



## Preparation for the National Grade Six Assessment

Guide #1 | Science Multiple Choice

### Who are you?

If you are in grade 5 or 6 and will be taking the next National Grade Six Assessment, then this packet is for you. This packet has past exam questions which have been solved with explanations to help you learn how to solve similar questions. Completing this packet will increase your chances of passing the exam with the highest possible score.

### Who are we?

This packet was created by the Caribbean Education Project, a team of students and teachers from universities in the United States and the Caribbean. Our goal is to help you with your preparations for the next exam and to help you better understand each topic. We want you to achieve your best score on the exam. If you are not clear on concepts after reading the material, ask your parent or guardian for help. If they cannot help, ask another family member or a friend. If no one can help you, then ask your parents to send us a message on Facebook or WhatsApp or e-mail us.

- To reach us through Facebook, go on Facebook and search for “Shawn Shivdat.” Then send me a message using Facebook Messenger.
- To reach us by WhatsApp, save this number “Shawn Shivdat, +1 404-406-9638” and message me on WhatsApp.
- To reach us by e-mail, send a message to this e-mail address: [info@caribed.org](mailto:info@caribed.org).

### Keep in contact

If you are using this packet to prepare, we would like to hear from you. Please keep in touch with us so we can help you with any questions you may have. We can also provide updates when future materials are posted. Send us your name and contact information through WhatsApp, Facebook Messenger, or e-mail (listed above), or send a picture of this sheet filled out through WhatsApp, Facebook Messenger, or e-mail.

Name: \_\_\_\_\_

Parent’s phone number: \_\_\_\_\_

Parent’s e-mail address: \_\_\_\_\_

**PLEASE SHARE THIS GUIDE WITH OTHERS WHO MAY BENEFIT  
FROM USING IT.**



**How to use this guide:**

1. The following pages have a total of 40 past exam questions. Try to answer these questions in the prescribed 70 minutes. If you are not able to answer a question, skip it and go on to the next question. When you are done answering all the questions, you can return to the ones you are having trouble with during your remaining time.
2. It is okay if you were not able to answer all the questions correctly on your first try. Keep practicing the questions, and you will get better. Soon, you will be able to answer all the questions in the 70 minutes. (**TIP:** Practice makes you perfect, so keep practicing.)
3. Answers to all the questions are on the pages immediately after the practice test. When you finish answering the questions, compare your answers to the answers on these pages.
4. Mark the questions which you got wrong.
5. Read our guide to solving each question. Even for questions you got correct, read the explanations we provided because you will likely learn something from them. Our explanations provide valuable information which can provide you with additional tricks to solve other problems.
6. Always read the instructions for each question carefully before attempting to answer. Also, read the question itself carefully and pay attention to what the question is asking you to do before attempting to answer it.
7. We provide the answers to all the questions in the practice exams to help you. Do not look at the answers before you attempt the questions. If you look at the answers before, you will not learn a lot from this packet. So, do we have a deal? Okay, I heard you say yes.





MINISTRY OF EDUCATION  
NATIONAL GRADE SIX ASSESSMENT  
PRACTICE TEST  
SCIENCE  
PAPER 1

**Hey students,** for the purposes of practice, you can ignore the instructions listed in steps 3-5 below about shading circles on an answer sheet. We have included that here so you will be familiar with these instructions on exam day.

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Reading Time: 10 minutes

Writing Time: 60 minutes

**READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This test has **40** questions. You have 1 hour 10 minutes to answer them.
2. Each question has four possible answers: (A), (B), (C) and (D). Read each question carefully then choose the correct answer.
3. On your answer sheet, find the number that matches the question you intend to answer.
4. Shade the circle which has the same letter A, B, C or D, next to the answer you have chosen.

Here is an example done for you.

Carbon dioxide is a

- (A) mixture
- (B) liquid
- (C) gas
- (D) solid

Sample Answer



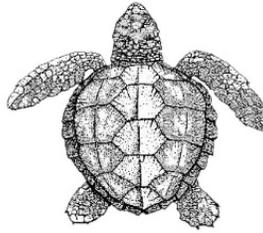
**Note:** The letter **C** is shaded on the answer sheet because gas, the correct answer, is next to **C**.

5. If you want to change your answer, erase it completely before you fill in your new choice.
6. When the supervisor tells you to begin, turn the page and work as quickly and as carefully as you can.
7. If you try a question and find that you cannot answer it, leave it and go on to the next one. You may return to that question later.

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.**



**Question 1** refers to the diagram of the animal below.



**1.** To which of the following groups does the animal belong?

- (A) Reptiles
- (B) Arachnids
- (C) Amphibians
- (D) Invertebrates

**2.** Animals are used by humans **mainly** for

- (A) protection.
- (B) food.
- (C) export.
- (D) shelter.

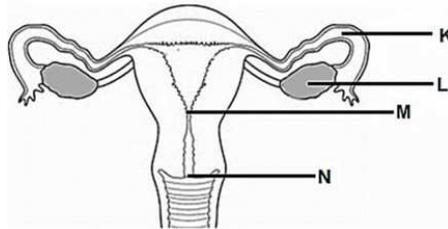
**3.** Which of the diseases below is **not** transmitted through sexual intercourse?

- (A) Syphilis
- (B) Cholera
- (C) Chlamydia
- (D) Gonorrhea

4. What happens in the human body when someone exercises?

- (A) More energy is needed.
- (B) More oxygen is produced.
- (C) The heart rate decreases.
- (D) Less carbon dioxide is produced.

Questions 5 and 6 refer to the labelled diagram of the human female reproductive system.



5. The part where fertilization occurs is labelled

- (A) N.
- (B) M.
- (C) L.
- (D) K.

6. The parts labelled M and N are

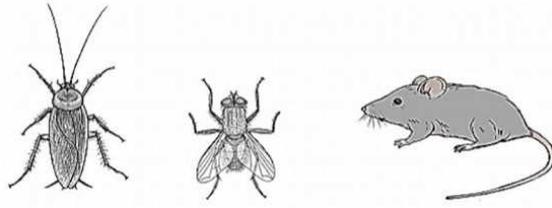
- (A) ovary and uterus.
- (B) uterus and cervix.
- (C) cervix and oviduct.
- (D) ovary and oviduct.



7. One example of a crustacean is

- (A) snail.
- (B) shrimp.
- (C) octopus.
- (D) Earthworm.

**Question 8** refers the diagrams of the animals shown below.



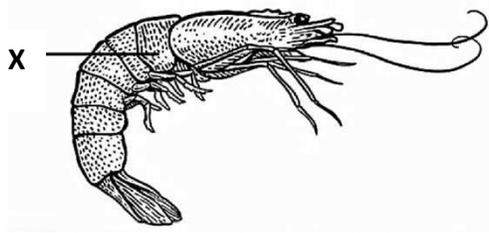
8. The animals above are all threats to humans because they

- (A) spread litter.
- (B) damage crops.
- (C) spread diseases.
- (D) destroy properties.

9. Which class of animals represents a group of invertebrates?

- (A) Reptiles
- (B) Mammals
- (C) Arachnids
- (D) Amphibians

**Question 10** refers to the diagram of a shrimp as shown below.



**10.** Functions of the part labelled **X** include

- (i) protecting the animal
- (ii) covering the animal.
- (iii) moving the animal.

- (A) (i) and (ii) only
- (B) (i) and (iii) only
- (C) (ii) and (iii) only
- (D) (i), (ii), and (iii)

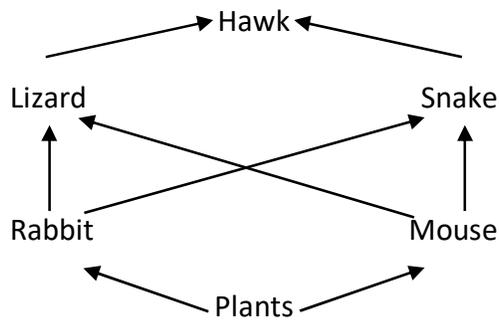
**11.** All of the following have hairy coverings **except**

- (A) deer.
- (B) toad.
- (C) horse.
- (D) whale.

**12.** In order to complete her assignment, Rita wants a material that is hard and transparent. Which of the following materials **must** she choose?

- (A) Rock
- (B) Glass
- (C) Wood
- (D) Rubber

**Questions 13 and 14** refer to the food web below. Study it carefully and answer the questions that follow.



**13.** Which organism in the food web above is an herbivore?

- (A) Plants
- (B) Snake
- (C) Lizard
- (D) Rabbit



**14.** Which organism in the food web above can be classified as a predator and a prey?

- (A) Hawk
- (B) Snake
- (C) Rabbit
- (D) Mouse

**15.** The conditions and substances needed by plants to make food are

- (A) water, oxygen, starch, and warmth.
- (B) carbon dioxide, chlorophyll, starch and sunlight.
- (C) sunlight, water, carbon dioxide and chlorophyll.
- (D) carbon dioxide, chlorophyll, starch and warmth.

**16.** The stomata in the leaves allow

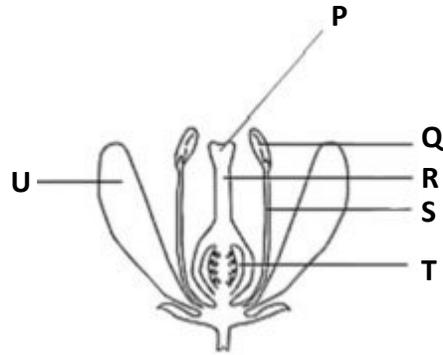
- (A) oxygen in and water out.
- (B) carbon dioxide and water in.
- (C) water vapour and carbon dioxide in.
- (D) carbon dioxide in and oxygen out.

**17.** In which of the following parts of the flower does fertilization occur?

- (A) Ovary
- (B) Anther
- (C) Stigma
- (D) Ovules



Questions 18 and 19 refer to the diagram of the flower shown below.



18. The **male** parts of the flower are labelled

- (A) P and R.
- (B) Q and S.
- (C) P, R and T.
- (D) Q, S and U.

19. The functions of the part labelled **U** are to

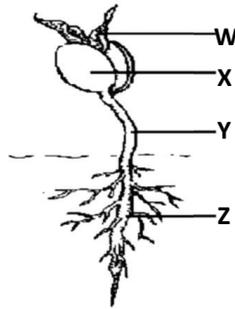
- (i) produce ovules.
- (ii) attract insects and birds.
- (iii) protect the reproductive parts.

- (A) (i) and (ii) only
- (B) (i) and (iii) only
- (C) (ii) and (iii) only
- (D) (i), (ii), and (iii)

**20.** Which of the following are **not** characteristics of a wind pollinated flower?

- (A) Long feathery anthers
- (B) Light and smooth pollen grains
- (C) Large coloured and scented petals
- (D) Large stamen dangling outside the flower

**Questions 21 and 22** refer to the following diagram which shows a very young plant.



**21.** Which of the parts labelled above stores food for the young plant?

- (A) W
- (B) X
- (C) Y
- (D) Z

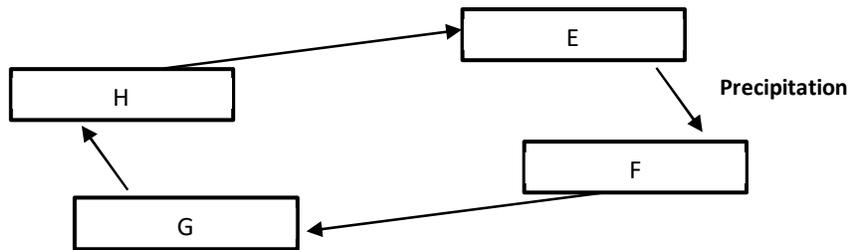
22. The part of the young plant that grows from the plumule is labelled

- (A) W
- (B) X
- (C) Y
- (D) Z

23. Which of the following instruments can be used to measure how fast the wind is moving?

- (A) Barometer
- (B) Wind vane
- (C) Anemometer
- (D) Thermometer

Question 24 refers to a simple illustration of the water cycle shown below.



24. What does E represent?

- (A) Clouds
- (B) Rain
- (C) Water vapour
- (D) Water in oceans



**25.** Which of the following activities will **most** likely reduce pollution?

- (A) Using animal manure for farming
- (B) Burying non-biodegradable waste
- (C) Cutting down a large number of trees
- (D) Building larger chimneys for factories

**26.** Humans benefit from the rainforest because it provides them with

- (i) food
- (ii) water
- (iii) medicine

- (A) (i) and (ii) only
- (B) (i) and (iii) only
- (C) (ii) and (iii) only
- (D) (i), (ii), and (iii)

**27.** All of the following are methods of conserving water in the home **except**

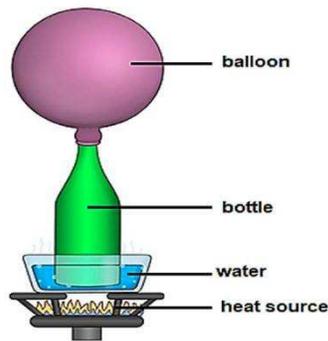
- (A) washing small loads of clothes.
- (B) bathing with a bucket of water.
- (C) purifying waste water for human consumption.
- (D) washing the yard with water used for rinsing clothes.



**28.** Which of the materials below is a good conductor of heat?

- (A) Rubber
- (B) Wood
- (C) Glass
- (D) Iron

**Question 29** refers to the diagram which shows the heating of a bottle which has its mouth covered with a balloon.



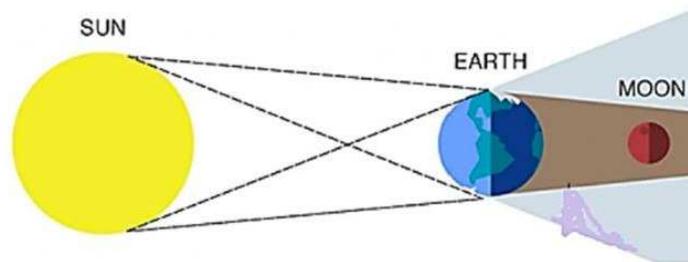
**29.** Which of the following statements explains why the balloon is inflated?

- (A) The bottle contracted.
- (B) The heat was turned off.
- (C) The air in the bottle expanded.
- (D) The surrounding air contracted.

**30.** A suspension can be made from mixing

- (A) sugar and water.
- (B) mud and water.
- (C) salt and water.
- (D) coffee and water.

**Question 31** refers to the position of the Sun, Moon and Earth as shown in the diagram below.



**31.** Which of the following is represented by the illustration above?

- (A) New moon
- (B) Full moon
- (C) Lunar eclipse
- (D) Solar eclipse

**32.** Which of the following is a natural source of heat and light?

- (A) Sun
- (B) Moon
- (C) Oven
- (D) Candle



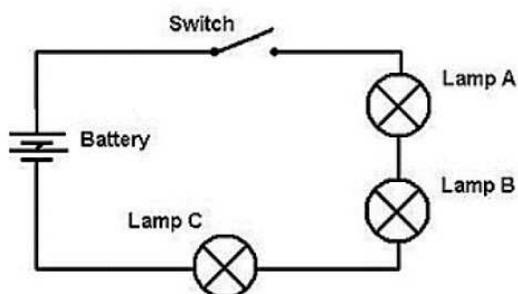
33. The water cycle can occur repeatedly because water

- (A) cannot be compressed.
- (B) is essential for all living things.
- (C) changes state by heating or cooling.
- (D) evaporates only from seas and oceans.

34. Which of the following is **not** an example of a physical change?

- (A) Cutting up a sheet of cloth
- (B) Mixing sugar and water
- (C) Ice melting into water
- (D) Baking a cake

Questions 35 and 36 refer to the diagram of a circuit as shown below.



35. What type of simple circuit is represented in the diagram above?

- (A) Series
- (B) Parallel
- (C) Parallel series
- (D) Series parallel



**36.** What effect will there be in the circuit if Lamp B is damaged and the switch is closed?

- (A) Only Lamp C will light.
- (B) Only Lamp A will light.
- (C) Lamps A and C will light.
- (D) Lamps A and C will not light.

**37.** Lina hangs her T-shirts outside. Which **two** weather conditions would be best for drying her laundry?

- (A) Windy and stormy
- (B) Windy and cloudy
- (C) Sunny and windy
- (D) Sunny and cloudy

**Question 38** refers to the diagram of a simple machine in use as shown below.



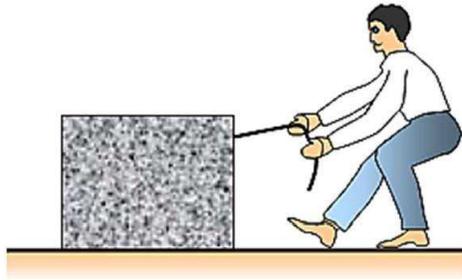
**38.** Which type of simple machine is used above to remove the cork from the bottle?

- (A) Lever
- (B) Screw
- (C) Wedge
- (D) Inclined plane

**39.** Which of the following objects possesses potential energy?

- (A) A ball rolling on the field
- (B) A stretched rubber band
- (C) An electric fan switched on
- (D) Water falling from a mountain

**Question 40** refers to the use of a simple machine as shown below.



**40.** The force that the man is acting against is

- (A) friction.
- (B) electrical.
- (C) magnetic.
- (D) gravitational.

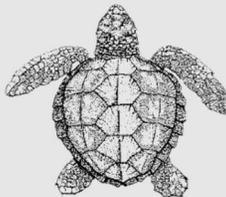
**END OF TEST**

**IF YOU FINISH BEFORE TIME IS UP, CHECK YOUR WORK ON THIS ASSESSMENT**



### ANSWER EXPLANATIONS

**Question 1** refers to the diagram of the animal below.



#### QUESTION 1 ANSWER EXPLANATION

1. To which of the following groups does the animal belong?

- (A) Reptiles
- (B) Arachnids
- (C) Amphibians
- (D) Invertebrates

Reptiles are cold-blooded, air-breathing, usually egg-laying vertebrates (vertebrates are animals with a backbone or spinal column). Reptiles have dry, scaly skin instead of hair or feathers. Examples include snakes, crocodiles, **turtles**, and lizards.

Arachnids have segmented bodies, a hard outer covering called an exoskeleton, and jointed appendages, or limbs. In most arachnids, four pairs of the appendages are legs to walk on. The other appendages are used for such tasks as holding and crushing prey. Examples include spiders, scorpions, ticks, and mites.

Amphibians are cold-blooded vertebrates that have similar characters of both fish and reptiles. Unlike reptiles, most amphibians possess a smooth, moist skin and lay their shell-less eggs in water or wet places. Examples include frogs, toads, and salamanders.

Invertebrates are animals that lack a backbone. Examples include arthropod, molluscs, arachnids, annelid, and coelenterate.

Our animal in this question is a turtle, and turtles are reptiles. **Answer choice A is correct.**

#### QUESTION 2 ANSWER EXPLANATION

2. Animals are used by humans **mainly** for

- (A) protection.
- (B) food.
- (C) export.
- (D) shelter.

Think about when we see animals in our lives.

We do not mainly use animals for protection, so answer choice **A** is incorrect. We do not use animals for shelter, so answer choice **D** is incorrect. Also, exports do not mainly consist of animals, so answer choice **C** is incorrect.

Meat for human consumption comes from animals like cattle or poultry, so animals are used mainly for food.

**Answer choice B is correct.**



**QUESTION 3 ANSWER EXPLANATION**

3. Which of the diseases below is **not** transmitted through sexual intercourse?

- (A) Syphilis
- (B) Cholera
- (C) Chlamydia
- (D) Gonorrhoea

Some common sexually transmitted diseases include the following:

Chlamydia	Gonorrhoea	Syphilis
Genital Herpes	Hepatitis B (HBV)	Trichomoniasis
Genital Warts	HIV/AIDS	

Cholera is not on this list.

Cholera is usually spread by water sources contaminated by feces. **Answer choice B is correct.**

**QUESTION 4 ANSWER EXPLANATION**

4. What happens in the human body when someone exercises?

- (A) More energy is needed.
- (B) More oxygen is produced.
- (C) The heart rate decreases.
- (D) Less carbon dioxide is produced.

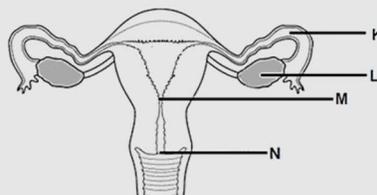
When we exercise, the cells of our muscles need extra food and oxygen. We get more oxygen by breathing in air. Answer choice **B** is incorrect because we do not produce oxygen ourselves.

Also, since we are breathing in more oxygen to fuel our cells, we are producing more carbon dioxide as waste from our cells. Each time we breathe out, the carbon dioxide from our cells is released from our lungs. This means that we produce more carbon dioxide when exercising, so answer choice **D** is incorrect.

Since our cells need more oxygen, our heart works harder to take blood with food and oxygen to our muscles. Our heart is beating harder and faster, so the heart rate increases during exercise. This means that answer choice **C** is incorrect.

We use energy when we exercise, so we have to restore the energy we lost with food and oxygen. **Answer choice A is correct.**

Questions 5 and 6 refer to the labelled diagram of the human female reproductive system.



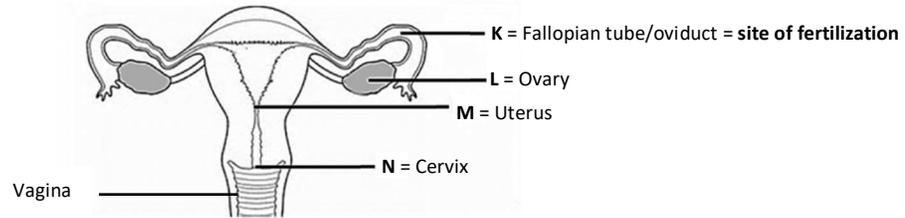
**QUESTION 5 ANSWER EXPLANATION**

5. The part where fertilization occurs is labelled

- (A) N.
- (B) M.
- (C) L.
- (D) K.



To answer Questions 5 and 6, we need to know the names and functions of the parts of the female reproductive system. Let's take a look at the diagram below with all the parts of the system labelled:



The **uterus** (labelled as **M** on the diagram) is where the fetus develops after fertilization. It expands to hold the developing baby, and it is located above the cervix.

The **cervix** (labelled as **N** on the diagram) is a ring of tissue between the uterus and the vagina.

The **ovaries** (labelled as **L** on the diagram, females have two ovaries) produce eggs for fertilization and hormones. Hormones are chemicals that circulate around the body and change our behavior. The ovaries are located on either side of the uterus.

The **fallopian tubes** (labelled as **K** on the diagram) connect the ovaries with the uterus. Fertilization of the egg by sperm occurs in the fallopian tubes. **Answer choice D is correct.**

#### QUESTION 6 ANSWER EXPLANATION

6. The parts labelled M and N are

- (A) ovary and uterus.
- (B) uterus and cervix.
- (C) cervix and oviduct.
- (D) ovary and oviduct.

See solution for question 5 for full explanation. **Answer choice B is correct.**

#### QUESTION 7 ANSWER EXPLANATION

7. One example of a crustacean is

- (A) snail.
- (B) shrimp.
- (C) octopus.
- (D) Earthworm.

Crustaceans are types of arthropods which include animals that usually have a hard covering, or exoskeleton, and two pairs of antennae, or feelers. Examples include crabs, lobsters, shrimps (or prawns), and crayfish.

Answer choice **D**, the Earthworm, does not have an exoskeleton.

Answer choice **C**, the octopus, does not have an exoskeleton. The octopus is a mollusk, and mollusks have soft, slimy bodies.

Answer choice **A**, the snail, is also a mollusk.

Answer choice **B**, the shrimp, is a crustacean. The shrimp's body is segmented and has many legs with joints. On the outside of its body is a hard skeleton, or exoskeleton. These are all properties of crustaceans.

**Answer choice B is correct.**



**Question 8** refers the diagrams of the animals shown below.



**QUESTION 8 ANSWER EXPLANATION**

**8.** The animals above are all threats to humans because they

- (A) spread litter.
- (B) damage crops.
- (C) spread diseases.
- (D) destroy properties.

These animals are a cockroach, a housefly, and a rat. While rats may spread litter, the spread of litter itself is not a threat to humans. Answer choice **A** is incorrect.

Damaging crops is a threat to humans, but the animals that are responsible for damaging crops are usually insects, not rats. Answer choice **B** is incorrect.

The animals that destroy property are usually larger animals. Flies and cockroaches are common in homes, but they do not destroy property. Answer choice **D** is incorrect.

Cockroaches, flies, and rats spread diseases by transferring disease-carrying pathogens from waste or dead animals to humans. **Answer choice C is correct.**

**QUESTION 9 ANSWER EXPLANATION**

**9.** Which class of animals represents a group of invertebrates?

- (A) Reptiles
- (B) Mammals
- (C) Arachnids
- (D) Amphibians

Invertebrates are animals that lack a backbone.

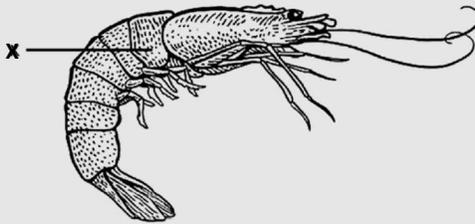
In depth discussion of reptiles and amphibians can be found in the Question 1 answer explanation. Reptiles and amphibians both have backbones which makes them vertebrates, so answer choices **A** and **D** are incorrect.

Mammals include human beings. We do have spines, so answer choice **B** is incorrect.

As covered in the Question 1 answer explanation, arachnids are invertebrates. **Answer choice C is correct.**



**Question 10** refers to the diagram of a shrimp as shown below.



**QUESTION 10 ANSWER EXPLANATION**

**10.** Functions of the part labelled **X** include

- (iv) protecting the animal
- (v) covering the animal.
- (vi) moving the animal.

- (A) (i) and (ii) only
- (B) (i) and (iii) only
- (C) (ii) and (iii) only
- (D) (i), (ii), and (iii)

For this question, first identify the part labelled **X**. Shrimps are a type of **arthropod**, and arthropods all have hard outer skeletons (exoskeletons). The **exoskeleton** covers the whole body of an arthropod, so **X** must be pointing to a segment of the shrimp's exoskeleton.

Now, we have to think about what the exoskeleton does. The exoskeleton is a hard layer above the softer parts of the animal inside, so it makes sense to say that it covers the animal. It serves as a shield between the animal and the outside world, so it protects the animal from harm. However, since it is so hard and rigid, the exoskeleton at point **X** does not help to move the animal. Shrimps move using the flexible muscles in their legs and abdomens, not their exoskeletons. **Answer choice A is correct.**

**QUESTION 11 ANSWER EXPLANATION**

**11.** All of the following have hairy coverings **except**

- (A) deer.
- (B) toad.
- (C) horse.
- (D) whale.

Deer and horses are covered in hair, so answer choices **A** and **C** are incorrect.

How do we decide between the toad and the whale?

Think about the **classes** of animals (discussed in depth in question 1). Deer, horses, and whales are all types of mammals, and a defining characteristic of mammals is they have coverings of hair. Toads are **amphibians**, which have smooth, slimy skin. **Answer choice B is correct.**



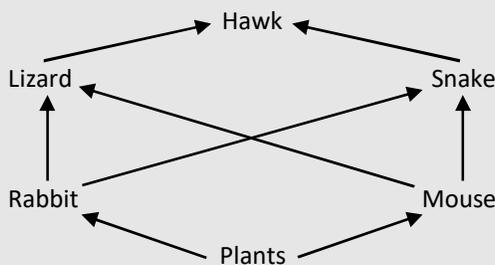
**QUESTION 12 ANSWER EXPLANATION**

12. In order to complete her assignment, Rita wants a material that is hard and transparent. Which of the following materials **must** she choose?

- (A) Rock
- (B) Glass
- (C) Wood
- (D) Rubber

The material must be both hard and transparent. **Transparent** means “see through.” The opposite of transparent is **opaque**. An object that is opaque is an object we cannot see through. We cannot see through rocks or wood, so those items are not transparent. This eliminates answer choices **A** and **C**. Rubber, like a pencil eraser, is usually opaque, and rubber is not hard. Answer choice **D** is incorrect. We can usually see through glass, and glass is hard (you cannot bend it or shape it). **Answer choice B is correct.**

Questions 13 and 14 refer to the food web below. Study it carefully and answer the questions that follow.



**QUESTION 13 ANSWER EXPLANATION**

13. Which organism in the food web above is an herbivore?

- (A) Plants
- (B) Snake
- (C) Lizard
- (D) Rabbit

In a food web, the arrows point from the plant/animal being eaten to the animal that eats it. So, an arrow pointing from “Plants” to “Mouse” means that the mouse eats the plants. You can also think of the arrow notation as pointing to the stomach the plant/insect/animal ends up in.

An **herbivore** is an *animal* that eats only plants. A **carnivore** is an animal that eats only other animals. An **omnivore** is an animal that eats both plants and animals.

The rabbit and the mouse are the only animals on the food web that eat only plants. The mouse is not listed as an answer option, so **answer choice D is correct.**



**QUESTION 14 ANSWER EXPLANATION**

14. Which organism in the food web above can be classified as a predator and a prey?

- (A) Hawk
- (B) Snake
- (C) Rabbit
- (D) Mouse

A **predator** is an animal that eats other animals. A **prey** is an animal that is eaten by other animals.

We need to select an animal that has an arrow pointing towards it from another animal (its prey) and an arrow pointing away from it towards another animal (its predator). The only animals on this food web that satisfy this requirement are the lizard and the snake. There is no answer option for the lizard, so **answer choice B**, the snake, is correct.

**QUESTION 15 ANSWER EXPLANATION**

15. The conditions and substances needed by plants to make food are

- (A) water, oxygen, starch, and warmth.
- (B) carbon dioxide, chlorophyll, starch and sunlight.
- (C) sunlight, water, carbon dioxide and chlorophyll.
- (D) carbon dioxide, chlorophyll, starch and warmth.

The process of plants making their own food by using the Sun's energy is called **photosynthesis**. Plants do this with a special chemical in their leaves called **chlorophyll**, which gives them their green colour. Chlorophyll traps some of the **light energy from the Sun**, and plants use this energy to transform **carbon dioxide** and **water** to sugar and oxygen. Sugar is the "food" of the plant, and once it has made sugar, it can use it for energy.

One substance that may be confusing in this question is starch. **Starch** is not needed by plants to *make* food. Plants use starch to *store* food because plants cannot use all the sugar they produce at once. This eliminates answer choices **A**, **B**, and **D**. **Answer choice C** is correct.

**QUESTION 16 ANSWER EXPLANATION**

16. The stomata in the leaves allow

- (A) oxygen in and water out.
- (B) carbon dioxide and water in.
- (C) water vapour and carbon dioxide in.
- (D) carbon dioxide in and oxygen out.

**Stomata** are small pores (openings or holes) on the underside of leaves that are important for photosynthesis (discussed in question 15). Plants take in carbon dioxide for photosynthesis and release oxygen after photosynthesis through the stomata. **Answer choice D** is correct.

**QUESTION 17 ANSWER EXPLANATION**

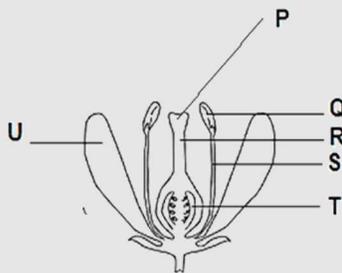
17. In which of the following parts of the flower does fertilization occur?

- (A) Ovary
- (B) Anther
- (C) Stigma
- (D) Ovules

The **anther** is where pollen is made. The **stigma** is the entrance towards the ovary. The **ovary** contains the ovules. The **ovule** contains the female reproductive cell. Think of the ovary as the housing for the ovule(s). Fertilization occurs in the ovary. **Answer choice A** is correct.



Questions 18 and 19 refer to the diagram of the flower shown below.



#### QUESTION 18 ANSWER EXPLANATION

18. The **male** parts of the flower are labelled

- (A) P and R.
- (B) Q and S.
- (C) P, R and T.
- (D) Q, S and U.

Here is a quick guide to the parts of a flower:

**Petals** (letter **U**) are often brightly coloured, and flowers can have four, five, or more petals. The purpose of petals is to attract birds and insects so that they pick up pollen and pollinate other flowers. Petals also protect the organs behind them.

**Stamens** are the male reproductive organs of the flower. They lie underneath the petals and are made up of two parts: a **filament** (letter **S**) and an **anther** (letter **Q**). The filaments are long stalks that hold up the anthers, and the anthers contain pollen grains in pollen sacs.

The **pistil** is the female reproductive organ of the flower and is made up of three parts: the **ovary** (letter **T**), the **style** (letter **R**), and the **stigma** (letter **P**). The ovary contains ovules that turn into seeds once the flower is fertilized; the style transports pollen tubes to the ovary; and the stigma receives pollen grains from the stamens.

The question asks us to identify the male parts of the flower. Since the male parts are the filament and the anther, we can determine that **answer choice B is correct**.

#### QUESTION 19 ANSWER EXPLANATION

19. The functions of the part labelled **U** are to

- (iv) produce ovules.
- (v) attract insects and birds.
- (vi) protect the reproductive parts.

- (A) (i) and (ii) only
- (B) (i) and (iii) only
- (C) (ii) and (iii) only
- (D) (i), (ii), and (iii)

As discussed in the question 18 answer explanation, the part labelled **U** is a petal. **Petals** are often brightly coloured and have nice smells, and they surround the reproductive organs (pistil and stamens) of the flower. Even though the main purpose of petals is to attract birds and insects to transport pollen, petals also protect the reproductive organs. Statements (ii) and (iii) are correct, but (i) is incorrect because ovules are produced by ovaries, not petals. **Answer choice C is correct**.



**QUESTION 20 ANSWER EXPLANATION**

20. Which of the following are **not** characteristics of a wind pollinated flower?

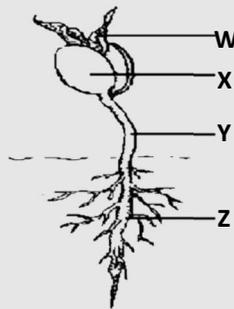
- (A) Long feathery anthers
- (B) Light and smooth pollen grains
- (C) Large coloured and scented petals
- (D) Large stamen dangling outside the flower

To answer this question, consider properties of flowers and pollen that would make it easy for wind pollination. In **wind pollination**, pollen travels from one flower to another by only wind—no insects or birds are involved.

What do we need for wind pollination to work? It would help if the pollen could travel easily through the air, and it would help if the stamen (the male reproductive organ of the flower that makes pollen) could easily release pollen into the air. Long feathery anthers and a large stamen dangling outside the flower would make it easier for pollen to be released into the air, and light and smooth pollen grains travel more easily through the air. Answer choices **A**, **B**, and **D** could all be characteristics of a wind pollinated flower.

Why would answer choice **C** not be a characteristic of a wind pollinated flower? As we discussed in the answer explanations for questions 18 and 19, one of the main functions of petals is to attract birds and insects so that they can help pollinate other flowers. If a flower pollinates by wind, it does not need brightly coloured and scented petals to attract birds and insects. **Answer choice C is correct.**

Questions 21 and 22 refer to the following diagram which shows a very young plant.



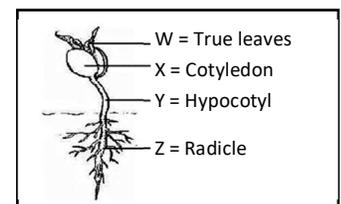
**QUESTION 21 ANSWER EXPLANATION**

21. Which of the parts labelled above stores food for the young plant?

- (A) W
- (B) X
- (C) Y
- (D) Z

Let's describe the parts of a young plant, or a seedling:

The **radicle** (Z, answer choice **D**) is the main root of the plant. Its job is to absorb water and nutrients from the soil and to anchor the plant in the ground. The **hypocotyl** (Y, answer choice **C**) is the part of the stem of a young plant above the radicle and beneath the cotyledon. The **cotyledons** (X, answer choice **B**) are the first 'leaves' to grow from the seed, and they store the energy left over from the seed as the plant begins to grow. The **true leaves** (W, answer choice **A**) of the plant are called 'true' because when they grow, the plant switches from the energy stored in the cotyledons to the energy the true leaves make with photosynthesis.



Since the cotyledons are the first energy source for the plant before its true leaves grow, **answer choice B is correct.** Keep in mind that cotyledons are always the first 'leaves' to grow, and different plants have different numbers and appearances of cotyledons.



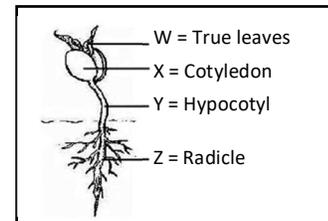
**QUESTION 22 ANSWER EXPLANATION**

22. The part of the young plant that grows from the plumule is labelled

- (A) W
- (B) X
- (C) Y
- (D) Z

The **plumule** is the young shoot that begins to grow from the cotyledon after the cotyledon has sprouted above ground. It is from the plumule that the first true leaves begin to grow.

The true leaves grow from the plumule. **Answer choice A is correct.**



**QUESTION 23 ANSWER EXPLANATION**

23. Which of the following instruments can be used to measure how fast the wind is moving?

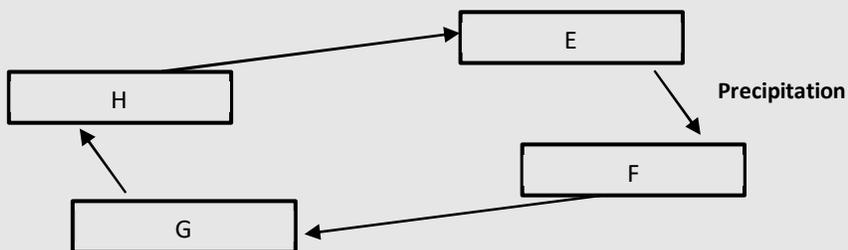
- (A) Barometer
- (B) Wind vane
- (C) Anemometer
- (D) Thermometer

All of these instruments measure weather conditions, we just need to know what, specifically, each one measures.

Barometer	Wind Vane	Anemometer	Thermometer
Measures pressure in the atmosphere.	Measures the direction of the wind, not how fast it is going.	<b>Measures the speed of wind.</b>	Measures temperature.

**Answer choice C is correct.**

**Question 24** refers to a simple illustration of the water cycle shown below.



**QUESTION 24 ANSWER EXPLANATION**

24. What does E represent?

- (A) Clouds
- (B) Rain
- (C) Water vapour
- (D) Water in oceans



The **water cycle** is the circulation of water from the clouds to land to oceans, and finally back up to the atmosphere. The water cycle is extremely important for living organisms, our environment, and the weather. It has been around for billions of years!

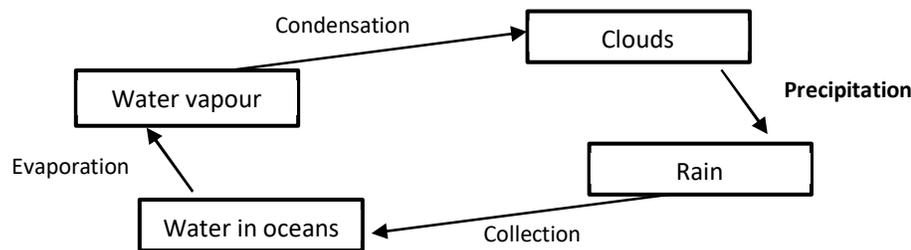
We can break down the water cycle into four main stages: precipitation, collection, evaporation, and condensation. **Precipitation** is another word for rain, snow, or sleet—it's the process of liquid water falling to Earth from clouds. Clouds are just collections of water droplets, and when they become too heavy, the droplets fall.

**Collection** is the process of precipitation “collecting” into bodies of water after it reaches Earth. Some precipitation falls onto land and some falls directly into bodies of water. If it falls onto land, it eventually flows to oceans or rivers or is taken up by living organisms.

When the Sun heats up bodies of water or land, water **evaporates** into water vapour and rises into the air. Water can also evaporate from plants or trees—this is called **transpiration**.

As the water vapour moves up into the atmosphere, the temperature gets colder and the water vapour turns back into liquid water in a process called **condensation**. Condensation causes clouds to form, and once clouds get too heavy with water droplets, precipitation occurs, and the water cycle starts over again!

Knowing all this, we can fill in the blanks on this picture of the water cycle:



Precipitation happens when clouds are so full of water droplets that they fall to the ground as rain, so E represents clouds in this picture. **Answer choice A is correct.**

#### **QUESTION 25 ANSWER EXPLANATION**

**25.** Which of the following activities will **most** likely reduce pollution?

- (A) Using animal manure for farming
- (B) Burying non-biodegradable waste
- (C) Cutting down a large number of trees
- (D) Building larger chimneys for factories

**Pollution** is the presence or introduction of harmful or poisonous substances into the environment.

Non-biodegradable waste cannot be broken down by nature, and it can harm animals and damage ecosystems if left in the ground. Answer choice **B**, burying non-biodegradable waste like plastic and batteries, would increase, not decrease, pollution of the land.

Since plants need carbon dioxide for photosynthesis, trees remove a lot of carbon dioxide from the atmosphere. Carbon dioxide is a gas which pollutes the air, so planting trees can reduce air pollution by removing carbon dioxide. Answer choice **C** is incorrect because cutting down trees would increase pollution by reducing removal of carbon dioxide from the atmosphere.

The purpose of a chimney is to ventilate (remove) hot, toxic gases from areas where we need to breathe fresh air. These gasses contribute to air pollution, so building larger chimneys for factories would create the ability to generate larger volumes of pollution. Answer **D** would increase, not decrease, pollution.

Using animal manure for farming is much less toxic and harmful than using artificial fertilizer. Chemicals from artificial soil fertilizer can leak into bodies of water and pollute ecosystems, so artificial fertilizer is a land pollutant. Replacing artificial fertilizer with animal manure reduces pollution by eliminating use of a land pollutant in farming. **Answer choice A is correct.**



**QUESTION 26 ANSWER EXPLANATION**

26. Humans benefit from the rainforest because it provides them with

- (iv) food
  - (v) water
  - (vi) medicine
- 
- (A) (i) and (ii) only
  - (B) (i) and (iii) only
  - (C) (ii) and (iii) only
  - (D) (i), (ii), and (iii)

The rainforest provides food, water, and medicine to humans. The rainforest provides food by serving as ecosystem for diverse plant and animal life. Humans can use these plants and animals for food. The rainforest provides water because it maintains the water cycle, which adds water to the atmosphere. All living organisms require water to survive. The rainforest provides medicine because some plants in rainforests can be used for medicinal purposes.

**Answer choice D is correct.**

**QUESTION 27 ANSWER EXPLANATION**

27. All of the following are methods of conserving water in the home **except**

- (A) washing small loads of clothes.
- (B) bathing with a bucket of water.
- (C) purifying waste water for human consumption.
- (D) washing the yard with water used for rinsing clothes.

Be careful. We need to select the answer that does **not** conserve water.

Answer choice **B** is a method of conserving water because bathing with a bucket of water uses less water than a continuously running faucet.

Answer choice **C** is a method of conserving water because reusing waste water through purification decreases the consumption of more water.

Answer choice **D** is a method of conserving water because the water used for rinsing clothes is then reused for washing the yard. This reduces the consumption of more water to wash the yard.

Answer choice **A** increases the consumption of clean water because washing small loads of clothes requires more washes. With each wash, more water is consumed. Washing large loads of clothes reduces the number of washes required to do laundry and would conserve water. **Answer choice A is correct** because washing small loads of clothes is **not** a method of conserving water.

**QUESTION 28 ANSWER EXPLANATION**

28. Which of the materials below is a good conductor of heat?

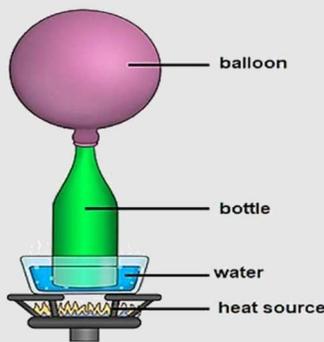
- (A) Rubber
- (B) Wood
- (C) Glass
- (D) Iron

**Conduction** is the movement of heat through a material.

The best conductors of heat are metals, and some poor conductors are glass, wood, rubber, and plastics. Iron is a metal, so it is the best conductor from this list of options. **Answer choice D is correct.**



**Question 29** refers to the diagram which shows the heating of a bottle which has its mouth covered with a balloon.



**QUESTION 29 ANSWER EXPLANATION**

**29.** Which of the following statements explains why the balloon is inflated?

- (A) The bottle contracted.
- (B) The heat was turned off.
- (C) The air in the bottle expanded.
- (D) The surrounding air contracted.

There are three **states of matter** that are made up of atoms and molecules: solids, liquids, and gases.

**Solids** have the slowest-moving molecules. They are packed very tightly, and they give solids a fixed shape. **Gases** have the fastest-moving molecules. They are very far from each other, and they move so fast that gases do not have a definite shape or size. **Liquids** have molecules that are moving at a rate somewhere between the speeds of solid molecules and gas molecules. This causes liquids to have a definite size, but not a definite shape. Liquids will change shape to fit the container they are in, but they cannot expand to take up more space or contract to take up less space.

Heating a liquid will cause molecules to vibrate faster and eventually change state and become a gas. As the gas inside the bottle heats, its molecules move faster and take up more space. As the air inside the bottle expands, the balloon inflates because the air cannot escape the bottle. **Answer choice C is correct.**

**QUESTION 30 ANSWER EXPLANATION**

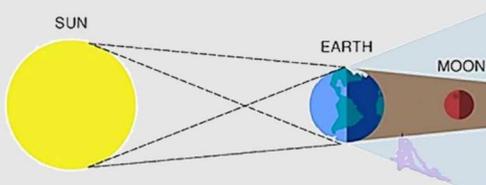
**30.** A suspension can be made from mixing

- (A) sugar and water.
- (B) mud and water.
- (C) salt and water.
- (D) coffee and water.

What is a **suspension**? A suspension is mixture in which the liquid and solid components do not dissolve.

Out of the four choices, mud and water would be the only mixture which would leave behind a solid. **Answer choice B is correct.**

**Question 31** refers to the position of the Sun, Moon and Earth as shown in the diagram below.



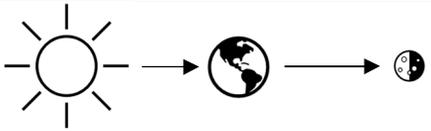
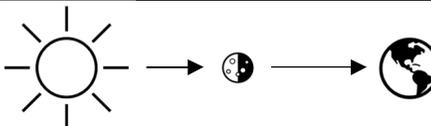
**QUESTION 31 ANSWER EXPLANATION**

31. Which of the following is represented by the illustration above?

- (A) New moon
- (B) Full moon
- (C) Lunar eclipse
- (D) Solar eclipse

Solar indicates sun and lunar indicates moon. Eclipse means to block or obscure. A full moon is when the Moon looks completely round and bright, and a new moon occurs when the Moon looks completely round and dark.

To appreciate how the Sun, Moon, and Earth need to align for each of these occurrences, a diagram is shown below. For each of these descriptions, we use the perspective that we are standing on planet Earth and looking towards the Sun or the Moon. *Note: the smallest circle that is half shaded, half unshaded represents the Moon.*

lunar eclipse (all 3 in a line)		A lunar eclipse occurs when the Earth is blocking the Moon from the Sun. The Sun, Earth, and Moon are <b>exactly</b> in a line with the Earth in the middle. This causes the Earth's shadow to fall on the Moon.
full moon (not in line)		Similar to lunar eclipse, but the three objects are not in a line. It is the phase of the Moon that occurs when the Earth lies between the Sun and the Moon so that the Moon is visible as a fully illuminated disc.
solar eclipse (all 3 in a line)		A solar eclipse means, from the perspective of standing on Earth, the Sun is blocked by the Moon. The Sun, Moon, and Earth are <b>exactly</b> in a line with the Moon in the middle.
new moon (not in line)		Similar to solar eclipse, but the three objects are not in a line. It is the phase of the Moon that occurs when the Moon lies between the Sun and the Earth and does not appear to be illuminated by the Sun.

The original illustration shows that the objects are in a straight line, so we have an eclipse. Because the Earth is in the middle and the Moon is being "blocked" from the Sun, we have a lunar eclipse. **Answer choice C is correct.**

**QUESTION 32 ANSWER EXPLANATION**

32. Which of the following is a natural source of heat and light?

- (A) Sun
- (B) Moon
- (C) Oven
- (D) Candle

We can eliminate answer choices **C** and **D** because ovens and candles are not natural, they are created by humans. Additionally, ovens provide heat but not light while candles provide light but not heat.

The Sun is the main source of light and heat on Earth! **Answer choice A is correct.**

Be aware that the Moon does not provide heat or light. The light we see from the Moon is reflected from the Sun.



### QUESTION 33 ANSWER EXPLANATION

33. The water cycle can occur repeatedly because water

- (A) cannot be compressed.
- (B) is essential for all living things.
- (C) changes state by heating or cooling.
- (D) evaporates only from seas and oceans.

Our answer explanation for question 24 outlines a more in-depth discussion of the water cycle.

Answer choice **A** is incorrect because water can be compressed. Water at the bottom of the ocean is more compressed by the weight of the water above it than water at the surface at the ocean. Even if you weren't sure about this answer choice, though, the fact that the water cycle is based on the changes of state of water should indicate that there is a stronger answer choice.

Be careful... answer choice **B** is true if we are making the statement that water is essential for all living things, *but this does not answer the question being asked!* We are being asked why the water cycle can occur repeatedly. In multiple choice questions, we must make sure we are answering the question. The water cycle does not occur repeatedly because water is essential for all living things.

Answer choice **D** is incorrect because it uses the word **only** with regards to water evaporating from **only** two sources. In multiple choice problems, watch out for words like only, always, and never because these words imply there are no exceptions. If there are any other places water can evaporate to contribute to the water cycle, then this answer is incorrect. Water does not only evaporate from seas and oceans. Water can also evaporate from lakes, rivers, streams, land, and plants (the process of evaporating from plants is the process called transpiration).

If water could not change state, it would not be able to evaporate from the Earth or condense in the atmosphere, and the water cycle would not be possible. **Answer choice C is correct.**

### QUESTION 34 ANSWER EXPLANATION

34. Which of the following is **not** an example of a physical change?

- (A) Cutting up a sheet of cloth
- (B) Mixing sugar and water
- (C) Ice melting into water
- (D) Baking a cake

A **physical change** occurs when there is a (usually) reversible change in the physical properties of a substance. An example of this could be altering the shape or size of a substance, and this includes changing phases. A key understanding of a physical change is no new substance is created, we just have the original substance in a different shape, size, or phase. For example, ice can melt into water when it is heated, but it will freeze back into ice when it cools. This is why answer choice **C** is a physical change.

Cutting up a sheet of cloth (answer choice **A**) results in changing the size of the pieces of cloth, but not changing the properties of the cloth. This is another example of a physical change.

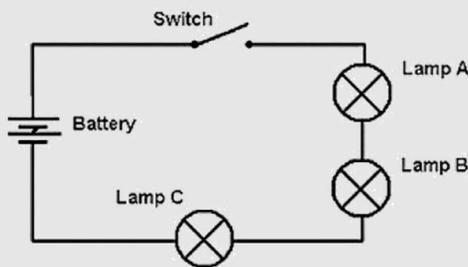
A **chemical change** occurs when we change a substance in a way that prevents it from being able to return to the original form. Chemical changes create a new substance with different properties – we change the chemical composition of the substance.

When we mix sugar and water (answer choice **B**), the sugar dissolves in the water and creates a solution. It might seem like a new substance is created, but we can still separate the sugar and water by heating the solution. So, this is a physical change.

When we bake a cake (answer choice **D**), we cannot go back to the original ingredients—we cannot “un-bake” a cake! The ingredients are chemically changed when we bake them, and a new substance is formed. This is not a physical change; this is a chemical change. A good awareness is cooking and burning things is always considered a chemical change. **Answer choice D is correct.**



Questions 35 and 36 refer to the diagram of a circuit as shown below.



**QUESTION 35 ANSWER EXPLANATION**

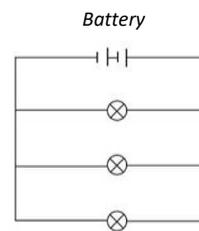
35. What type of simple circuit is represented in the diagram above?

- (A) Series
- (B) Parallel
- (C) Parallel series
- (D) Series parallel

A **circuit** is a path through which electricity flows. Circuits can be made up of wires, a battery, lamps, and a switch.

In a **series circuit**, the electrical current flows to all the bulbs through a single wire. **Parallel circuits** (as illustrated to the right) split up the current across several wires.

Series parallel or parallel series circuits are combinations of series and parallel circuits. Since the bulbs in the diagram for this question are all on the same wire and no bulbs are wired in parallel, it is a series circuit.



a parallel circuit

**Answer choice A is correct.**

**QUESTION 36 ANSWER EXPLANATION**

36. What effect will there be in the circuit if Lamp B is damaged and the switch is closed?

- (A) Only Lamp C will light.
- (B) Only Lamp A will light.
- (C) Lamps A and C will light.
- (D) Lamps A and C will not light.

A switch has two states, either open or closed. When a switch is open, that means the current is interrupted and no current can flow through it. When a switch is closed, the circuit is closed, and current can flow through the circuit.

This question is stating that the switch is closed, so there is the potential for lamps to be on. If the question had stated the switch was open, then no lamps would be able to light.

Because the lamps in this circuit all receive electrical current from the same wire, damaging one lamp will stop the current from flowing to all the lamps in the circuit. In other words, damaging any of the lamps is the same as opening the circuit and stopping the flow of current. **Answer choice D is correct.**

**QUESTION 37 ANSWER EXPLANATION**

37. Lina hangs her T-shirts outside. Which **two** weather conditions would be best for drying her laundry?

- (A) Windy and stormy
- (B) Windy and cloudy
- (C) Sunny and windy
- (D) Sunny and cloudy



Lina wants conditions that will cause the clothes to dry. We know from the answer explanations of questions 24 and 33 that heat from the Sun causes water to **evaporate**. In order to dry clothes, water needs to evaporate from the clothes into a gas.

Also, wind can help to dry clothes by carrying water away from them. So, sunny and windy weather is best for drying laundry.

**Answer choice C is correct.**

**Question 38** refers to the diagram of a simple machine in use as shown below.



### QUESTION 38 ANSWER EXPLANATION

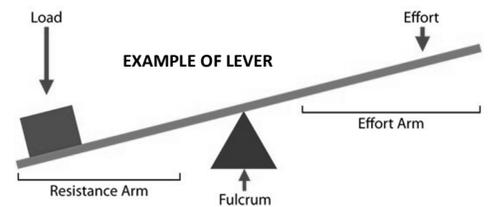
**38.** Which type of simple machine is used above to remove the cork from the bottle?

- (A) Lever
- (B) Screw
- (C) Wedge
- (D) Inclined plane

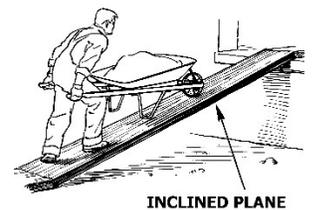
A **simple machine** is a tool that is used to make a task easier to accomplish. They allow us to apply force for doing work. Simple machines usually have only a few or no moving parts. Some types of simple machines are levers, wheels and axles, inclined planes, wedges, screws, and pulleys.

The **lever** is made up of a straight rigid object like a board or a bar which pivots on a turning point called a fulcrum. This makes it easier to move a load. Examples of levers include a seesaw, pliers, crowbar, wheelbarrow, and tweezers.

In this question, the center of the cork is the fulcrum because it supports the bottle opener as you move it upward. The load is the bottom of the cork. When you lift the bottle opener upward, it pivots on the top of the cork so that you can easily lift the cork from underneath. That is why **Answer choice A is correct**.



**Inclined planes** are flat surfaces with one end higher than the other. They make it easier to push or roll a heavy load up or down instead of lifting it. Even though the load has to be carried a longer distance, less effort is needed when we are using an inclined plane. It is generally easier to slide something than to lift it. A bottle opener may have a slanted surface, but it is not used to move something across a distance. Examples of inclined planes include slides and ramps.

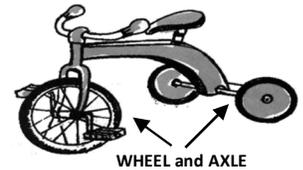


**Wedges** are made of two inclined planes put together, and they are used in many tools that split things apart (or push them apart). For example, an axe is a wedge used to split wood, and knives are wedges that are used to cut food. A bottle opener is not a wedge because it is lifting, not splitting.

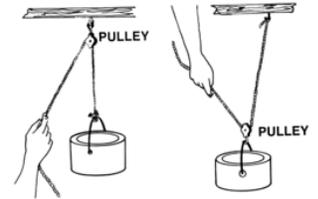
**Screws** are inclined planes that are wrapped around a cylinder or cone. Screws are used to hold materials together, so a bottle opener cannot be a screw.



Even though it is not in this question, the **wheel and axle** is another simple machine. It uses a wheel with a rod attached in the middle as an axle to help it to lift or move loads. In some cases, this machine works like a lever to multiply force (like with a doorknob or a fishing reel). In other cases, wheels and axles like bicycles or tricycles are used to move objects.



Last, a **pulley** is a grooved wheel and a rope that is used to lift heavy loads to high places. The rope fits into the groove, and one end of the rope attaches to the load. Pulling on the other end of the rope allows the load to move.



### QUESTION 39 ANSWER EXPLANATION

39. Which of the following objects possesses potential energy?

- (A) A ball rolling on the field
- (B) A stretched rubber band
- (C) An electric fan switched on
- (D) Water falling from a mountain

There are many different types of energy: kinetic energy, potential energy, light energy, chemical energy, mechanical energy, heat energy, and electrical energy.

An important thing to know about energy is that it can be converted from one form to another.

The word **potential** means having or showing the capacity to become or develop into something in the future. **Potential energy** is stored energy, while **kinetic energy** is the energy of motion.

**Potential energy** can eventually turn into **kinetic energy**.

A ball rolling on a field has mostly kinetic energy because the ball is already moving. Answer choice **A** is incorrect.

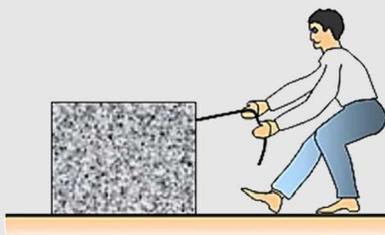
An electric fan switched on converts **electrical energy** to kinetic energy as it starts moving, which is not a conversion of potential to kinetic energy. Answer choice **C** is incorrect.

Answer choice **D** is incorrect because water falling from a mountain loses its potential energy as it falls from the mountain. At the top of the mountain, the water had potential energy. Once it starts moving, that potential energy converts to kinetic energy.

When you stretch a rubber band, the rubber band has a lot of potential energy that converts to kinetic energy once you let go of it. The rubber band in its stretched state (before it is released) possesses potential energy. **Answer choice B is correct.**



**Question 40** refers to the use of a simple machine as shown below.



**QUESTION 40 ANSWER EXPLANATION**

**40.** The force that the man is acting against is

- (A) friction.
- (B) electrical.
- (C) magnetic.
- (D) gravitational.

**Friction** is a force that can hold back objects with surfaces when they are rubbed against each other. The rougher the surfaces are, the more friction there is. When you push a book on the surface of a desk, the book eventually stops moving. Friction is the force that caused it to stop because the surface of the desk was rubbing the surface of the book. In this question, the surface of the rock is rubbing against the ground, which creates friction to hold back the movement of the rock. **Answer choice A is correct.**

**Gravitational force** is the force that pulls objects towards the Earth. You would have to act against gravitational force to lift something up, not to pull something along the ground. That is why answer choice **D** is incorrect.

**Magnetic force** is the force between two objects (magnets) that attract or repel each other. All magnets are made of metal, so the ground that the man is pulling the box along cannot be a magnet. Answer choice **C** is incorrect.

**Electrical force** is similar to magnetic force because it is an attraction or repulsion of two objects. It is different from magnetic force because the objects are charged. Answer choice **B** is incorrect.

