

Released 2012
Achievement
Test

Science

GRADE

6

Alberta  Government

This document contains a full release of the 2012 Grade 6 Science Achievement Test. A test blueprint and an answer key that describes the difficulty, reporting category, test section, and item description for each question are also included. These materials, along with the [program of studies](#) and [subject bulletin](#) for Grade 6 Science, provide information that can be used to inform instructional practice.

The [Assessment Highlights](#) web page provides information about the overall test, the test blueprints, and student performance on the Grade 6 Science Achievement Test. Commentary on student performance at the acceptable standard and the standard of excellence on the achievement test is also provided. This information is intended for teachers and is best used in conjunction with the multi-year and detailed school reports that are available to schools via the extranet. **Assessment highlights reports** for all achievement test subjects and grades are **posted on the Alberta Education website every year** in the fall.

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2012 Test Blueprint and Item Descriptions

The following blueprint shows the reporting categories and topics by which questions were classified on the 2012 Grade 6 Science Achievement Test.

Topic	Question Distribution by Reporting Category		Number (Percentage) of Questions
	Knowledge	Skills	
Inquiry and Problem Solving	0	11 (14, 16, 20, 24, 29, 34, 35, 37, 38, 42, 48)	11 Questions (22% of Total Test)
Aerodynamics and Flight	8 (1, 3, 4, 7, 10, 11, 12, 15)	6 (2, 5, 6, 8, 9, 13)	14 Questions (28% of Total Test)
Sky Science	5 (17, 21, 23, 25, 26)	3 (18, 19, 22)	8 Questions (16% of Total Test)
Evidence and Investigation	2 (28, 30)	5 (27, 31, 32, 33, 36)	7 Questions (14% of Total Test)
Trees and Forests	6 (39, 41, 43, 44, 46, 47)	4 (40, 45, 49, 50)	10 Questions (20% of Total Test)
Number (Percentage) of Questions	21 Questions (42% of Total Test)	29 Questions (58% of Total Test)	Total Test 50 Questions (100%)

The table below provides information about each question: the keyed response, the difficulty of the item (the percentage of students who answered the question correctly on the English form of the test), the reporting category, the topic, and the item description.

Question	Key	Correct Response (%)	Reporting Category	Topic	Item Description
1	B	81.3	Knowledge	Aerodynamics and Flight	Identify what causes a hot air balloon to rise.
2	A	86.1	Skills	Aerodynamics and Flight	Evaluate wing designs of an airplane to determine the wing shape that would produce the greatest lift.
3	A	59.4	Knowledge	Aerodynamics and Flight	Given the motion of an aircraft, identify the relative strength of forces involved in that motion.
4	B	79.2	Knowledge	Aerodynamics and Flight	Use a concept map to identify some components of air.
5	C	67.8	Skills	Aerodynamics and Flight	Apply knowledge of the properties of air to predict the result of a science experiment.
6	A	76.3	Skills	Aerodynamics and Flight	Describe the compressibility of air using a tire pump example.
7	D	85.2	Knowledge	Aerodynamics and Flight	Infer the purpose for the design of a trailer.
8	A	66.7	Skills	Aerodynamics and Flight	To change direction of an airplane while in flight, identify adjustments to an airplane's control surfaces and their locations on the airplane.
9	D	79.4	Skills	Aerodynamics and Flight	Identify insect adaptations that improve flight.
10	A	66.8	Knowledge	Aerodynamics and Flight	Identify the purpose of the hole in the canopy of a parachute.
11	B	68.1	Knowledge	Aerodynamics and Flight	Indicate why a certain species of bird cannot fly.
12	C	64.9	Knowledge	Aerodynamics and Flight	Evaluate differences in design between aircraft and spacecraft.
13	B	75.4	Skills	Aerodynamics and Flight	Evaluate three diagrams to determine a common function of the structures.
14	C	57.9	Skills	Inquiry and Problem Solving	Identify constant variables in an experiment.

Question	Key	Correct Response (%)	Reporting Category	Topic	Item Description
15	A	83.4	Knowledge	Aerodynamics & Flight	Evaluate a diagram to determine the similarities between an experiment and a jet engine.
16	D	65.8	Skills	Inquiry and Problem Solving	Analyze a graph and make an inference.
17	D	55.2	Knowledge	Sky Science	Identify the length of time it takes the moon to revolve around the Earth.
18	A	43.0	Skills	Sky Science	Relate the rising and setting of the sun to the rotation of Earth.
19	C	80.2	Skills	Sky Science	Identify a trend in data presented in a chart.
20	D	55.7	Skills	Inquiry and Problem Solving	Identify a method of improving the reliability of an experiment.
21	C	42.1	Knowledge	Sky Science	Recognize the best way to safely view the sun.
22	D	68.0	Skills	Sky Science	Recognize relative size of parts of our universe.
23	B	77.8	Knowledge	Sky Science	Recognize that the tilt of Earth influences seasons and amount of daylight.
24	B	81.0	Skills	Inquiry and Problem Solving	Identify the question that initiated the collection of data shown in a source.
25	D	61.7	Knowledge	Sky Science	Recognize the appearance of a gibbous moon.
26	B	73.7	Knowledge	Sky Science	Recognize that light is emitted from stars and reflected by planets.
27	D	85.9	Skills	Evidence & Investigation	Analyze and make an inference about a series of footprints and animal tracks.
28	C	74.7	Knowledge	Evidence & Investigation	Identify information about a suspect that can be determined by examining footprints.
29	D	79.2	Skills	Inquiry and Problem Solving	Analyze a circle graph, and identify the experimental question used to gather the data shown in the graph.
30	C	56.6	Knowledge	Evidence & Investigation	Identify the proper procedure for conducting a chromatography test.

Question	Key	Correct Response (%)	Reporting Category	Topic	Item Description
31	B	84.4	Skills	Evidence & Investigation	Determine the order of tracks shown in a diagram.
32	C	68.3	Skills	Evidence & Investigation	Classify fingerprint characteristics based on a source.
33	A	54.9	Skills	Evidence & Investigation	Identify soil characteristics that would be least helpful in identifying a suspect based on information in a source.
34	D	65.4	Skills	Inquiry and Problem Solving	Identify evidence that would be used to clear a suspect given various types of evidence found at a crime scene.
35	B	71.2	Skills	Inquiry and Problem Solving	Evaluate a graph of the height vs. foot length to determine the most likely suspect for a crime.
36	C	76.4	Skills	Evidence & Investigation	Make an inference based on a crime-scene diagram.
37	D	74.5	Skills	Inquiry and Problem Solving	Identify a disadvantage of fabric analysis.
38	B	74.3	Skills	Inquiry and Problem Solving	Determine a process in the scientific method that is being described in a source.
39	C	57.9	Knowledge	Trees & Forests	Recognize descriptive words used to describe leaf margin.
40	A	67.3	Skills	Trees & Forests	Identify the activities that would have a specified impact on a forest ecosystem.
41	A	75.3	Knowledge	Trees & Forests	Identify the meaning of certain tree cookie characteristics.
42	A	59.1	Skills	Inquiry and Problem Solving	Evaluate data to determine the manipulated variable in an experiment.
43	B	77.0	Knowledge	Trees & Forests	Identify a characteristic common to all deciduous and coniferous trees.
44	D	83.8	Knowledge	Trees & Forests	Identify the role decomposers play in a plant's nutrient cycle.
45	C	59.6	Skills	Trees & Forests	Associate given tree ring widths with the appropriate graph.

Question	Key	Correct Response (%)	Reporting Category	Topic	Item Description
46	C	62.1	Knowledge	Trees & Forests	Identify the most useful characteristic for classifying trees.
47	C	73.6	Knowledge	Trees & Forests	Recognize that plants require chlorophyll in order to produce oxygen.
48	B	63.9	Skills	Inquiry and Problem Solving	Make a conclusion based on information about different tree species.
49	C	53.6	Skills	Trees & Forests	Analyze four statements, and determine which statements represent opposition to forest development.
50	D	85.1	Skills	Trees & Forests	Identify a valuable role plants have in the environment.

2012 Achievement Test Questions

The questions presented in this document are from the previously secured 2012 Grade 6 Science Achievement Test and are representative of the questions that form achievement tests. These questions are released by Alberta Education for teacher and student use.

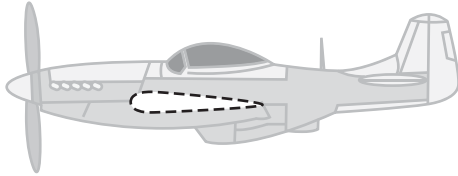
2012 Grade 6 Science Achievement Test

1. To lift a hot-air balloon off the ground, the air inside the balloon must

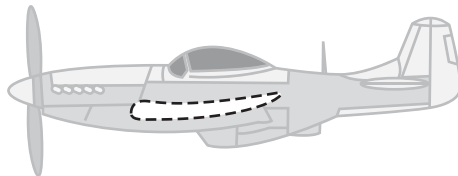
- A. cool
- B. expand
- C. contract
- D. compress

2. Which wing design shown below would produce the greatest lift?

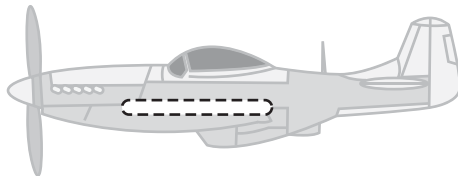
A.



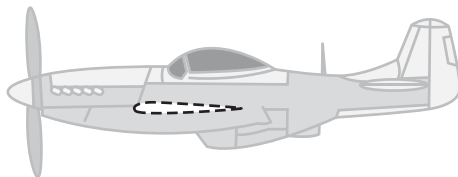
B.



C.



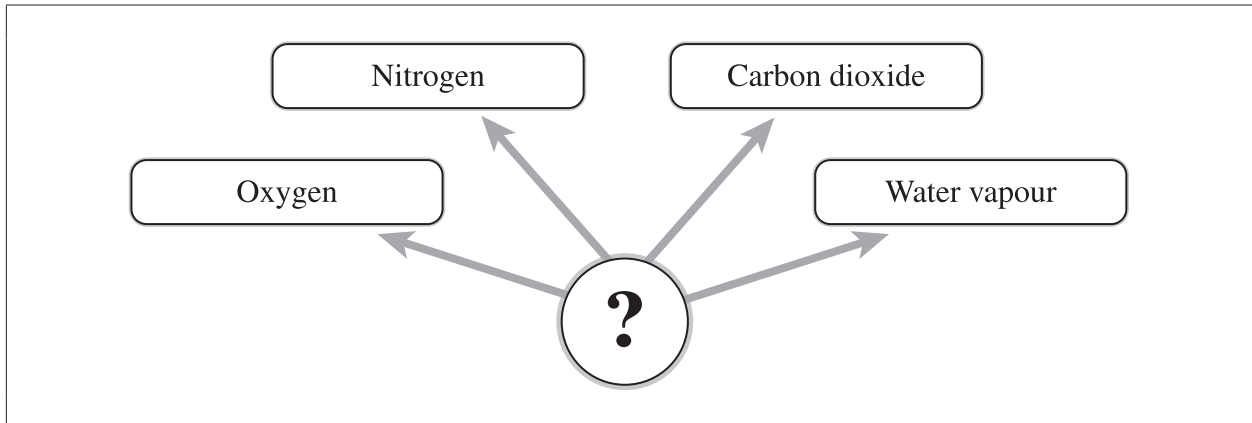
D.



3. A descending aircraft experiences a stronger force of

- A. gravity than lift
- B. thrust than drag
- C. lift than gravity
- D. drag than thrust

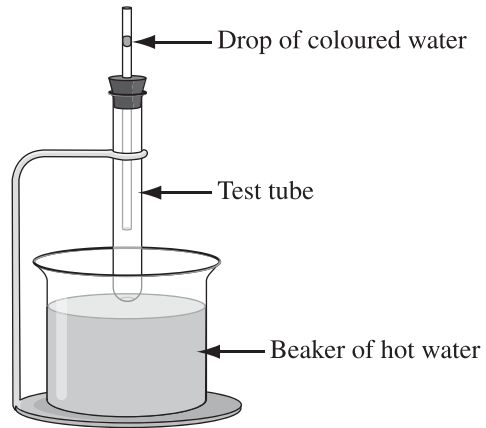
Use the following information to answer question 4.



4. Which of the following titles would **most accurately** complete the missing information in the concept map above?
- A. Volume of air
 - B. Components of air
 - C. Atmospheric pressure
 - D. Rocket-fuel ingredients

Use the following information to answer question 5.

Alex uses the following apparatus in an experiment.



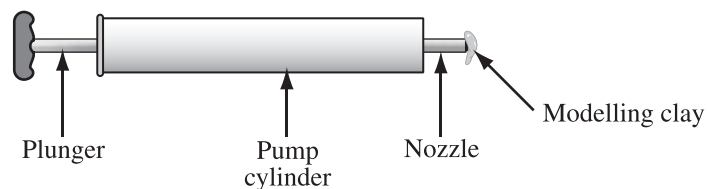
5. When the test tube is lowered into the hot water, the coloured drop will *i* because the pressure inside the test tube will *ii* .

The statement above is completed by the information in row

Row	<i>i</i>	<i>ii</i>
A.	fall	increase
B.	fall	decrease
C.	rise	increase
D.	rise	decrease

Use the following information to answer question 6.

A student completely plugs the nozzle of an air pump with modelling clay, as shown below.



The student notices that even though the pump is sealed off, the plunger can still be pushed into the cylinder. The difference is that when the pump is plugged, a greater force is required to push the plunger further into the cylinder.

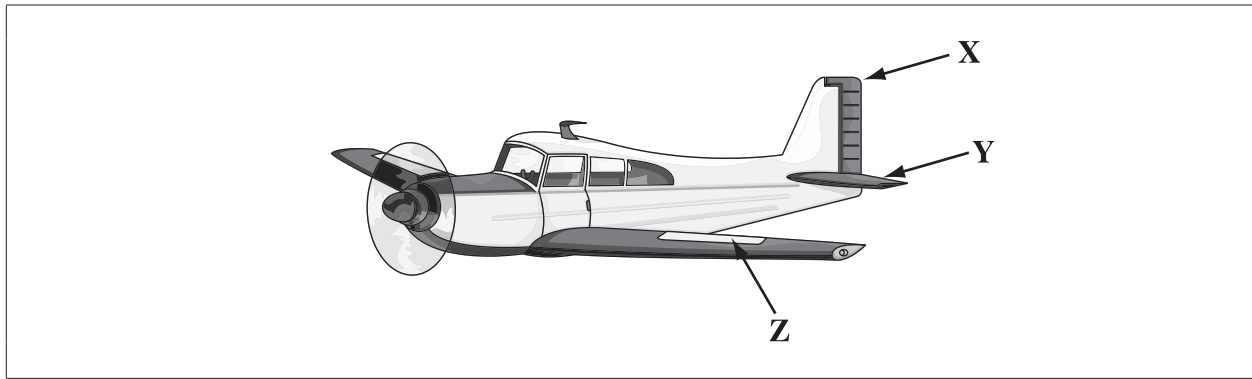
6. An inference that can be made from the observation above is that air
- A. exerts pressure and can be compressed
 - B. exerts pressure and cannot be compressed
 - C. does not exert pressure and can be compressed
 - D. does not exert pressure and cannot be compressed

Use the following illustration to answer question 7.



7. The purpose of the trailer's wedge-shaped front end is **most likely** to
- A. give the trailer lift
 - B. give the trailer drag
 - C. make the trailer light
 - D. make the trailer streamlined

Use the following information to answer question 8.



8. To turn an airplane right, a pilot must use the i labelled ii , and to raise an airplane's nose, a pilot must use the iii labelled iv .

The statement above is completed by the information in row

Row	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>
A.	rudder	X	elevators	Y
B.	ailerons	X	rudder	Z
C.	ailerons	Z	elevators	X
D.	rudder	Y	elevators	Z

Use the following information to answer question 9.

Adaptations of Some Insects

- I** Aerodynamic body shape
- II** Lightweight skeleton
- III** Long antennae
- IV** Specialized muscles
- V** Black wing tips

9. Which of the adaptations listed above do **not** improve the ability of an insect to fly?
- A. I and II
 - B. II and V
 - C. III and IV
 - D. III and V

Use the following illustration to answer question 10.



10. The **main** purpose of the hole in the top of the parachute is to
- A. increase the stability of the parachute
 - B. decrease the stability of the parachute
 - C. increase the speed of the parachute
 - D. decrease the speed of the parachute
-
11. Which of the following factors explains why ostriches cannot fly?
- A. Their bodies are not streamlined enough to overcome air resistance.
 - B. Their wings do not generate enough lift to overcome gravity.
 - C. They cannot generate enough speed to overcome gravity.
 - D. They cannot tuck in their legs enough to decrease drag.

Use the following information to answer question 12.

On a quiz about the design of aircraft and spacecraft, Kari writes “yes” beside correct statements and “no” beside incorrect statements.

Aircraft and Spacecraft Design Quiz	
Answer:	Statement:
1. _____	Aircraft need smaller wings than spacecraft.
2. _____	Aircraft fly inside Earth’s atmosphere.
3. _____	Spacecraft use a rudder to control direction in space.

12. If Kari answers all 3 questions correctly, which of the following sets of responses does Kari write?

A.

Answer:
1. <u>yes</u>
2. <u>no</u>
3. <u>yes</u>

B.

Answer:
1. <u>no</u>
2. <u>no</u>
3. <u>yes</u>

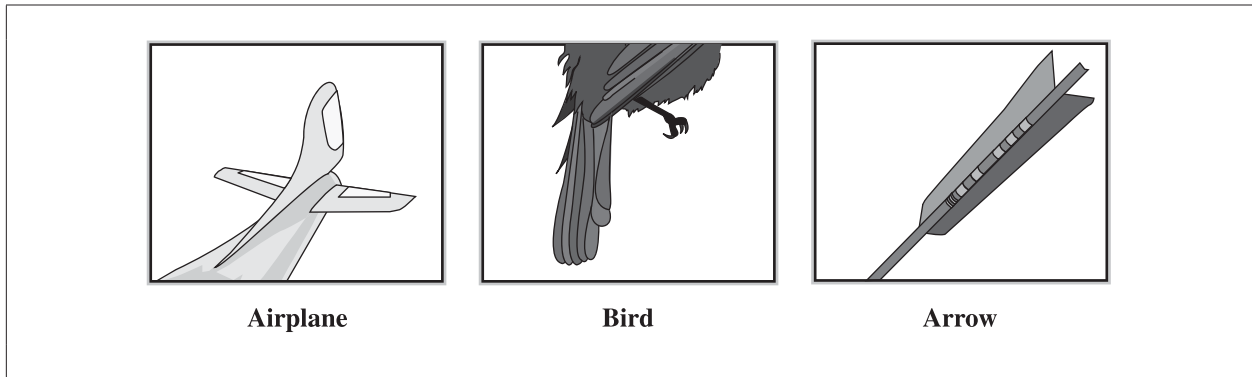
C.

Answer:
1. <u>no</u>
2. <u>yes</u>
3. <u>no</u>

D.

Answer:
1. <u>yes</u>
2. <u>yes</u>
3. <u>no</u>

Use the following information to answer question 13.



13. The main functions of the objects shown above are to
- A. reduce the effects of gravity and provide thrust
 - B. provide stability and guide direction of travel
 - C. provide lift and increase propulsion
 - D. reduce stability and increase speed
-

Use the following information to answer question 14.

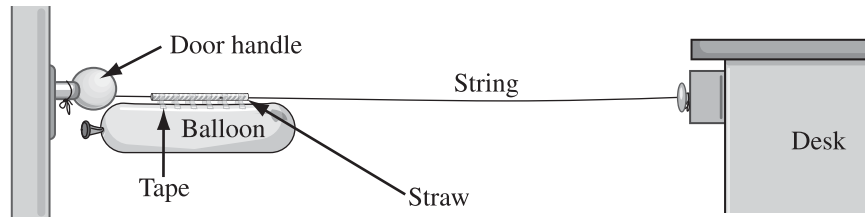
Ronald wants to perform an experiment to determine if the width of a parachute's canopy affects the time that it takes the parachute to descend. He identifies the following four variables:

- Variable 1** Surface area of the parachute canopy
- Variable 2** Mass of the object attached to the parachute
- Variable 3** Time taken for the parachute to reach the ground
- Variable 4** Height from which the parachute is dropped

14. Which two of the variables above should Ronald keep constant?
- A. Variables 1 and 2
 - B. Variables 2 and 3
 - C. Variables 2 and 4
 - D. Variables 3 and 4

Use the following information to answer question 15.

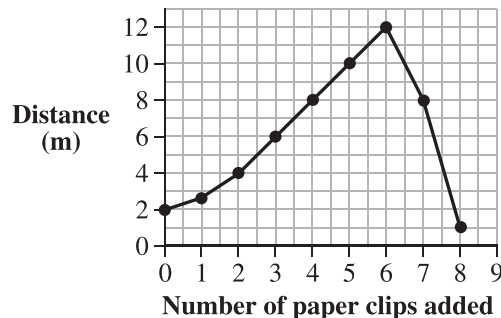
An experiment is set up as shown below to determine the distance a balloon will travel when the air inside it is released. This experiment can demonstrate how a simple jet engine works.



15. A simple jet engine is similar to the balloon in the diagram because
- A. thrust propels both forward
 - B. thrust propels both upward
 - C. drag propels both forward
 - D. lift propels both upward

Use the following information to answer question 16.

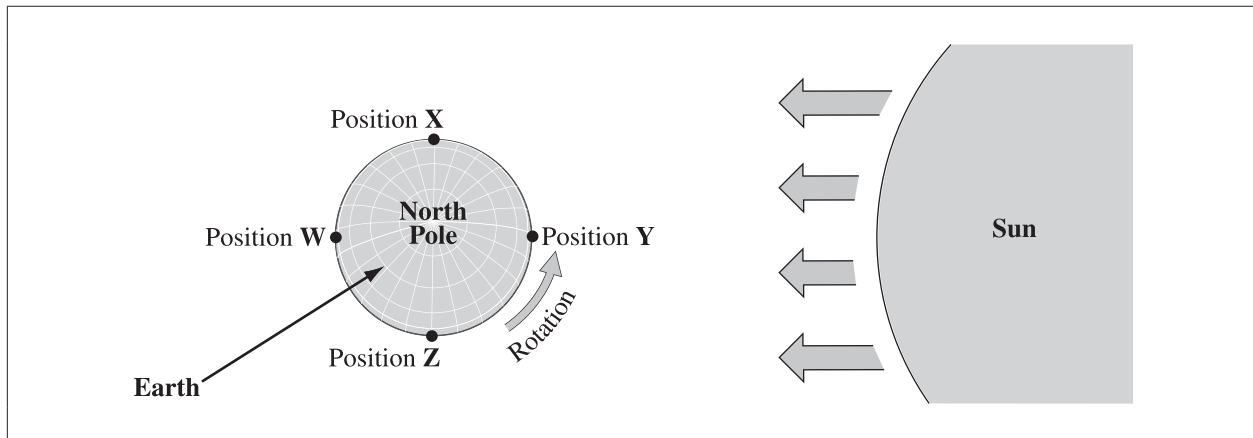
In a science experiment, Allison adds paper clips to a paper airplane to increase its mass. Each time she adds a paper clip, she measures how far the paper airplane flies. A graph of her results is shown below.



16. An inference that can be made from Allison's graph is that
- A. increasing the mass of the airplane allowed it to fly farther
 - B. Allison's test airplane required at least one paper clip to fly
 - C. the airplane flew 12 meters with 7 paper clips attached to it
 - D. if Allison added 9 paper clips, the airplane would most likely not fly

17. The Moon makes a complete revolution around Earth approximately once each
- A. day
 - B. week
 - C. year
 - D. month

Use the following information to answer question 18.



18. Sunrise is occurring at position *i* , and sunset is occurring at position *ii* .

The statement above is completed by the information in row

Row	<i>i</i>	<i>ii</i>
A.	Z	X
B.	Y	W
C.	X	Z
D.	W	Y

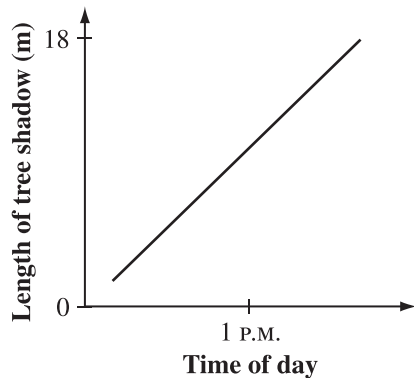
Use the following information to answer question 19.

Everett and Samuel wanted to track and plot the apparent movement of the Sun over the course of the day. They measured the length of a tree's shadow at different times throughout the day and recorded their results in the following chart.

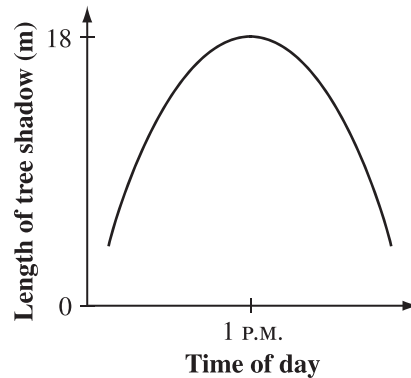
Time of Day	Length of Tree Shadow (m)
7 A.M.	18
9 A.M.	14
11 A.M.	9
1 P.M.	5
3 P.M.	9
5 P.M.	14
7 P.M.	18

19. According to the information above, which of the following graphs shows the trend in the data that Everett and Samuel recorded?

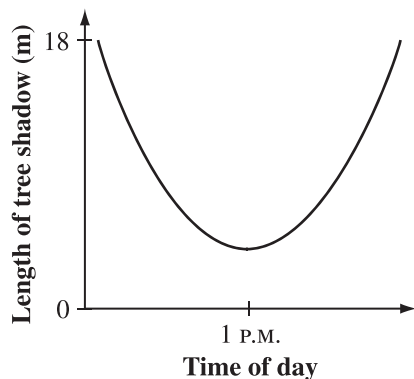
A.



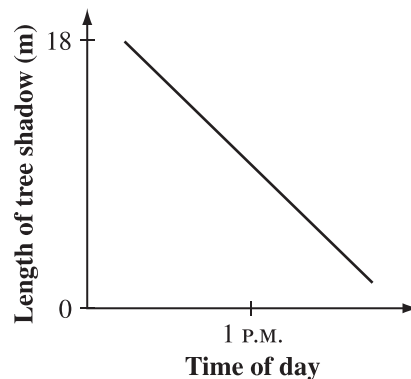
B.



C.



D.



Use the following information to answer question 20.

Greg's Meteorite Experiment

Greg wonders if the mass of a meteorite will affect the depth of the crater the meteorite creates when it hits Earth's surface. He creates the following experiment:

○	
○	
○	Problem: Will the mass of a meteorite affect the depth of the crater produced?
○	
○	Hypothesis: I think that the mass of the meteorite will affect the depth of the crater produced because the greater the mass of an object, the deeper the hole it will produce.
○	
○	Materials:
○	▪ ruler
○	▪ flour
○	▪ metal pan
○	▪ three round objects each with different masses
○	
○	Procedure:
○	1) Make a layer of flour in the pan 5 cm deep.
○	2) Weigh one of the objects to find its mass.
○	3) Measure a height of 30 cm above the pan to drop each object from.
○	4) Drop one object from that height.
○	5) Measure and record the depth of the crater produced.
○	6) Repeat steps 2 to 5 for each of the three different objects.
○	

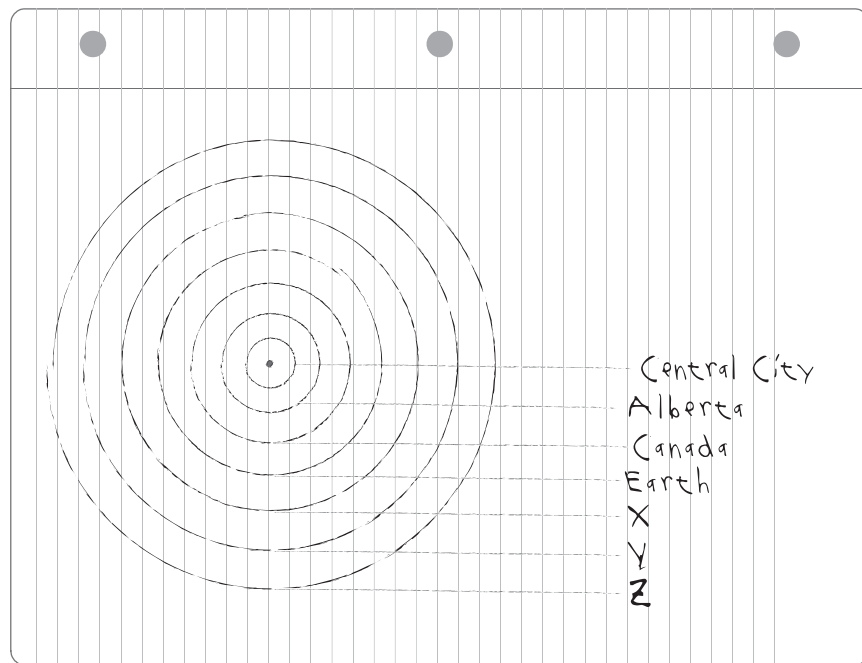
20. In order for Greg to make his results more reliable, he should

- A. test objects of three different shapes
- B. increase the height from which the objects are dropped
- C. test more than three different objects with different masses only once
- D. repeat the experiment by dropping each of the objects at least three times

21. In order to safely view the sun, a person should
- A. view the sun while wearing sunglasses
 - B. place a piece of dark paper over the lens of a telescope
 - C. view an image of the sun projected onto a piece of paper
 - D. place a piece of coloured glass over the lens of a telescope

Use the following diagram to answer question 22.

Leroy draws the following sketch in his space binder.



22. Which of the following rows identifies possible names for the missing X, Y, and Z titles in Leroy's diagram?

Row	X	Y	Z
A.	Universe	Solar System	Galaxy
B.	Galaxy	Solar System	Universe
C.	Milky Way	Galaxy	Solar System
D.	Solar System	Milky Way	Universe

23. At the North Pole, continuous darkness occurs during the *i* because Earth's axis is tilted so that the North Pole is pointed *ii* the sun.

The statement above is completed by the information in row

Row	<i>i</i>	<i>ii</i>
A.	summer	away from
B.	winter	away from
C.	summer	toward
D.	winter	toward

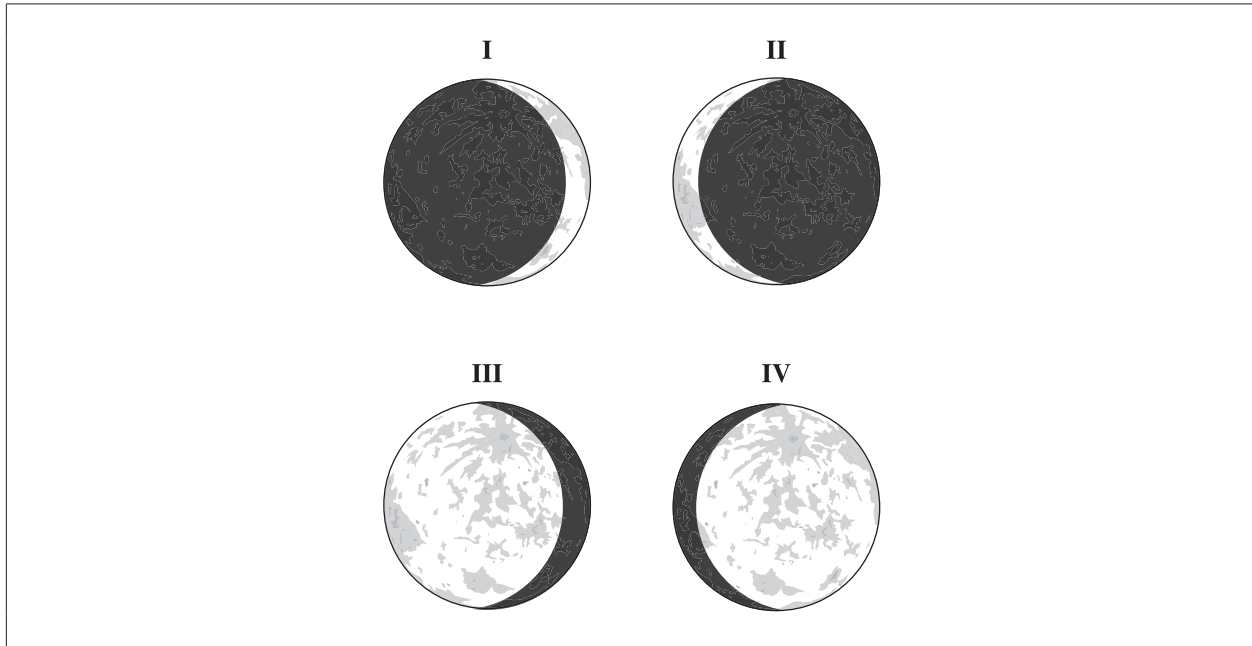
Use the following information to answer question 24.

A group of Grade 6 students gathers the following information while researching planets.

Planet	Number of Moons
Mercury	0
Venus	0
Earth	1
Mars	2
Jupiter	63
Saturn	62
Uranus	27
Neptune	13

24. Which of the following research questions is best answered by the information above?
- A. "Why do some planets have moons and others do not?"
 - B. "How many moons does each planet have?"
 - C. "How many moons are in the universe?"
 - D. "What are moons made up of?"

Use the following diagram to answer question 25.



25. The gibbous moons are labelled

- A. I and II
- B. I and IV
- C. II and III
- D. III and IV

26. Mars can be easily viewed through a telescope because Mars *i* light that is *ii* from the Sun.

The statement above is completed by the information in row

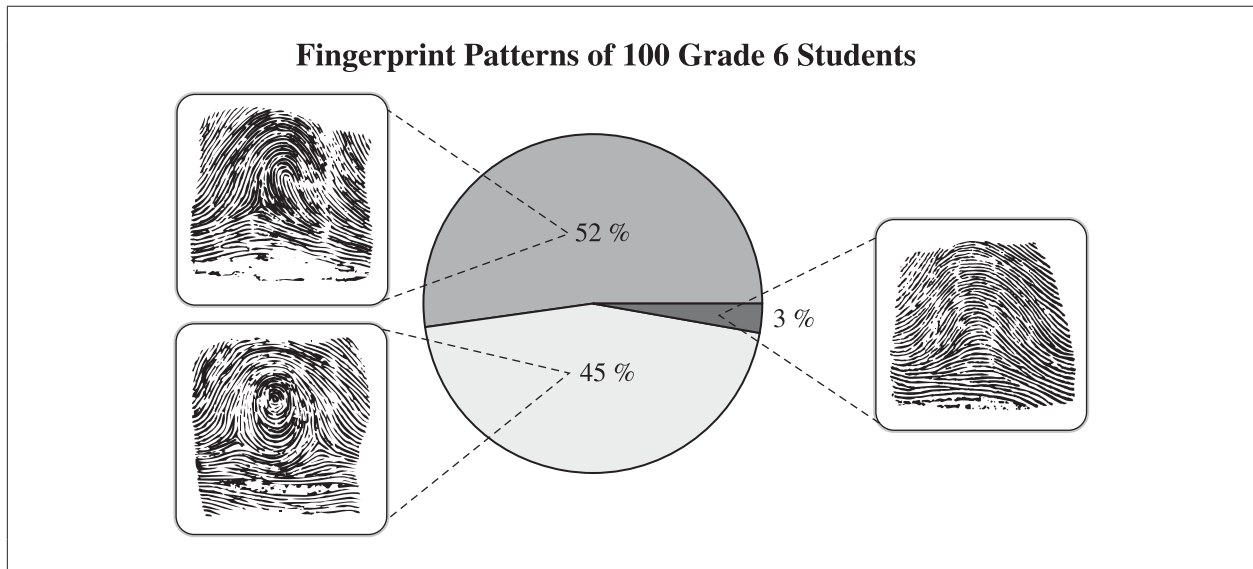
Row	<i>i</i>	<i>ii</i>
A.	reflects	reflected
B.	reflects	emitted
C.	emits	reflected
D.	emits	emitted

Use the following information to answer question 27.



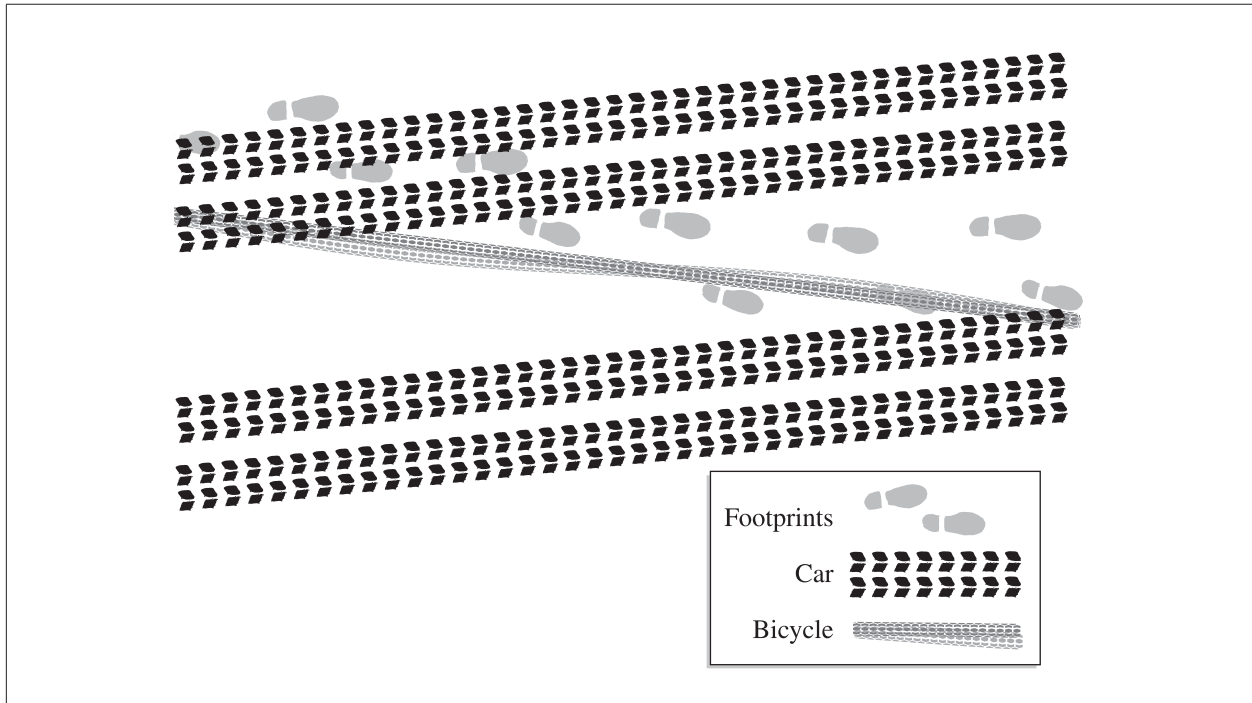
27. Which of the following inferences can be made from the track patterns above?
- A. The bear was running through the area.
 - B. Jordan was walking in the area before the bear.
 - C. All three sets of tracks entered the area from the same direction.
 - D. Hannah started to move more quickly after crossing the bear tracks.
-
28. Examining the footprints found at a crime scene would **most likely** help an investigator determine
- A. the age of a suspect
 - B. whether a suspect is male or female
 - C. whether there is more than one suspect
 - D. the time the suspect committed the crime

Use the following information to answer question 29.



29. Which of the following questions would students have been investigating when they recorded the data above?
- A. How many Grade 6 students have composite fingerprints?
 - B. How many students in our school have arched fingerprints?
 - C. Which students in our school have the most common fingerprint pattern?
 - D. Which fingerprint pattern is the most common among a group of Grade 6 students?
-
30. Which of the following statements outlines a proper procedure to use when completing a chromatography test?
- A. The chromatography paper should be left in the water until all the ink has disappeared.
 - B. The chromatography paper should be dipped completely under water and then quickly removed.
 - C. The bottom 1 cm of the chromatography paper should touch the water but the ink line should not.
 - D. The chromatography paper should be dipped 1 cm into the water only deep enough so that the ink line is just under the water level.

Use the following diagram to answer question 31.

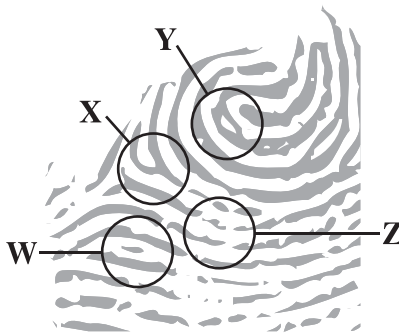
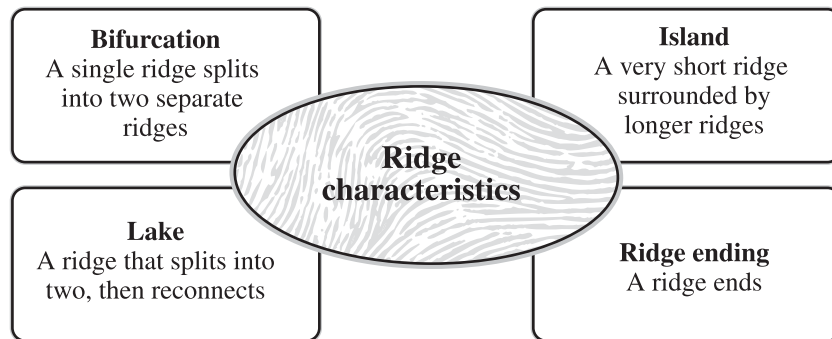


31. In what order were the tracks created?

- A. Footprints, car, bicycle
- B. Footprints, bicycle, car
- C. Bicycle, car, footprints
- D. Bicycle, footprints, car

Use the following information to answer question 32.

Mary classifies fingerprints using the following concept chart.



32. The letters in the diagram above that identify a bifurcation and a lake are, respectively,

- A. W and Y
- B. W and Z
- C. X and Y
- D. X and Z

Use the following information to answer question 33.

A police officer collected a soil sample at a crime scene.

Crime Scene Soil Sample Characteristics

- Black
- Low moisture content
- Presence of pine needles
- Coarse texture

The description of the soil samples collected from the shoes of four suspects was recorded in a chart, as shown below.

Descriptions of Soil Samples Collected from the Shoes of Four Suspects

	Colour	Moisture Content	Composition	Texture
Suspect I	Dark brown	Low	Mix of pine needles and grass	Coarse
Suspect II	Black	Low	Mix of pine needles and grass	Coarse
Suspect III	Dark brown	Low	Mix of leaves and shell fragments	Grainy
Suspect IV	Black	Low	Mix of leaves and shell fragments	Grainy

33. Based on the information above, which of the soil descriptions is the **least** helpful in determining which suspect was likely at the crime scene?
- A. Moisture content
 - B. Composition
 - C. Texture
 - D. Colour

Use the following information to answer question 34.

A police officer gathers the following evidence at a house where a break-in took place. The evidence suggests that two different suspects were involved in the crime.

Evidence

- Partial thumbprints with arch and whorl patterns
- Black silk thread and dark green cotton thread
- Size 11W shoe print
- 23-cm-wide car tire track with treads that are worn and 0.6 cm deep

Investigators analyzed evidence gathered from five different suspects. The investigators' findings are recorded in the table below.

Descriptions of Evidence Collected from Five Suspects

	Thumbprints	Clothing	Shoe Prints	Car Tires
Suspect I	Composite and loop	Black cotton pants	Size 11W	<ul style="list-style-type: none"> • 22 cm wide • New treads • 0.8 cm deep
Suspect II	Whorl and loop	Black silk scarf	Size 11W	<ul style="list-style-type: none"> • 21 cm wide • Slightly worn treads • 0.5 cm deep
Suspect III	Arch and loop	Dark green cotton sweatshirt	Size 11N	<ul style="list-style-type: none"> • 23 cm wide • Slightly worn treads • 0.5 cm deep
Suspect IV	Loop and composite	Black wool socks	Size 11W	<ul style="list-style-type: none"> • 22 cm wide • Worn treads • 0.6 cm deep
Suspect V	Loop and arch	Dark green cotton shirt	Size 11W	<ul style="list-style-type: none"> • 23 cm wide • Worn treads • 0.6 cm deep

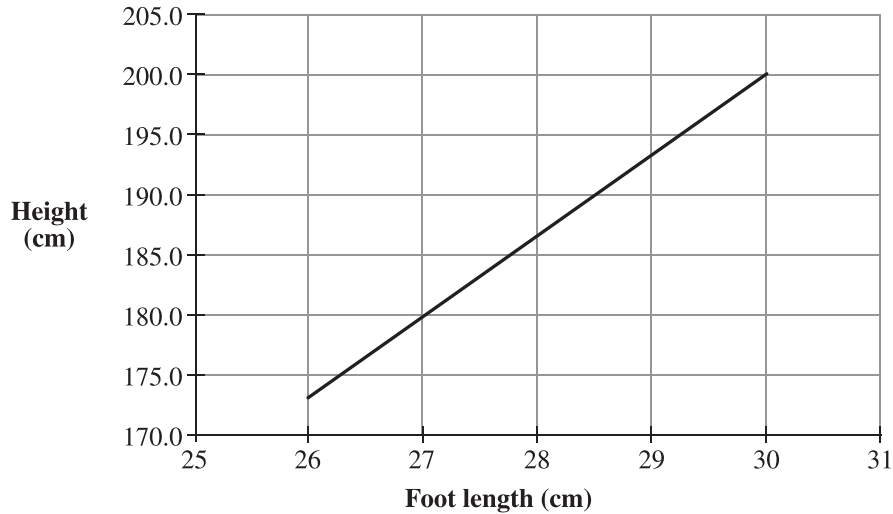
34. Evidence that helps to clear Suspect IV is the

- A. size 11W shoe
- B. colour of cloth
- C. worn tire treads
- D. type of thumbprints

Use the following information to answer question 35.

Crime scene investigators can estimate the height of an individual based on footprint evidence and the relationship between foot length and height.

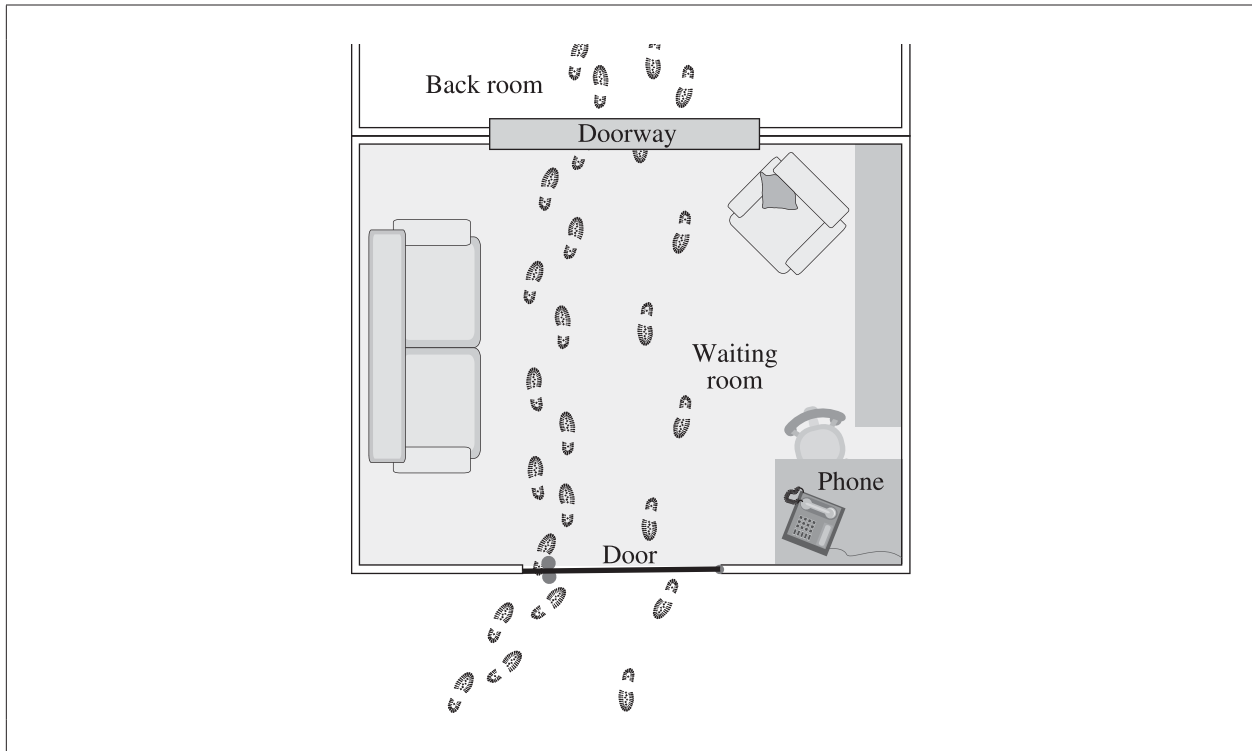
Relationship Between Foot Length and Height



35. The estimated height of an individual who leaves a 28.5 cm footprint is

- A. 200 cm tall
- B. 190 cm tall
- C. 180 cm tall
- D. 170 cm tall

Use the following diagram to answer question 36.



36. An inference that can be made from observing the diagram above is that the person who left the footprints
- A. was scared out of the office by an employee
 - B. did not find a back door, so left through the front door
 - C. moved faster when exiting the office than when entering it
 - D. moved slowly throughout the office to find what they were looking for

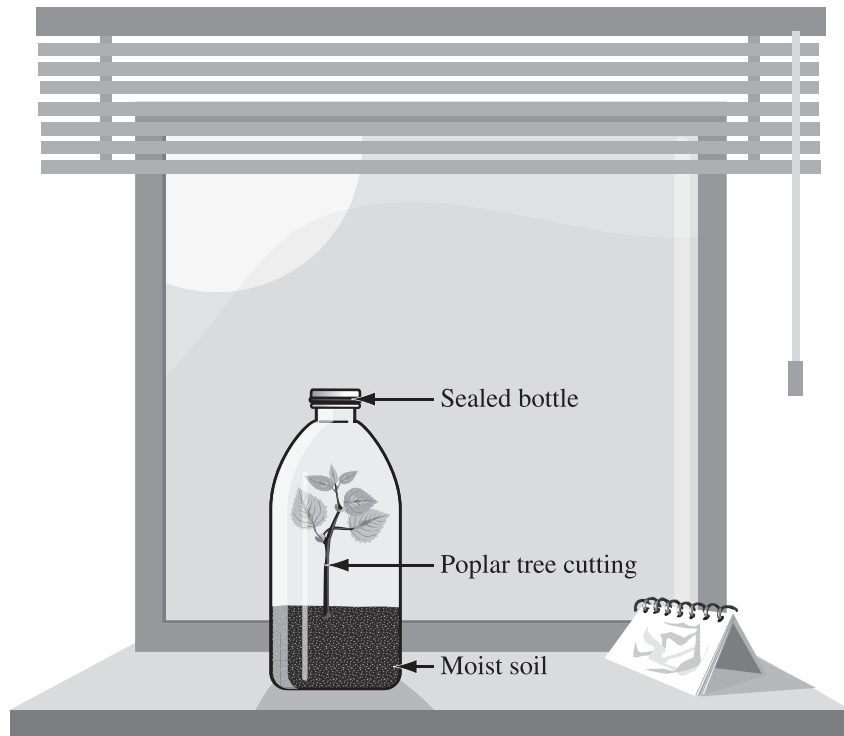
Use the following information to answer question 37.

Some fabric was recovered from a crime scene and analyzed. It was observed that when the fabric was burned, it produced black ash. The fabric burned quickly and produced a red and green flame as it burned.

37. The primary disadvantage of performing the analysis described above is that it
- A. is unreliable
 - B. costs too much
 - C. is time-consuming
 - D. destroys the sample

Use the following information to answer question 38.

Kelly is conducting the following experiment at home.



Before starting her experiment, Kelly states that she thinks the leaves of the tree cutting will change colour in 24 hours.

38. Into which part of Kelly's lab report would her statement above best fit?
- A. Observations
 - B. Hypothesis
 - C. Conclusion
 - D. Variables

Use the following information to answer question 39.

Categories Used to Describe a Leaf

- I Type
- II Shape
- III Margin
- IV Arrangement

39. The terms *smooth*, *serrated*, and *scalloped* would **most commonly** be associated with category
- A. I
 - B. II
 - C. III
 - D. IV
-

Use the following information to answer question 40.

Human Activities in a Forest

- 1 Mining for fossil fuels
- 2 Gathering dead wood for a campfire
- 3 Clear-cutting trees to make a new road
- 4 Hiking along a marked trail in the mountains
- 5 Setting controlled fires to help pine trees spread their seeds
- 6 Planting new trees after clear-cutting for pulp and paper resources

40. Through which of the activities above do the needs of humans **most negatively** impact the health of a forest ecosystem?
- A. Activities 1 and 3
 - B. Activities 2 and 4
 - C. Activities 3 and 5
 - D. Activities 2 and 6

41. A tree ring that is *i* than the other rings in a tree cookie would indicate that the tree *ii* that year.

The statement above is completed by the information in row

Row	<i>i</i>	<i>ii</i>
A.	wider	grew more
B.	narrower	grew more
C.	darker	suffered from disease
D.	lighter	suffered from disease

Use the following information to answer question 42.

A student conducts an experiment to determine the effects of salt in soil on the germination and growth of seeds. The following chart shows the results.

Effects of Salt on Germination and Growth of Seeds

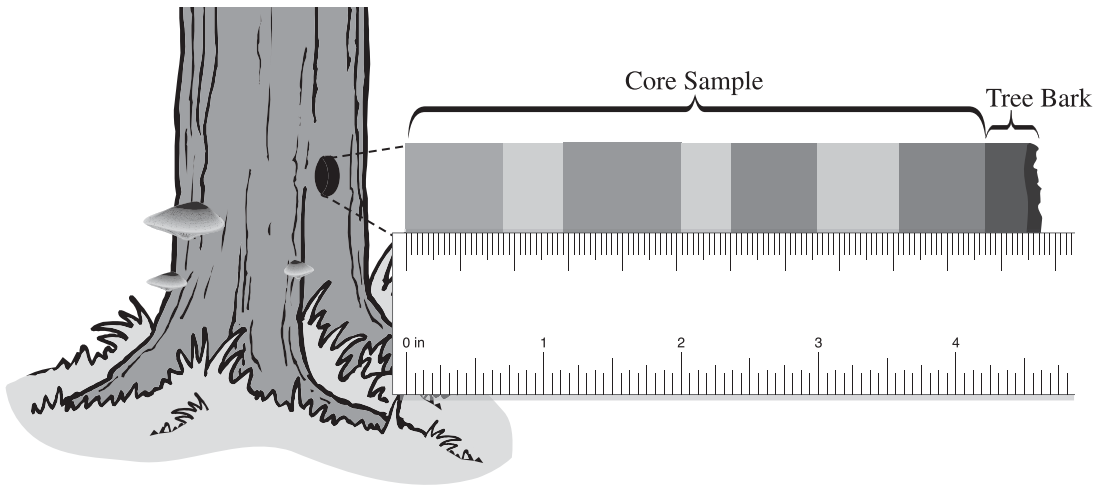
Mass of Salt in Soil (g)	Volume of Water Applied per Week (mL)	Seed Germination (%)	Average Plant Height at Three Weeks (cm)	Percentage of Living Plants After Six Weeks (%)
0	100	84	10	80
1	100	62	7	35
2	100	42	4	8

42. In this experiment, the manipulated variable is the
- A. mass of salt in the soil
 - B. percentage of seeds that germinate
 - C. average height of plants after three weeks
 - D. percentage of plants living after six weeks

43. Which of the following characteristics is common to all deciduous and coniferous trees?
- A. They shed their leaves in the fall.
 - B. They have chlorophyll.
 - C. They produce flowers.
 - D. They produce cones.
44. Plants rely on decomposers for their survival because decomposers
- A. provide chlorophyll for photosynthesis
 - B. feed on living animals that eat plants
 - C. use up oxygen provided by plants
 - D. return nutrients to the soil

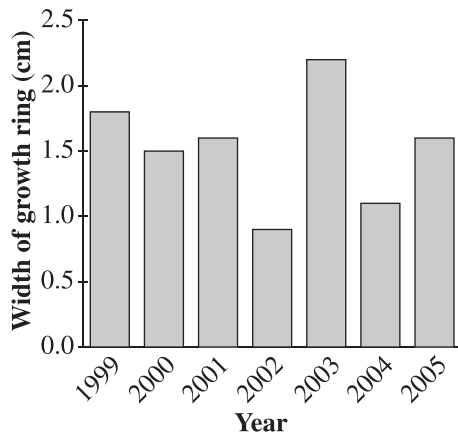
Use the following information to answer question 45.

Extracting a tree core reveals a tree's ring pattern without harming the tree. A tree core is a small, cylindrical cross-section of a tree trunk, as shown below. The most recent ring of growth is closest to the bark.

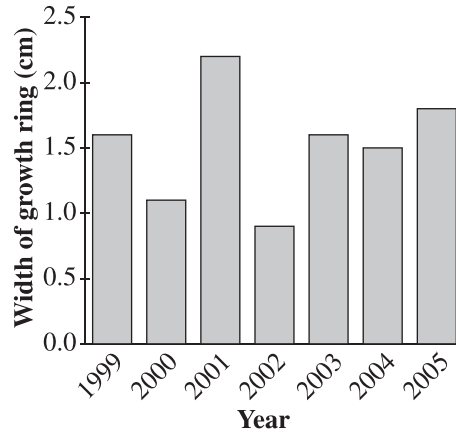


45. Which of the following graphs **best** represents the tree-ring width in the tree core sample shown above?

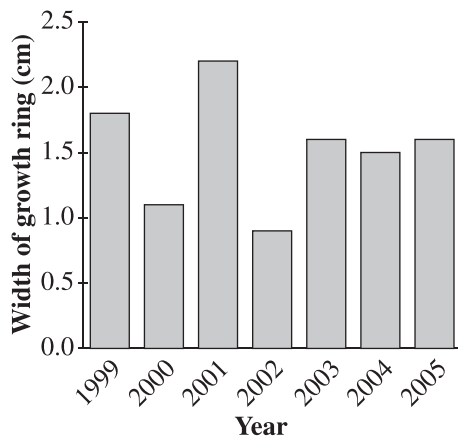
A.



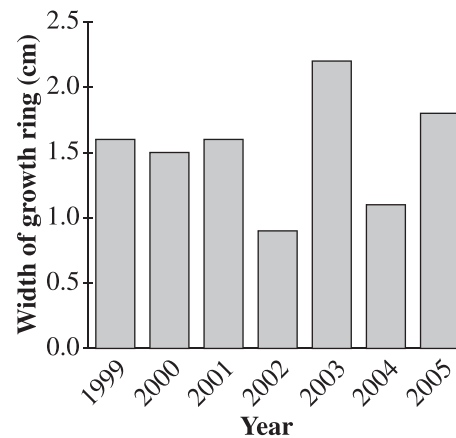
B.



C.



D.



46. Which of the following characteristics is **most** useful in classifying the species of a tree?
- A. Height of the tree
 - B. Colour of the bark
 - C. Arrangement of the leaves
 - D. Size of rings in the tree cookie

47. To produce their own food through the process of photosynthesis, plants require *i* . During photosynthesis, *ii* is released.

The statements above are completed by the information in row

Row	<i>i</i>	<i>ii</i>
A.	water vapour	carbon dioxide
B.	chlorophyll	nitrogen
C.	chlorophyll	oxygen
D.	nitrogen	water vapour

Use the following information to answer question 48.

A student plants seeds from four tree species. He compares the number of leaves and the height of four healthy seedlings that develop.

Tree Species	Number of Leaves	Height of Seedling (cm)
Balsam poplar	6	15
White birch	4	5
Willow	2	4
Aspen poplar	4	10

48. A conclusion that can be made from the data in the table is that the
- A. balsam poplar seedling has twice as many leaves as the willow seedling
 - B. white birch seedling has fewer leaves than the balsam poplar seedling
 - C. aspen poplar seedling is half the height of the white birch seedling
 - D. willow seedling is taller than the aspen poplar seedling

Use the following information to answer question 49.

A community met to discuss the future use of a nearby forest. Four citizens shared their views.

- Citizen 1** “Although I enjoy the natural environment, the forest is too close to our town. I have many problems with deer and other animals eating my flowers and destroying my garden.”
- Citizen 2** “I enjoy living close to the forest. It is a very peaceful area free of pollution and garbage.”
- Citizen 3** “Research shows that an organism’s natural forest habitat is extremely important in ensuring its health and survival. We should protect that forest habitat.”
- Citizen 4** “We should turn a portion of the forest into a playground. It is important that families have a place to enjoy themselves as the town grows.”

49. Which two citizens would **most likely** oppose future development of the forest?
- A. Citizens 1 and 2
 - B. Citizens 1 and 4
 - C. Citizens 2 and 3
 - D. Citizens 3 and 4

Use the following information to answer question 50.



50. Which of the following phrases would fit **best** with the phrases posted on the sign above?
- A. Carbon dioxide
 - B. Fresh water
 - C. Fossil fuels
 - D. Clean air

*You have now completed the test.
If you have time, you may wish to check your answers.*