ASMOPSS THAILAND 2026

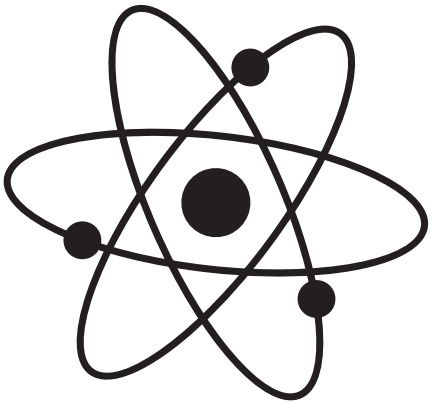
Asian Science & Mathematics Olympiad for Primary and Secondary Schools (Thailand)

Science Primary G.5

Sunday, August 9, 2026

10:30 a.m. – 12:00 p.m. (90 minutes)

B



Instructions

1. This exam includes 40 questions, with 4 choices given (100 marks).
2. Use a 2B black pencil or darker one to fill in the circle.
3. Fill out your name, grade, school, test center, room, seat number, and identification number either in pen or in pencil.
4. If you want to change an answer that you have already marked, use a clean eraser to erase the incorrect answer and mark the new one.
5. It should be noted that figures in the exam are not drawn to scale.
6. Dictionaries, calculators, and electronic devices are not permitted in the test room.
7. Note taking can be done on the test paper only, with no extra sheet provided.
8. Do not write anything or make any symbols in the black barcode area along the edge of the paper except the answers on the answer sheet. Make sure the answersheet is not crumpled.
9. Submit the answer sheet to the proctor when the time is up.
10. Cheating in the exam may cause serious consequences including disqualification from receiving any award or joining the second round of the test held by ASMOPSS THAILAND.

Should any disagreement arise, the judgment of the panel is deemed final.

Announcement of the results via https://asmopssthailand.com on September 16, 2026

: ASMOPSS Thailand / Miraah Education

Contact US

LINE @asmopss.thailand

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Instructions :

1. Each question carries a different score, as indicated at the end of the question.
2. Students must select only the one best answer for each question.

1. Noah records the temperature of a hot cup of cocoa left on a table as shown below.

Time after being left on the table (minutes)	Temperature of the cocoa (°C)
0	80
5	65
10	53
15	43
20	35

Based on Noah's data, which statement is a scientific inference? (1.25 marks)

1. The cocoa had a higher temperature at 10 minutes than it did at 15 minutes.
2. The temperature of the cocoa decreased by 15°C during the first 5 minutes.
3. The cocoa is losing heat energy to the cooler surrounding air in the room.
4. At 20 minutes, the thermometer showed a temperature reading of exactly 35°C.

period.

2. Sophia conducts an experiment to determine which brand of paper towel absorbs the most liquid. She pours 50 mL of water onto a tray and uses one sheet of Brand X to soak it up. Then, she measures the amount of water left behind. She repeats the same procedure with Brand Y and Brand Z. To make sure her results are reliable and valid, which factor must she keep constant? (1.25 marks)

1. The color of the tray and the time of day during each test.
2. The brand of paper towel tested in each experimental trial.
3. The price of each brand and the package design of the towel.
4. The size of each paper towel sheet and the starting volume of water.

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3. Emily is conducting an experiment with a simple circuit. She connects a 9 V battery, a switch, and a small light bulb using copper wires. When she opens the switch, the bulb lights up brightly. However, after leaving the circuit closed for 30 minutes, she notices that the light bulb becomes very hot to the touch and its brightness decreases slightly.
Which statement best explains the transformation of electrical energy in this situation? (1.25 marks)

1. Electrical energy changes only into light energy, while the heat comes only from the surrounding air.
2. Chemical energy from the battery changes directly into heat without becoming electrical energy.
3. Electrical energy from the battery is completely destroyed as the circuit continues operating.
4. Electrical energy changes into both light energy and thermal energy in the light bulb.

4. On a very hot summer day, an orchestra performs outdoors. On a very cold winter day, the same orchestra performs the same music. How does the temperature of the air affect the speed at which the music reaches the audience sitting 100 meters away? (1.25 marks)

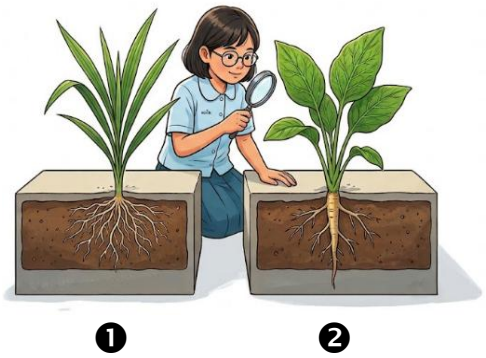
1. Temperature has no effect on speed.
2. Sound travels faster on a hot day.
3. Sound stops moving in freezing air.
4. Sound travels faster on a cold day.

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5. A student is observing two different plants in the school garden.

Plant ❶ has leaves with veins that run parallel to each other and a fibrous root system.

Plant ❷ has leaves with branching, net-like veins and a thick main taproot.



❶ ❷

Based on these observations, how should the student classify these plants? (1.25 marks)

1. Both plants are non-flowering plants.
2. Plant ❶ is a monocot and Plant ❷ is a dicot.
3. Plant ❶ is a dicot and Plant ❷ is a monocot.
4. Plant ❶ is a spore-bearing plant and Plant ❷ is a seed plant.

6. During a hiking trip up a high mountain, Sarah carried an unopened, tightly sealed bag of potato chips in her backpack. At the base of the mountain near sea level, the bag looked flat and normal. However, when she reached the summit at 3,500 meters above sea level, she noticed that the bag had puffed up like a balloon and looked ready to burst.
Which statement gives the most accurate scientific explanation for this phenomenon?
(1.25 marks)

1. Gravity pulled the air inside the sealed bag downward, causing the lower part of the bag to compress and the upper part to stretch outward.
2. The air density inside the sealed bag increased because the bag absorbed extra nitrogen gas from the surrounding mountain air.
3. The temperature at the mountain summit became much higher, causing the air molecules inside the bag to expand very rapidly.
4. The atmospheric pressure outside the bag decreased as altitude increased, so the trapped air inside pushed outward more strongly by comparison.

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7. An engineer tests four mystery materials, W, X, Y, and Z, of equal size to determine which is most suitable for making safety handles for electric frying pans. She records the following observations:

Material W : It is easily scratched by iron, conducts electricity, and bends without breaking.

Material X : It cannot be scratched by iron, does not conduct electricity, but breaks when dropped from a height.

Material Y : It is difficult to scratch, does not conduct electricity, and remains rigid and unchanged when heated to 300°C.

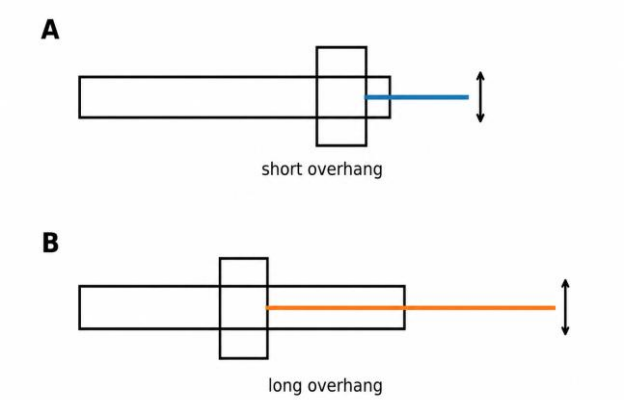
Material Z : It melts at 120°C, does not conduct electricity, and is highly flexible.

Which material should the engineer choose for the handles? (1.25 marks)

1. Material W
2. Material X
3. Material Y
4. Material Z

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8. A student places the same plastic ruler on a table and holds it firmly at the edge. In Trial A, only a short section of the ruler extends beyond the table. In Trial B, a longer section extends beyond the table. The student plucks the ruler with the same force in both trials.



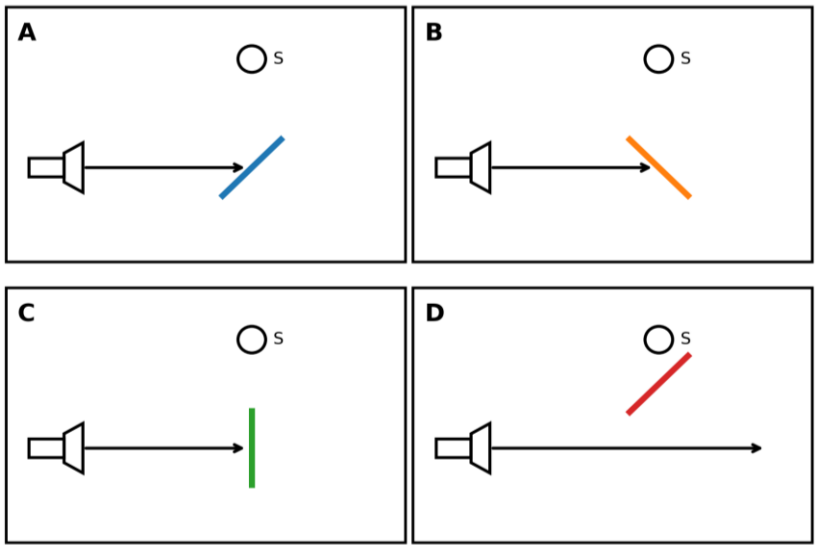
The ruler produces a higher-pitched sound in Trial A. Which statement best explains this observation? (1.25 marks)

1. The shorter ruler section moves through a greater distance and therefore sounds louder.
2. The longer ruler section sends sound through the table faster and therefore sounds higher.
3. The shorter ruler section vibrates more rapidly and therefore produces a higher frequency.
4. The longer ruler section pushes more air each second and therefore produces a higher pitch.

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9. A STEM team is designing a light-triggered alarm. A horizontal beam from a flashlight enters each box from the left. Sensor **S** is fixed near the top of the box. Each colored line represents a small plane mirror placed as shown.

Light – alarm prototypes



Which prototype can direct the flashlight beam toward sensor S? (1.25 marks)

1. Prototype A
2. Prototype B
3. Prototype C
4. Prototype D

10. A scientist observes several processes in a laboratory and classifies them in the table below. However, one process has been classified incorrectly.

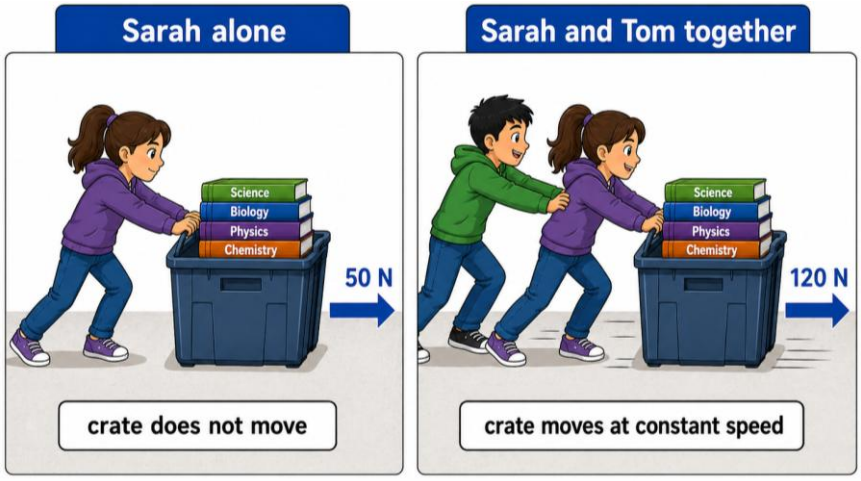
Process	Observation	Classification
I	Ice melts into liquid water	Reversible physical change
II	An egg is cooked	Irreversible chemical change
III	Salt dissolves in water	Irreversible physical change
IV	A candle wick burns	Irreversible chemical change
V	A rubber band is stretched	Reversible physical change

Which process has been classified incorrectly? (1.25 marks)

1. Process II
2. Process III
3. Process IV
4. Process V

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11. Sarah wants to move a heavy plastic crate full of science textbooks across the school laboratory floor. At first, she pushes the crate with a force of 50 N, but the crate does not move. She then asks her friend Tom to help. Together, they push with a combined force of 120 N, causing the crate to slide forward at a constant speed.



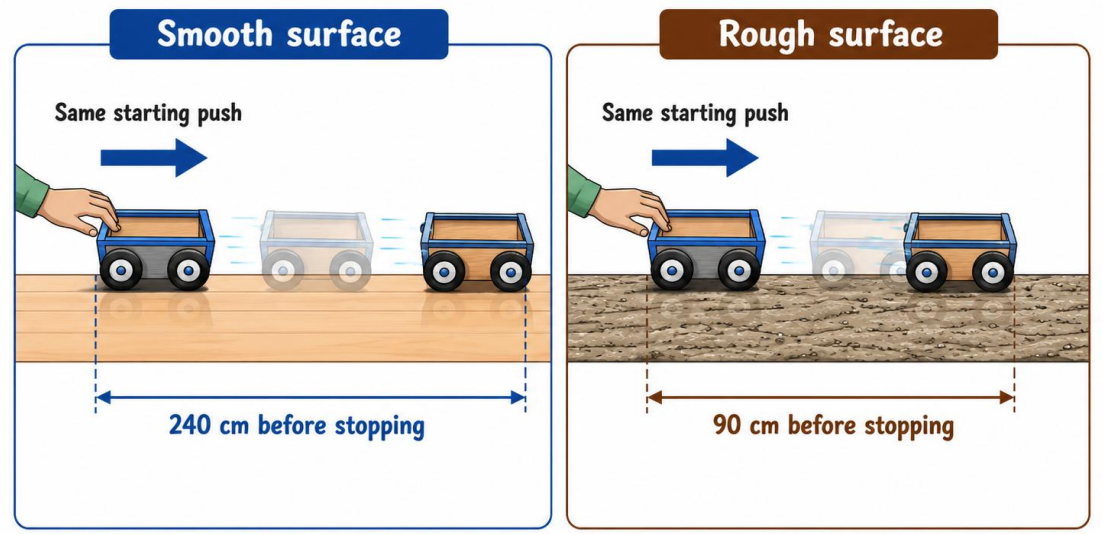
What can be concluded about the frictional forces acting on the crate? (1.25 marks)

1. The static friction was 50 N when Sarah pushed alone, and the kinetic friction was 120 N while the crate was moving.
2. The friction force was zero when the crate was at rest, and it became 120 N only after Tom started helping.
3. The floor had no friction at all, and the 120 N force was used only to overcome the weight of the textbooks.
4. The static friction was fixed at 120 N from the start, which is why Sarah could not move the crate alone.

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12. A student tests the same toy cart on two different horizontal surfaces.

The cart receives the same starting push in both trials.



▶ On the smooth surface, the cart travels 240 centimeters before stopping.

▶ On the rough surface, the cart travels 90 centimeters before stopping.

Which explanation best accounts for the different distances? (1.25 marks)

1. The rough surface increases the cart's mass, so the cart requires more time to move.
2. The rough surface exerts greater friction, so the cart loses speed more quickly.
3. The smooth surface produces a forward force, so the cart continues speeding up by itself.
4. The smooth surface removes the cart's weight, so no downward force acts on the cart.

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13. After several dry days, Malee collects a sample of garden soil and gently places it into a transparent jar of water. She observes that:

▶ bubbles rise from the soil;

▶ some dark, lightweight pieces float near the surface; and

▶ mineral grains gradually settle at the bottom.

Which explanation best accounts for all three observations? (1.25 marks)

1. The bubbles are a new gas made by water, the floating pieces are clay particles, and the settled grains are living organisms.

2. The bubbles are water vapor trapped in rocks, the floating pieces are sand particles, and the settled grains are dissolved nutrients.

3. The bubbles are air displaced from soil spaces, the floating pieces are organic matter, and the settled grains are mineral particles.

4. The bubbles are oxygen made by the soil, the floating pieces are mineral crystals, and the settled grains are liquid water.

14. An explorer is packing equipment for a scientific expedition to the extremely cold Arctic. She must select everyday items that can withstand the low temperatures and assist her survival. She considers three items: a copper cooking pot, a heavy-duty nylon climbing rope, and a silicone hot-water bottle.

She records three predictions about the properties of these materials:

I. The copper cooking pot is selected because metals have high thermal conductivity, allowing heat from a small campfire to be transferred rapidly to the food.

II. The nylon climbing rope is preferred to a rope made from glass fibers because nylon is tough, flexible, and capable of stretching under tension, reducing the likelihood of sudden breakage.

III. The silicone hot-water bottle is useful because silicone is a thermal insulator, so it will release all its heat rapidly into the cold air within a few seconds.

Which of the explorer's predictions are scientifically accurate? (1.25 marks)

1. I only
2. III only
3. I and II only
4. II and III only

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15. Lucas wanted to test how temperature affects the rate at which sugar dissolves in water. He performed three trials for each temperature and recorded the average time in seconds.

Temperature (°C)	Average Dissolving Time (seconds)
10	180
25	75
60	22

Based on this data, which scientific conclusion is most accurate? (2.5 marks)

1. The amount of sugar used was too large for the cold water trial.
2. An increase in water temperature causes the rate of sugar dissolution to increase.
3. The dissolving time of sugar increases as the temperature of the water increases.
4. Sugar dissolves completely only when the water is heated above room temperature.

16. Miraah wants to find out what makes tomato plants grow taller. She uses four identical pots with the same type of soil. She places Pot A and Pot B near a sunny window, but she gives Pot A more water than Pot B every day. She places Pot C and Pot D in a dark closet, giving Pot C the same amount of water as Pot A, and Pot D the same amount of water as Pot B. She measures the height of all plants after two weeks.

Before looking at her results, Mira writes down four statements in her lab notebook:

I. The amount of water given to the plants is an independent variable.

II. The location of the pots is a controlled variable.

III. The height of the tomato plants after two weeks is the dependent variable.

IV. The type of soil and the type of pots are controlled variables.

Which of Mira's statements are correct? (2.5 marks)

1. Only I and II
2. Only II and IV
3. Only I, III, and IV
4. Only I, II, and III

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17. Amy wanted to test how air moves when its speed changes. She took two identical, lightweight plastic ping-pong balls and hung them from a wooden bar using thin pieces of string. The two balls hung perfectly still, spaced exactly 4 cm apart.

Next, Amy aimed a plastic straw directly at the gap between the balls and blew a fast stream of air right through it. She expected the fast wind to push the balls apart.

Based on the principles of air pressure and moving air currents, what is the correct scientific reason? (2.5 marks)

1. The two balls will push farther apart because blowing air increases the gravitational mass in the gap between them.

2. The two balls will move inward and collide because the fast-moving air stream between them creates a low-pressure area.

3. The two balls will instantly catch fire because the friction between plastic and human breath triggers a chemical explosion.

4. Nothing will happen at all because air lacks mass and volume, meaning it cannot exert force on plastic objects.

18. An astronaut research station drops a heavy metal wrench and a light feather at the exact same time inside a specialized vacuum chamber where all air has been completely removed. Which of the following best describes the motion and forces acting on both objects as they fall toward the floor? (2.5 marks)

1. The feather will fall faster than the wrench because its small surface area experiences a special magnetic pulling force in a vacuum.

2. The feather will float upwards instead of falling because it has no mass and requires atmospheric air pressure to experience gravity.

3. The heavy wrench will hit the floor first because gravity always exerts a much stronger downward pull on objects with greater mass, regardless of air.

4. Both objects reach the floor together because they have the same gravitational acceleration without air resistance.

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19. During a science activity, Kevin is trying to open a glass jar with a tight metal lid, but it is stuck. His teacher suggests a trick: "Pour hot water only over the metal lid for one minute, and it will open easily." Kevin wonders why this works and considers how heat affects different materials. He writes down four scientific statements in his journal to explain the phenomenon:

I. The heat from the water causes the particles of the metal lid to gain energy and move slightly further apart.

II. The hot water causes the metal lid to undergo thermal contraction, making it looser.

III. The metal lid expands faster and more easily than the glass jar when heated.

IV. If Kevin used ice-cold water instead of hot water, the metal lid would expand and open even faster.

Which of Kevin's statements are correct? (2.5 marks)

1. Only I and II
2. Only I and III
3. Only II and IV
4. Only I, III, and IV

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20. In a geology workshop, Linda is given two different solid minerals, Mineral A and Mineral B. She performs two experiments to test their physical properties:

Experiment 1 : She takes a sharp steel nail and scratches the surface of both minerals. The nail leaves a deep, visible scratch on Mineral A, but leaves no scratch at all on Mineral B.

Experiment 2 : She uses a hammer to strike both minerals with equal force. Mineral A flattens slightly into a thin sheet without breaking, while Mineral B shatters instantly into small pieces.

Linda reviews the physical definitions of materials and writes down four statements:

I. Mineral B is harder than Mineral A because it resisted being scratched by the steel nail.

II. Mineral A is more brittle than Mineral B because it flattened under the hammer instead of breaking.

III. Mineral A demonstrates malleability (the ability to be shaped or hammered without breaking).

IV. If Mineral B is rubbed against Mineral A, Mineral A will be scratched by Mineral B.

Which of Linda's statements are **c**orrect based on her experiments? (2.5 marks)

1. Only I and II
2. Only III and IV
3. Only I, II, and III
4. Only I, III, and IV

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21. During a science laboratory workshop, Ken investigates how Earth's motion produces daily natural phenomena. He conducts an experiment in a completely dark room using the following equipment:

▶ A large, stationary desk lamp representing the Sun

▶ A terrestrial globe mounted on a tilted axis representing Earth

Ken marks the location of Thailand on the globe with a small red star so that it faces directly toward the lamp, then rotates the globe once from west to east. When viewed from above the North Pole, this motion appears counterclockwise.

Which statement best explains the result of the experiment? (2.5 marks)

1. The experiment demonstrates the formation of the seasons because Thailand receives sunlight at different angles during one rotation of Earth.

2. The experiment demonstrates the day-and-night cycle. As Earth rotates, Thailand moves from the illuminated side into darkness and then returns to the light in approximately 24 hours.

3. The experiment demonstrates a lunar eclipse because Earth passes between the Sun and the Moon during each rotation about its axis.

4. The experiment demonstrates that the Sun revolves around Earth once each day, causing Thailand to alternate between daylight and darkness.

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22. A student wants to investigate whether the blade of a paper helicopter affects the time it takes to fall to the floor.

The student makes four helicopters from the same type of paper. Each helicopter has the same body size and an identical paper clip attached. The helicopters are released from the same height without being pushed.

The hypothesis is: “Increasing the blade length will increase the time it takes for the paper helicopter to reach the floor.”

The results are shown below.

Blade length (centimeters)	**Trial 1** (seconds)	**Trial 2** (seconds)	**Trial 3** (seconds)
4	1.20	1.18	1.22
6	1.45	1.48	1.47
8	1.72	1.75	1.73
10	1.40	1.78	1.76

Which statement correctly identifies the variables and interprets the results? (2.5 marks)

1. Blade length is the independent variable; falling time is the dependent variable, and the first result for 10-centimeter blades should be verified by repeating the trial.

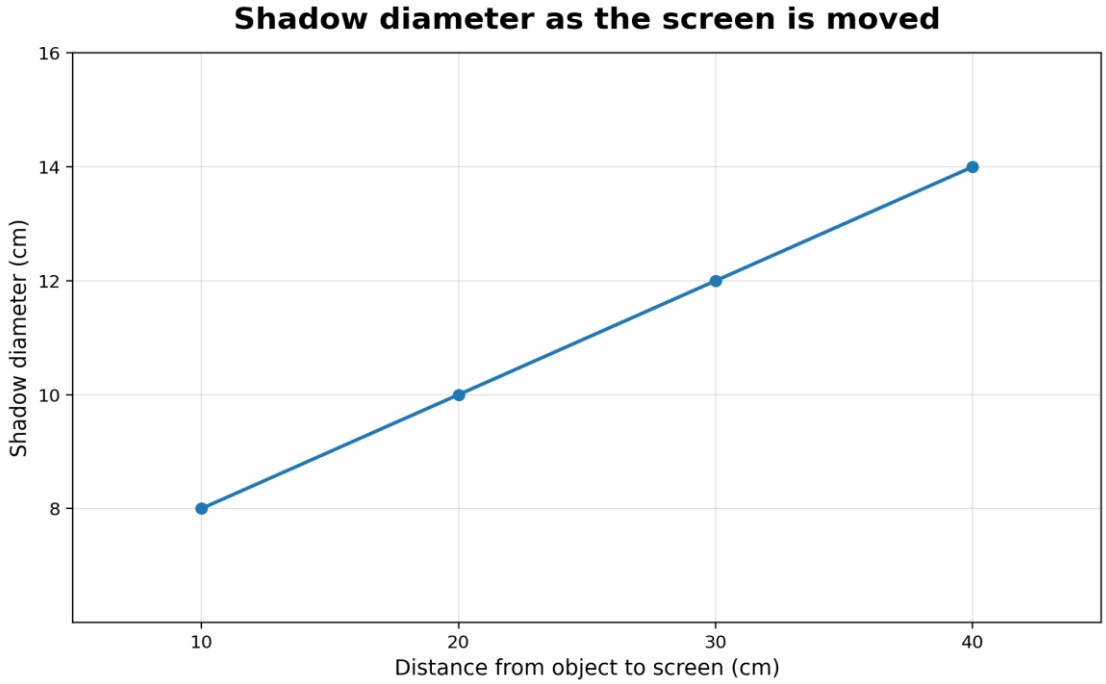
2. Falling time is the independent variable; blade length is the dependent variable, and all results prove that longer blades always fall more slowly.

3. Drop height is the independent variable; falling time is the controlled variable, and the result of 1.40 seconds should be removed without further testing.

4. Paper type is the dependent variable; blade length is the controlled variable, and the three results for each helicopter should be added together.

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23. A student places an opaque circular object between a flashlight and a screen. The flashlight and the object remain fixed, while the screen is moved farther from the object.



The flashlight and opaque object remain fixed.

The graph shows the measured diameter of the shadow.

If the screen is placed 50 cm from the object, which prediction and explanation are most reasonable? (2.5 marks)

1. About 16 cm, because the diverging light rays continue along straight paths beyond the object.
2. About 14 cm, because the shadow remains constant after the screen moves beyond 40 cm.
3. About 10 cm, because light loses energy over distance, causing the shadow to shrink.
4. About 8 cm, because the light rays bend inward as the screen moves farther away.

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24. A student proposes several groupings based on the table.

Animal	Body covering	Breathing organ	Reproduction	Feeds young with milk	Main movement
Bat	Hair or fur	Lungs	Live young	Yes	Flies
Whale	Sparse hair	Lungs	Live young	Yes	Swims
Penguin	Feathers	Lungs	Hard-shelled eggs	No	Swims
Shark	Scales	Gills	Eggs or live young	No	Swims

Which grouping is supported by the greatest number of shared biological characteristics? (2.5 marks)

1. The whale and the shark belong together because both have streamlined bodies and spend most of their lives swimming in water.

2. The bat and the whale belong together because both have hair, breathe with lungs, give birth to live young, and nurse their young with milk.

3. The bat and the penguin belong together because both have modified forelimbs used for movement in different environments.

4. The penguin, the whale, and the shark belong together because all three can swim, even though their coverings and reproductive methods differ.

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25. A school plans an evening Moon-observation activity from 7:00 p.m. to 9:00 p.m. The students want the Moon to be above the horizon for most of the activity.

Observation date	Moon phase	Moonrise	Moonset
Day 1	Near new moon	6:20 a.m.	6:35 p.m.
Day 8	First quarter	12:15 p.m.	12:20 a.m.
Day 15	Near full moon	6:10 p.m.	6:25 a.m.
Day 22	Last quarter	12:05 a.m.	12:10 p.m.

Which date is the best choice based on the table? (2.5 marks)

1. Day 1, because a near-new Moon rises early in the morning and remains visible all evening.
2. Day 8, because the first-quarter Moon rises around noon and remains above the horizon during the evening.
3. Day 15, because the near-full Moon rises shortly before the activity and stays above the horizon overnight.
4. Day 22, because the last-quarter Moon rises near midnight and is already high in the evening sky.

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26. A student shines a narrow beam of light through three cards containing small holes. The cards and the screen are placed at fixed distances.

Trial	Arrangement	Observation on the screen
1	All three holes are aligned, and no plastic block is used.	A bright spot appears at the center.
2	The middle hole is moved 2 cm upward.	No bright spot is observed.
3	All three holes are aligned, and a rectangular clear plastic block is placed perpendicular to the beam.	A bright spot appears at the center.
4	All three holes are aligned, and a clear triangular plastic block with a sloping surface is placed in the beam.	A bright spot appears but is shifted sideways.

A student concludes: "This experiment proves that light always travels in a straight line and never changes direction."

Which evaluation of the conclusion is most scientifically valid? (2.5 marks)

1. The conclusion is fully supported because light reaches the screen whenever the holes are aligned.
2. The conclusion is too broad because light travels in a straight line through a single medium but can change direction at a boundary.
3. The conclusion is disproved because the missing light spot in Trial 2 shows that light stops traveling completely.
4. The evidence is unreliable because transparent materials generate new light instead of transmitting the beam.

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27. A teacher sets up a vertical wooden rod standing on a base. She has three identical donut-shaped ring magnets labeled Magnet A (Top), Magnet B (Middle), and Magnet C (Bottom).

The teacher slides the three ring magnets down the wooden rod one by one. The students observe that Magnet A floats in the air above Magnet B without touching it, and Magnet B floats in the air above Magnet C. There are empty gaps of air separating all three magnets.

Consider the following scientific statements regarding this phenomenon:

I. Magnet A floats because the bottom side of Magnet A and the top side of Magnet B have like poles, creating a magnetic repulsive force.

II. Magnet B floats because Magnet C pulls it downward with an attractive force that is stronger than gravity.

III. The magnetic repulsive force pushing Magnet A upward is strong enough to overcome the downward pull of Earth's gravity on Magnet A.

IV. If the teacher flips Magnet A upside down, Magnet A will no longer float; instead, it will snap down and stick to Magnet B due to an attractive force.

Which statements are correct? (5 marks)

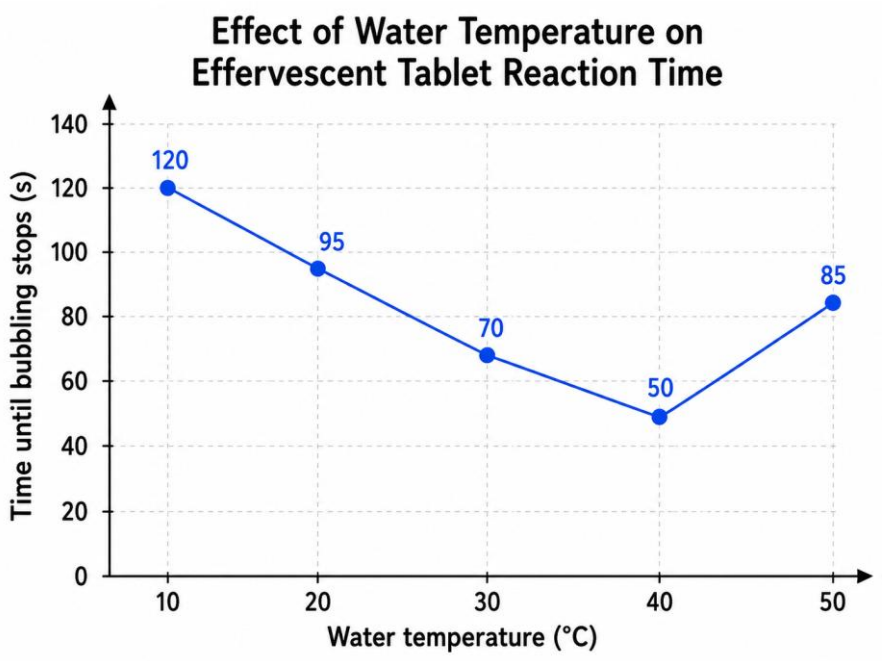
1. Only Statements I and II
2. Only Statements II and III
3. Only Statements I, II and IV
4. Only Statements I, III and IV

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28. An effervescent tablet reacts with water to produce gas bubbles. A student proposes the following hypothesis:

"Increasing the temperature of the water will make the chemical reaction occur faster."

The student places identical tablets into equal volumes of water at different temperatures. The time from adding each tablet until bubbling stops is recorded in the graph.



Which response correctly identifies the variables and gives the most appropriate interpretation of the results? (5 marks)

1. Water temperature is the independent variable; the first four results support the hypothesis, but the result at 50 degrees Celsius should be verified by repeating the trial under the same conditions.

2. Reaction time is the independent variable; the result at 50 degrees Celsius disproves the hypothesis, so the water volume should be increased.

3. Tablet size is the dependent variable; the unusual result should be removed because the other points fully prove the hypothesis.

4. Water temperature is a controlled variable; all five reaction times should be averaged to show that temperature has no effect on the reaction.

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29. Leo is a drummer in the school band. He wants to study how the loudness of a sound changes with distance and force. He takes a bass drum to the center of the school football field and asks his two friends, Amy and Ben, to help him measure the sound.

Amy stands very close to the drum, only 2 meters away.

Ben stands all the way across the field, 50 meters away.

Leo performs two different actions:

Action 1 : He taps the drumhead gently with a small wooden stick.

Action 2 : He strikes the drumhead with maximum force using a heavy mallet.

Leo writes down four scientific statements based on his experiment:

I. Action 2 produces a much louder sound than Action 1 because striking the drum with more force causes the drumhead to vibrate with more energy (higher amplitude).

II. During Action 2, Ben will hear a softer sound than Amy because sound energy dissipates as it travels a longer distance through the air.

III. If Leo wants to create a very soft sound, he must strike the drum with the greatest amount of physical force possible.

IV. The loudness of the sound Leo makes is scientifically measured in a unit called " Hertz (Hz)."

Which statements are correct? (5 marks)

1. I, II
2. II, III
3. I, II, IV
4. I, III, IV

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30. Ben wants to test how a strong bar magnet interacts with different everyday objects. He places five small items inside a plastic tray: an iron nail, a copper coin, a steel paperclip, a wooden toothpick, and a plastic button.

Ben slowly passes a powerful bar magnet over the tray without letting it directly touch any of the items. He observes that some items jump up to stick to the magnet, while others do not move at all.

Ben writes down four statements in his laboratory notebook:

I. Only the iron nail and the steel paperclip will be attracted to the magnet because they are made of magnetic materials.

II. The copper coin will be strongly attracted to the magnet because all metals are magnetic.

III. The wooden toothpick and plastic button are non-magnetic materials, so the magnetic force does not pull them.

IV. The magnetic force is a non-contact force because it can pull certain objects without physically touching them.

How many of Ben's notebook statements are scientifically CORRECT? (5 marks)

1. Only 1 statement is correct.
2. Only 2 statements are correct.
3. Only 3 statements are correct.
4. All 4 statements are correct.

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31. A group of Grade 6 students in the Environmental Science Club wanted to study how noise pollution affects daily learning and hearing health. They borrowed a digital sound level meter – a device used to measure the loudness of sound decibels (dB).

During lunch break, the students walked around the school campus and recorded the peak sound levels in four different zones:

Zone	**Location**	**Peak Sound Level** (dB)
Zone 1	School library	40
Zone 2	Canteen during lunch	72
Zone 3	Main playground	65
Zone 4	Construction site next door	98

Based on the given hearing-safety criterion and the decibel data recorded by the students, which zone poses a serious noise hazard, and what is the correct scientific way to protect their hearing? (1.25 marks)

1. Zone 1 is dangerous, so students should play loud music through headphones to eliminate unwanted quietness.
2. Zone 2 is dangerous, so students should stop eating because chewing food increases the speed of sound inside the body.
3. Zone 3 is dangerous, so teachers should cover the playground with bubble wrap to stop children from running or laughing.
4. Zone 4 is dangerous because 98 dB is much higher than the 85 dB safety limit, so people near this area should wear protective earplugs.

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32. Four students are building a scale model of the Solar System on their school playground. Using a large yellow basketball as the Sun, they measure distances to place four colored marbles representing Mercury, Venus, Earth, and Mars.

During the project, the students write down two important rules of planetary motion:

Distance Rule : Planets closer to the Sun have shorter orbital paths.

Speed Rule : The Sun's gravity pulls harder on nearby planets, making them move faster in their orbits than planets farther away.

The students then imagine racing their planet marbles around the yellow basketball Sun at the exact same time, following these scientific rules.

Based on these rules and observations from the students' project, which planet marble would take the shortest time to complete one full orbit around the yellow basketball Sun? (1.25 marks)

1. The Mars marble, because being farthest from the Sun gives it more open space to move quickly.
2. The Earth marble, because life on Earth gives it extra energy to finish first.
3. The Mercury marble, because it is closest to the Sun, has the shortest orbital path, and moves the fastest.
4. The Venus marble, because it is the brightest marble and light travels faster than anything else.

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33. A research team measures the number of available oxygen molecules per cubic meter at four different locations across the globe. The data is organized into the table below:

Location	Altitude above Sea Level	Air Density Rating	Oxygen Molecules per m^3
Location 1	0 meters (Sea Level)	Very High	5.6×10^{24}
Location 2	1,500 meters	High	4.7×10^{24}
Location 3	4,000 meters	Medium	3.5×10^{24}
Location 4	8,800 meters	Low	1.9×10^{24}

If an athlete trains at Location 4 without an oxygen tank, what respiratory challenge will they face based on the physical properties of air shown in the table? (2.5 marks)

1. The percentage of oxygen in the air drops from 21% down to 0%, meaning there is literally no oxygen gas left to breathe at Location 4.

2. The high air density at Location 4 compresses the oxygen molecules into dangerous solid crystals that block the windpipe.

3. The lower air density means the air molecules are spread very far apart due to weaker gravitational pull at high altitudes, so each breath delivers significantly fewer oxygen molecules to the lungs.

4. The athlete will breathe easier because fewer air molecules mean there is zero friction inside the human nose.

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34. A group of young structural engineers wants to design an energy-efficient greenhouse and study room for a smart home. They need to choose suitable optical materials based on how much light can pass through them.

The students place four material sheets of equal thickness – labelled W, X, Y, and Z – between a flashlight and a light sensor, one at a time. They record the transmitted light intensity and their observations in the table below.

Tested material	Light intensity reaching the sensor (lux)	Percentage of light transmitted (%)	Appearance when viewed through the material
No material	1,000	100	Completely clear, sharp, and perfectly visible.
Material W	450	45	Blurred and fuzzy; shapes are visible but details are unclear.
Material X	920	92	Clear and sharp; objects on the other side are clearly visible.
Material Y	0	0	Completely dark; nothing behind it can be seen.
Material Z	300	30	Dim and foggy; only let a small amount of scattered light pass through.

The design team has two strict requirements for the smart home:

Sunroom roof: It needs a transparent material that allows the maximum amount of natural sunlight to pass through clearly, ensuring indoor plants can perform photosynthesis efficiently.

Bedroom window: It needs a translucent material that provides privacy by scattering light, allowing some soft daylight to enter while preventing people outside from seeing inside clearly.

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Which choice correctly identifies the optical categories and selects the most appropriate materials for both rooms? (2.5 marks)

1. Sunroom roof: Material Y (opaque) | Bedroom window: Material X (transparent)
   Reason: Material Y blocks all light, which helps plants grow stronger roots in complete darkness.
2. Sunroom roof: Material W (translucent) | Bedroom window: Material Z (translucent)
   Reason: Material W allows some light through, so it should be considered fully transparent.
3. Sunroom roof: Material X (transparent) | Bedroom window: Material W or Z (translucent)
   Reason: Material X allows 92% of light to pass through clearly, while Materials W and Z allow partial light through and scatter it.
4. Sunroom roof: Material Z (opaque) | Bedroom window: Material Y (transparent)
   Reason: Material Z turns into a reflective liquid when heated, while Material Y allows light to pass clearly.

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35. A STEM team tests four payloads at the same location on Planet K. The students use a balance to measure mass and a spring scale to measure weight.

Payload	Mass (kg)	Weight (N)
A	0.5	4
B	1.0	8
C	1.5	12
D	2.0	15

Which analysis of the data is most scientifically reasonable? (2.5 marks)

1. The data for Payload D are inconsistent; if its mass is 2.0 kg, its expected weight should be about 16 N.

2. The data for Payload D show that its true mass is 1.5 kg, because a weight of 15 N fixes the mass exactly at that value.

3. The data show that gravity becomes weaker for larger objects, so Payload D should weigh less than the predicted value.

4. The data show no useful relationship between mass and weight, because every payload has a different weight.

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36. A STEM team is investigating how a container's color affects the temperature of water under a lamp. They filled two identical metal containers with equal volumes of water – wrapping Container A in black paper and Container B in white paper. Both containers are placed at the same distance from the lamp, and the students record their data in the table below:

Time (min)	Temperature of Water in Container A (°C)	Temperature of Water in Container B (°C)
0	25	25
5	28	26
10	32	28
15	35	30
20	37	31

The team wants to show both how the temperature changed over time and how the two containers differed. Which method displays this data most accurately? (2.5 marks)

1. Create a single line graph with time on the horizontal axis, temperature on the vertical axis, and two clearly labelled lines plotted on the same scale.

2. Create a single bar graph showing only the temperatures at 20 minutes, using separate bars for the two containers and a clear title.

3. Create two separate line graphs using different temperature scales, making the changes in each container appear as large as possible.

4. Create a pie chart using the sum of all temperature readings, with one slice for each container and a colour key.

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37. Two Grade 5 students, Leo and Mia, noticed that a loaf of bread left on a warm kitchen counter grew fuzzy green mold much faster than a loaf kept inside a cold refrigerator.
To investigate this, they designed a controlled experiment:
They set up their experiment using the following scientific steps:

Step 1 : They stated, “If we increase the environmental temperature, then bread mold will grow faster because mold fungi thrive in warm conditions.”

Step 2 : They purchased two identical slices of white bread from the same bakery. They placed Slice 1 inside a warm plastic box at 30°C and Slice 2 inside a cold plastic box at 4°C. Both slices received the same amount of moisture and were kept in the same level of darkness.

Step 3 : After 5 days, they measured the total area of green mold on each slice using a grid ruler. Slice 1 (warm) had 15 cm^2 of mold, while Slice 2 (cold) had only 1 cm^2 of mold.

Based on the scientific method and process skills shown in their experiment, which choice correctly identifies the scientific skill used in Step 1 and the independent variable in Step 2? (5 marks)

1. Step 1 skill : Drawing a final conclusion
   Independent variable in Step 2 : The bakery brand of the bread.
2. Step 1 skill : Formulating a hypothesis
   Independent variable in Step 2 : The environmental temperature.
3. Step 1 skill : Making a random guess
   Independent variable in Step 2 : The amount of dark space in the kitchen.
4. Step 1 skill : Collecting raw data
   Independent variable in Step 2 : The mold area measured after 5 days.

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38. A Grade 5 student wants to investigate how adding chemical fertilizer affects the growth of sunflower plants. He sets up a controlled experiment in his school garden with the following conditions:

Setup: He plants two identical young sunflower seedlings in two identical clay pots containing the same type and amount of soil. Both pots are placed in the same sunny area and receive 200 ml of water every morning.

Difference: He adds 10 grams of chemical fertilizer to Pot A once a week. He adds no fertilizer to Pot B.

Measurement: Every Friday afternoon for 4 weeks, he uses a plastic ruler to measure the vertical height of each sunflower stem from the soil surface to the top leaf in centimeters (cm). He wants to find out which plant grows taller because of the fertilizer treatment.

Based on the experimental design, which choice correctly identifies the dependent variable – the outcome being observed and measured – in this investigation? (5 marks)

1. The brand and material of the plastic ruler used to measure the plants.
2. The amount of sunlight reaching the school garden each afternoon.
3. The amount of chemical fertilizer added to Pot A each week.
4. The vertical height of the sunflower stems measured in centimeters over 4 weeks.

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39. A team of students wants to test the following hypothesis:
"Materials with many open pores absorb more water than materials with smooth, water-resistant surfaces."

The students prepare equal-sized pieces of four materials. They pour 20 millilitres of water onto each material, wait for 60 seconds, and then allow each piece to drip for 30 seconds. They measure the volume of water remaining in the tray. Each test is repeated three times.

Material	Water Remaining: Trial 1 (ml)	Water Remaining: Trial 2 (ml)	Water Remaining: Trial 3 (ml)
Sponge	1	2	1
Cotton fabric	4	5	4
Waxed paper	17	18	17
Plastic sheet	19	20	19

Which statement provides the most scientifically appropriate analysis of this experiment?
(5 marks)

1. The type of material is the independent variable, the volume absorbed is the dependent variable, and the results support the hypothesis, even though pore structure was not measured directly.

2. The volume of water poured is the independent variable, the type of material is the dependent variable, and the results prove that all porous material absorbs exactly the same amount of water.

3. The waiting time is the independent variable, the water remaining is the controlled variable, and the results show that waxed paper absorbs more water than cotton fabric.

4. The size of each material is the dependent variable, the dripping time is the independent variable, and the results reject the hypothesis because some water remained in every tray.

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40. A group of students is investigating how the vibrating length of a plastic ruler affects the pitch of the sound it makes. They clamp the same ruler to the edge of a table. In each trial, a different length of the ruler extends beyond the table. The students pull the end of the ruler downward by the same distance and release it. They record the number of vibrations per one second and describe the resulting pitch. Their hypothesis is:
"The shorter the vibrating part of the ruler, the higher the pitch of the sound."

Length Extending Beyond the Table (centimetres)	Vibrations in One Second	Observed Pitch
8	25	High
12	17	Medium
16	11	Low

Which statement gives the most scientifically appropriate analysis of the experiment?
(5 marks)

1. The extending length is the independent variable, the vibration rate and pitch are dependent variables, and the results support the hypothesis.

2. The pulling distance is the independent variable, the length of the ruler is the dependent variable, and the results show that a slower vibration rate produces a higher pitch.

3. The observed pitch is the controlled variable, the vibration rate is the independent variable, and the results prove that ruler's material has no effect on sound.

4. The vibration rate is the controlled variable, the extending length is the dependent variable, and the hypothesis is rejected because all trials produced sound.

---------- End of Questions ----------

Please check your answers before submitting the answer sheet.

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Answers Keys : Science Primary - Grade 5

No.	Answers	No.	Answers
1.	3	21.	2
2.	4	22.	1
3.	4	23.	1
4.	2	24.	2
5.	2	25.	3
6.	4	26.	2
7.	3	27.	4
8.	3	28.	1
9.	1	29.	1
10.	2	30.	3
11.	1	31.	4
12.	2	32.	3
13.	3	33.	3
14.	3	34.	3
15.	2	35.	1
16.	3	36.	1
17.	2	37.	2
18.	4	38.	4
19.	2	39.	1
20.	4	40.	1

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