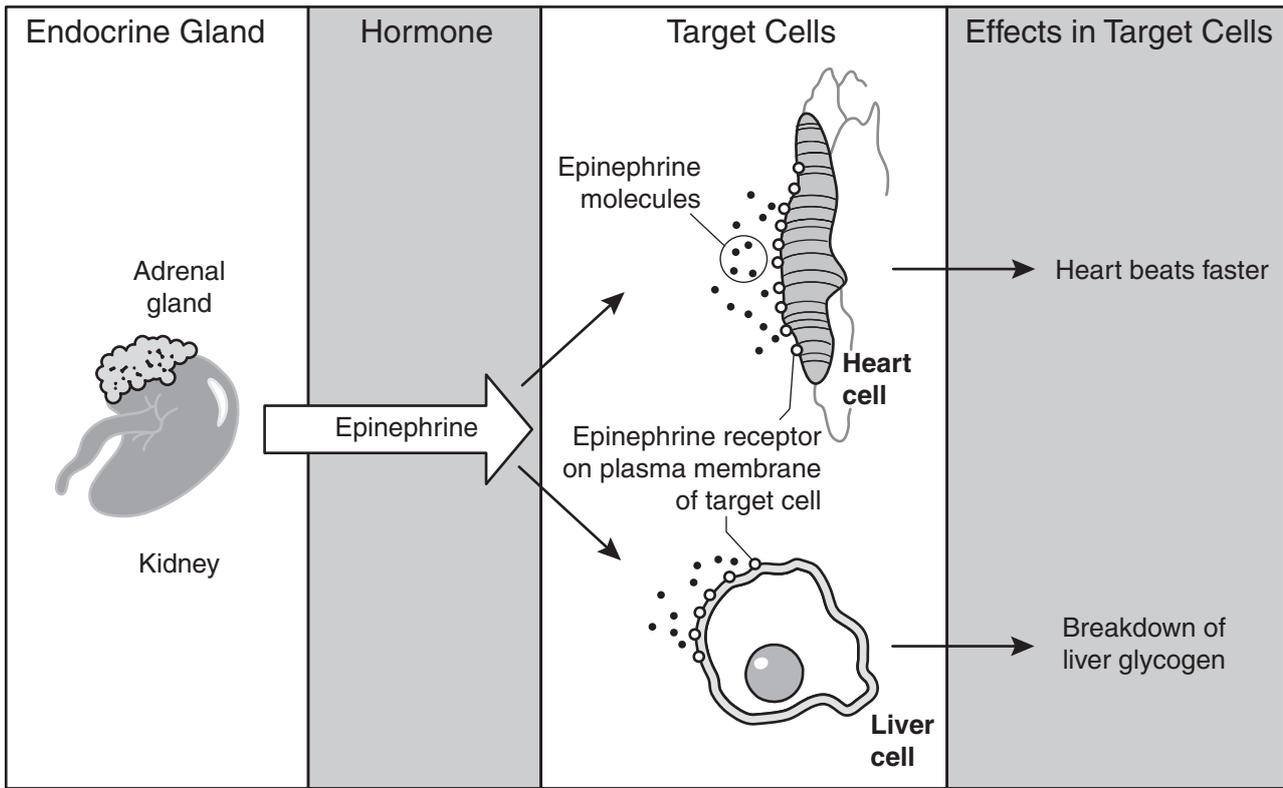
- 1 The diagram shows how a section of protein containing the amino acid sequence QYWQ is formed. What is the nucleotide sequence of the mRNA section shown?
- A 5'UCGGAUACUACU^{3'}
- B 5'CCACCACCACCA^{3'}
- C 5'ACUUCGGAUACU^{3'}
- D 5'CAGUAUUGGCAA^{3'}

- 2 During photosynthesis hydrogen combines with carbon dioxide to make —
- A cholesterol
- B protein
- C glucose
- D cellulose

Classification	Examples
Kingdom Animalia	Gray wolf, dog, rattlesnake, mockingbird, salamander, lobster
Phylum Chordata	Gray wolf, dog, rattlesnake, mockingbird, salamander
Genus <i>Canis</i>	Gray wolf, dog
Species <i>lupus</i>	Gray wolf

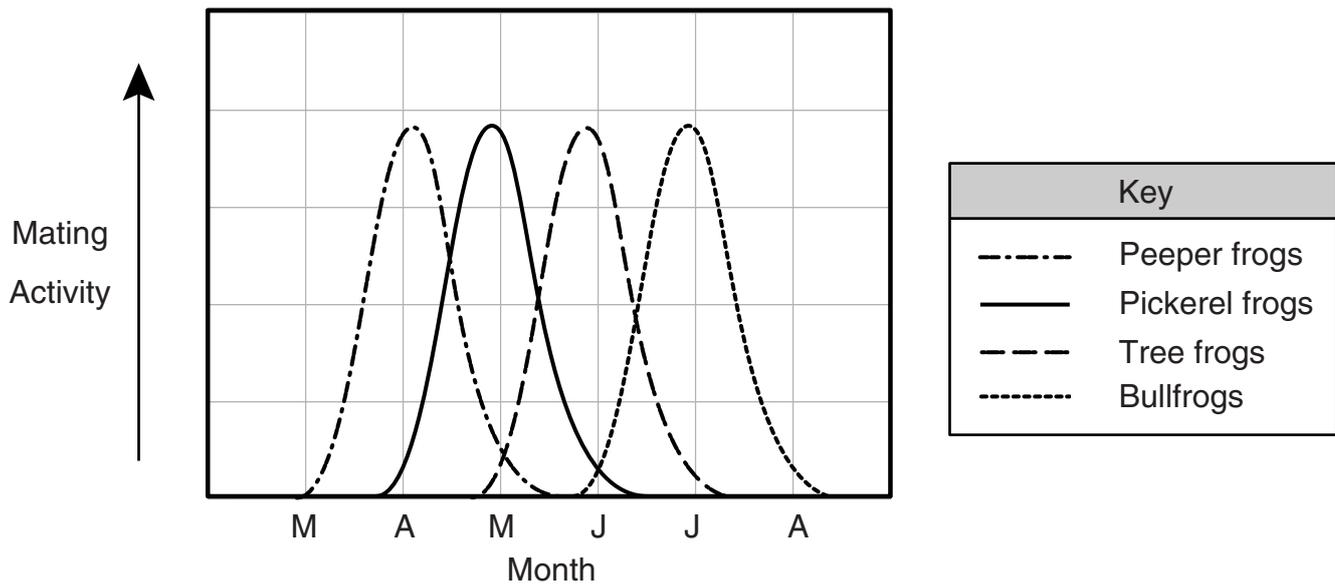
- 3 According to the table, the gray wolf is least related to the —
- A dog
 - B rattlesnake
 - C salamander
 - D lobster

- 4 Which organ system is most involved when a dog develops resistance to rabies after being vaccinated?
- A Muscular system
 - B Skeletal system
 - C Nervous system
 - D Immune system



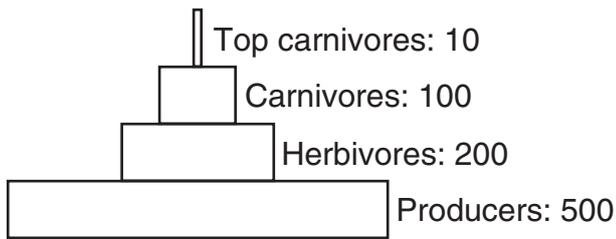
- 5 A student produced this poster to show the interdependence of organ systems. According to the information on the poster, how does the endocrine system affect the circulatory system?
- A The endocrine system metabolizes liver glycogen.
 - B The endocrine system increases the heart rate.
 - C The endocrine system helps form plasma membranes.
 - D The endocrine system enlarges arteries.

- 1 Which of the following describes viruses?
- A Viruses avoid antibiotics in humans.
 - B Viruses exist as single cells or groups of cells.
 - C Viruses require a living host in order to reproduce.
 - D Viruses have plasma membranes and capsids.

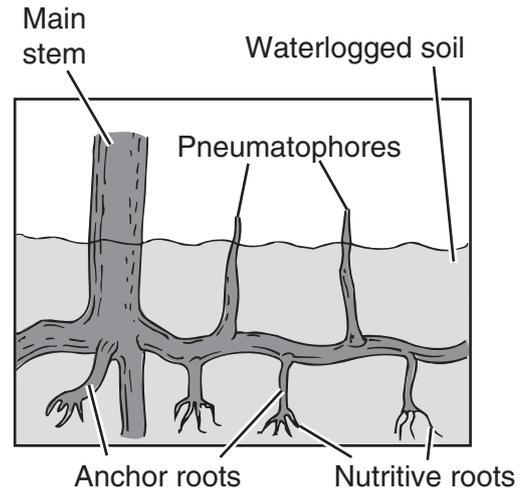


- 2 Based on the graph, the reader can conclude that the most likely reason that peeper frogs and tree frogs do not mate and produce fertile offspring is that their mating activity —
- A peaks at different times
 - B fails to reach a maximum rate
 - C occurs mostly in springtime
 - D decreases at the same time

Pyramid of Numbers

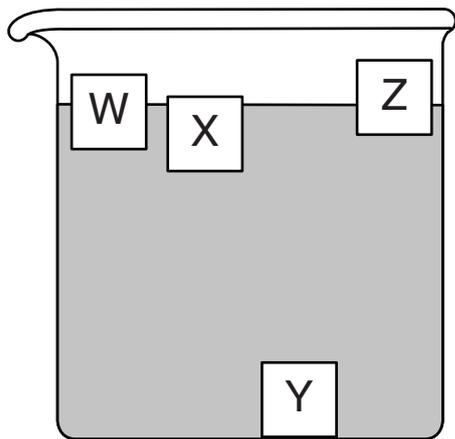


- 3 The diagram shows a standard pyramid of numbers that indicates the number of individual organisms in a community. Which of the following situations would form a pyramid showing more consumers than producers?
- A A small plot with 500 corn plants and 100 grasshoppers
 - B One pond with 300 producers and one snake
 - C An 11,000 m³ lake with 75 fish and one alligator
 - D One giant oak tree with 10,000 insects and 10 lizards
- 4 Pollen adheres to bees as they feed on the nectar of flowers. When they move from flower to flower gathering nectar, the bees pollinate the flowers. The bees then use the nectar to make honey. The relationship between bees and flowers is an example of —
- A parasitism
 - B commensalism
 - C mutualism
 - D neutralism



- 5 The picture above shows pneumatophores, specialized roots that occur in some mangrove trees found in waterlogged soils. Which of the following best describes the purpose of these structures?
- A Photosynthesis
 - B Reproduction
 - C Water absorption
 - D Oxygen absorption

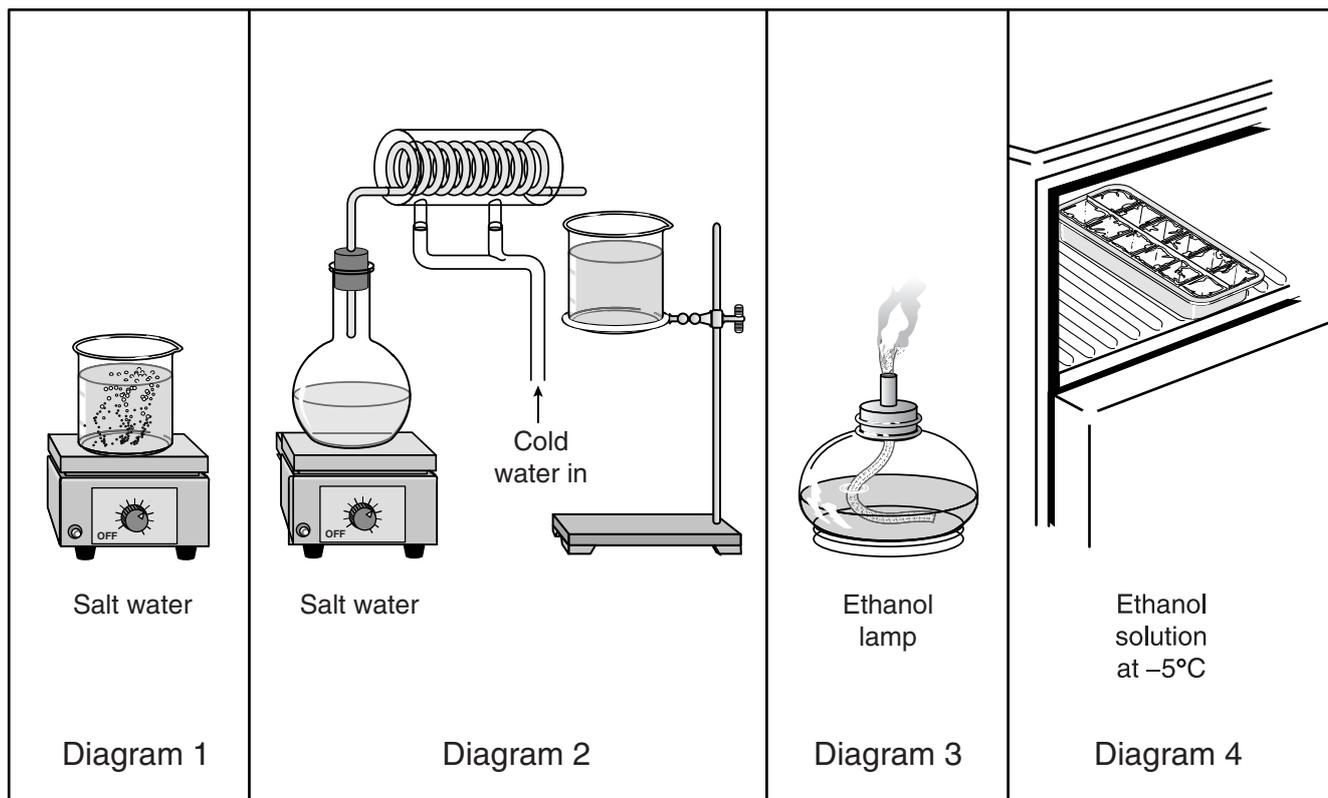
Buoyancy of Wood Blocks



Type of Wood	Density (g/cm ³)
Balsa	0.12
Ebony	1.22
Maple	0.67
Poplar	0.42

- 1 According to this information, Block Z is most likely composed of —
- A balsa
 - B ebony
 - C maple
 - D poplar

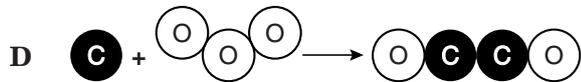
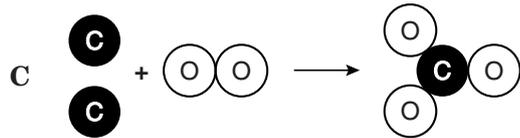
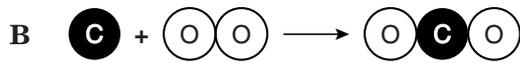
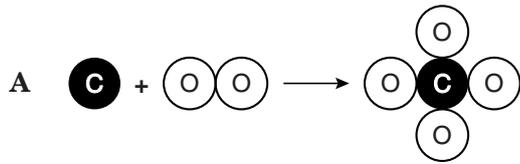
- 2 An element is discovered that has an atomic number of 118 and 8 valence electrons. The element is most likely —
- A a noble gas
 - B an alkali metal
 - C a halogen
 - D a transition metal



3 In which diagram is a chemical change occurring?

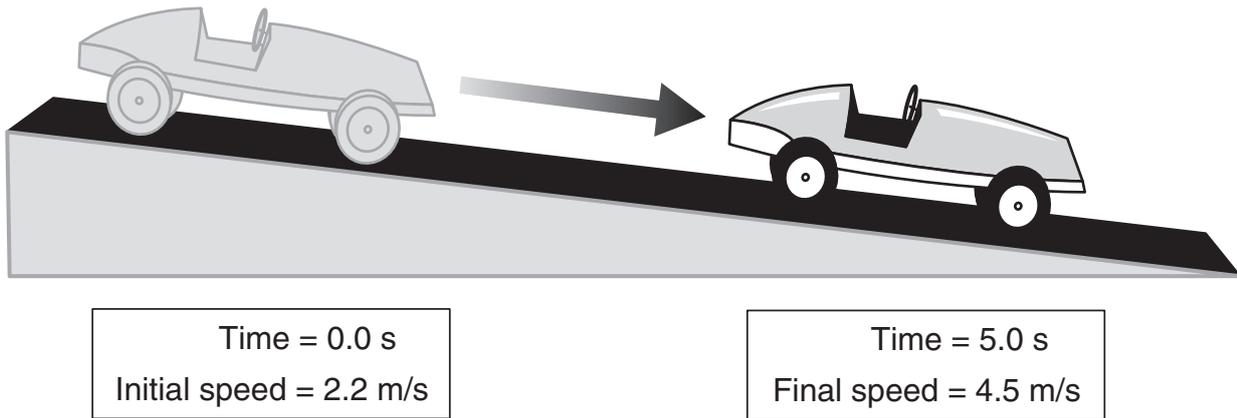
- A Diagram 1
- B Diagram 2
- C Diagram 3
- D Diagram 4

4 Which diagram best demonstrates the law of conservation of mass?

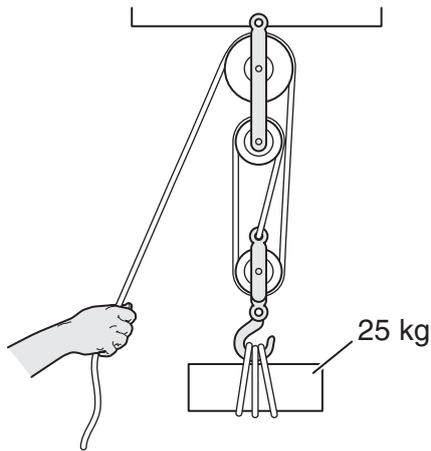


5 Hard water has a pH higher than 7 and an abundance of calcium and magnesium salts. Which of the following would be the best cleaning solution for removing hard-water residue from drinking glasses?

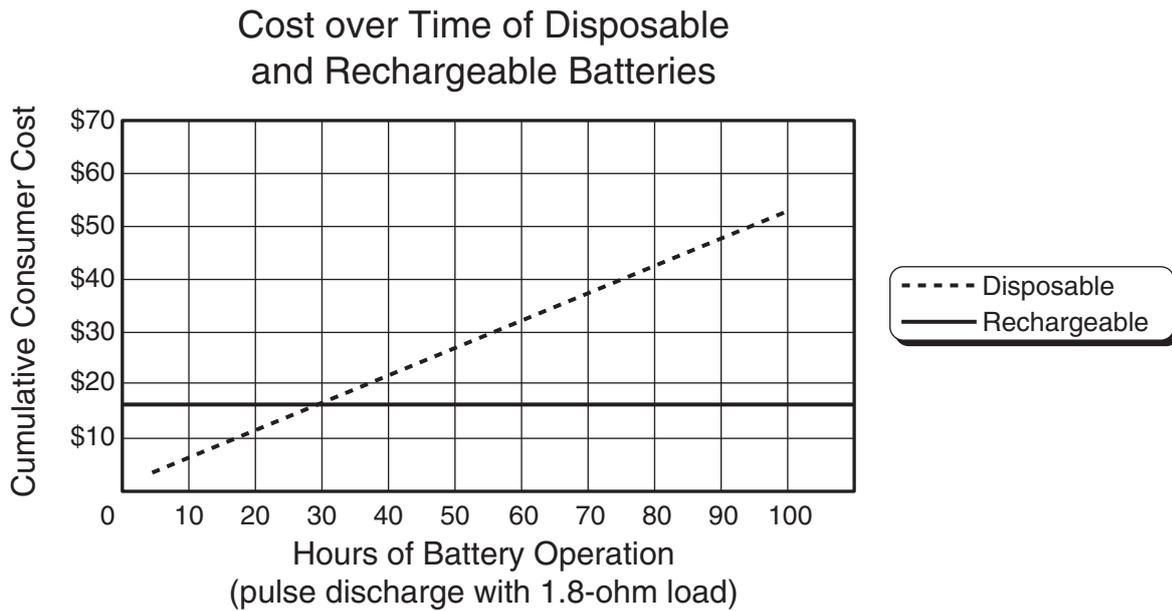
- A A mild acid such as vinegar
- B A strong solution such as ammonia
- C A hot solution such as baking soda in boiling water
- D A strong base such as sodium hydroxide



- 1 According to the information above, what is the average acceleration of the racer in m/s^2 ? Record and bubble in your answer to the nearest hundredth on the answer document.



- 2 Which of the following explains why the machine shown above has an efficiency of less than 100%?
- A The effort force is less than the resistance force.
 - B The load must be less than the force.
 - C The load and the force act in opposite directions.
 - D The motion between the rope and the pulleys produces friction.
- 3 A diver on a springboard can increase the height of a jump by repeatedly flexing the knees with a rhythm that matches the springboard's natural frequency. This is an example of —
- A interference
 - B reflection
 - C resonance
 - D polarization
- 4 Heat cannot spread through a solid by convection because —
- A a heated solid turns into a liquid
 - B atoms in a solid possess maximum kinetic energy
 - C heat is rapidly lost from solids through radiation
 - D particles of a solid are fixed in a rigid structure



- 5 The graph above shows how the cost of using batteries varies depending on the number of hours of battery operation. What economic and environmental factors should be considered when choosing between disposable and rechargeable batteries for a 40-hour use period?
- A Disposable batteries are more expensive and produce less solid waste.
 - B Rechargeable batteries are more expensive and produce more solid waste.
 - C Disposable batteries are cheaper and produce more solid waste.
 - D Rechargeable batteries are cheaper and produce less solid waste.

Item Number	Student Expectation	Correct Answer
OBJECTIVE 1		
1	B.1 (A)	D
2	B.2 (A)	B
3	B.2 (C)	A
4	B.2 (D)	C
5	I.3 (B)	B
OBJECTIVE 2		
1	B.6 (B)	D
2	B.4 (B)	C
3	B.8 (C)	D
4	B.10 (A)	D
5	B.10 (B)	B
OBJECTIVE 3		
1	B.4 (C)	C
2	B.7 (B)	A
3	B.9 (D)	D
4	B.12 (B)	C
5	B.13 (A)	D
OBJECTIVE 4		
1	I.7 (A)	A
2	I.7 (D)	A
3	I.8 (A)	C
4	I.8 (C)	B
5	I.9 (B)	A
OBJECTIVE 5		
1	I.4 (A)	0.46
2	I.4 (D)	D
3	I.5 (B)	C
4	I.6 (B)	D
5	I.6 (D)	D