

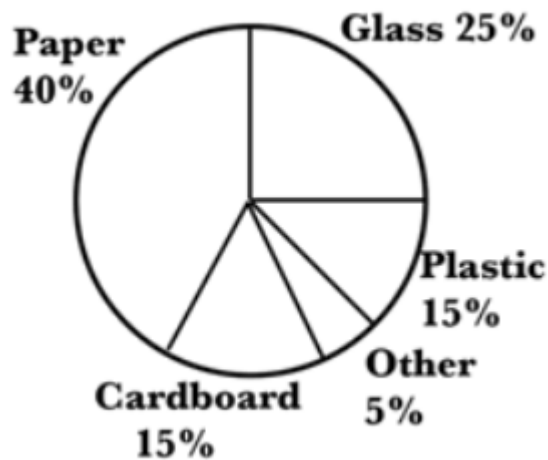
GED Science Practice Questions

If you've heard rumors about the GED being changed and are worried that these questions no longer apply, there's no need for concern. The new improved GED doesn't start until 2014. Until then, these samples are great practice.

1. The pilot of an eastbound plane determines wind speed relative to his aircraft. He measures a wind velocity of 320 km/h, with the wind coming from the east. An observer on the ground sees the plane pass overhead, and measures its velocity as 290 km/h. What is the wind velocity relative to the observer?

1. 30 km/h east-to-west
2. 30 km/h west-to-east
3. 320 km/h east-to-west
4. 290 km/h east-to-west
5. 290 km/h west-to-east

Question 2 pertains to the following figure:



2. A recycling company collects sorted materials from its clients. The materials are weighed and then processed for re-use. The chart shows the weights of various classes of materials that were collected by the company during a representative month. Which of the following statements is NOT supported by the data in the chart?

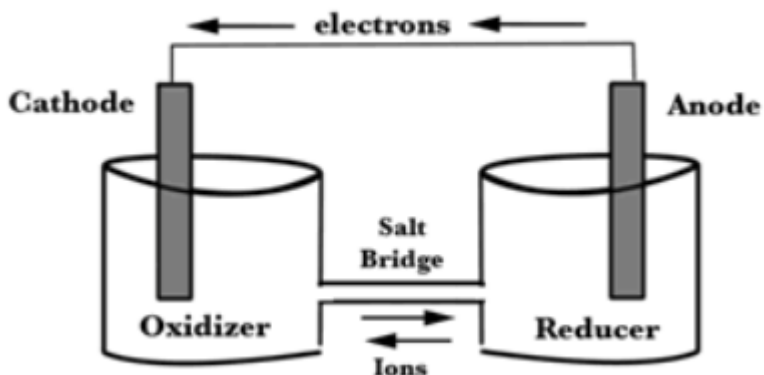
1. Paper products, including cardboard, make up a majority of the collected materials
2. One quarter of the materials collected are made of glass
3. More plastic is collected than cardboard
4. Plastic and cardboard together represent a larger portion of the collected materials than glass bottles
5. The largest category of collected materials includes newspapers

3. During the process of oogenesis, primary oocytes produce:

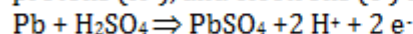
1. Sperm
2. Eggs
3. Oogonia
4. Stem cells
5. None of the above

Questions 4-6 are based upon the following figure and text:

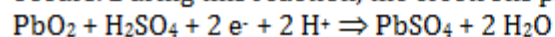
Electrochemical Battery



An electrochemical battery is a device powered by oxidation and reduction reactions that are physically separated so that the electrons must travel through a wire from the reducing agent to the oxidizing agent. The reducing agent loses electrons, and is oxidized in a reaction that takes place at an electrode called the anode. The electrons flow through a wire to the other electrode, the cathode, where an oxidizing agent gains electrons and is thus reduced. To maintain a net zero charge in each compartment, there is a limited flow of ions through a salt bridge. In a car battery, for example, the reducing agent is oxidized by the following reaction, which involves a lead (Pb) anode and sulfuric acid (H₂SO₄). Lead sulfate (PbSO₄), protons (H⁺), and electrons (e⁻) are produced:



At the cathode, which is made of lead oxide (PbO₂), the following reaction occurs. During this reaction, the electrons produced at the anode are used:



4. Electrons are produced by a chemical reaction that takes place at the:

1. Anode
2. Cathode
3. Lead oxide electrode
4. Oxidizer
5. Salt bridge

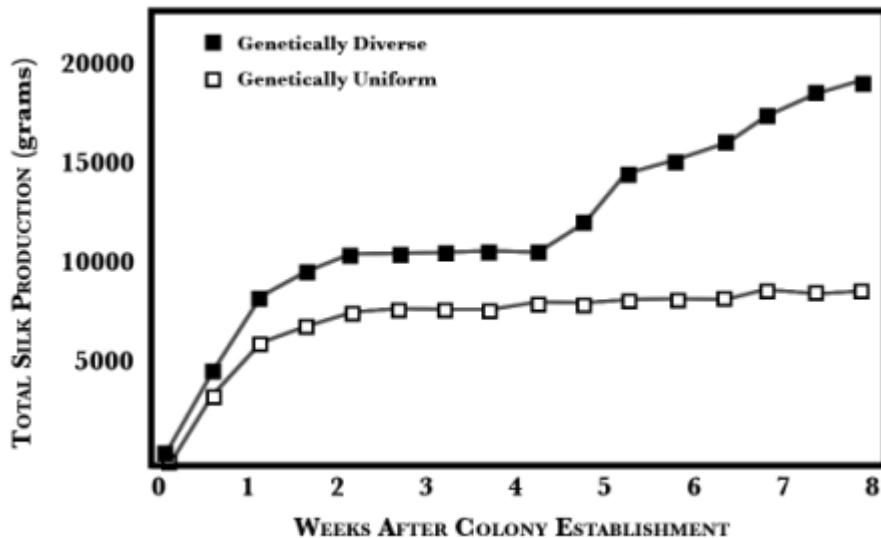
5. In an oxidation reaction:

1. An oxidizing agent gains electrons
2. An oxidizing agent loses electrons
3. A reducing agent gains electrons
4. A reducing agent loses electrons
5. An oxidizing agent reduces an electrode

6. In a car battery, a product of the oxidation reaction that occurs at the cathode is:

1. Lead oxide
2. Lead
3. Electrons
4. Water
5. Sulfuric acid

Questions 7-8 are based upon the following figure:



7. Colonies of silkworms containing the same number of genetically identical or genetically varying animals were established. For several weeks after the colonies were created, silk production was estimated by removing small samples of silk from the colonies and weighing them. The results are shown in the graph. The open symbols refer to the production of silk by genetically uniform worms, while the closed symbols refer to production of silk by genetically diverse worms. Which of the following conclusions can be drawn from the data?

1. Genetically diverse worms produce more silk than genetically uniform worms
2. Genetically uniform worms produce more silk than genetically diverse worms
3. Genetically diverse silkworm colonies produce more silk than genetically uniform colonies
4. Genetically uniform silkworm colonies produce more silk than genetically diverse colonies
5. Genetically diverse silkworms produce silk longer than genetically uniform worms

8. If the generation time of a silkworm is about four weeks, which of the following hypotheses offers the best explanation for the difference in silk productivity between the two colonies?

1. Genetically diverse silkworms produce silk longer than genetically uniform worms.
2. Genetically diverse silkworms reproduce more than genetically uniform worms.
3. Genetically diverse silkworms produce heavier silk than genetically uniform worms.
4. Genetically uniform silkworms stop producing silk when they reproduce.
5. The silk from genetically uniform silkworms decays rapidly.

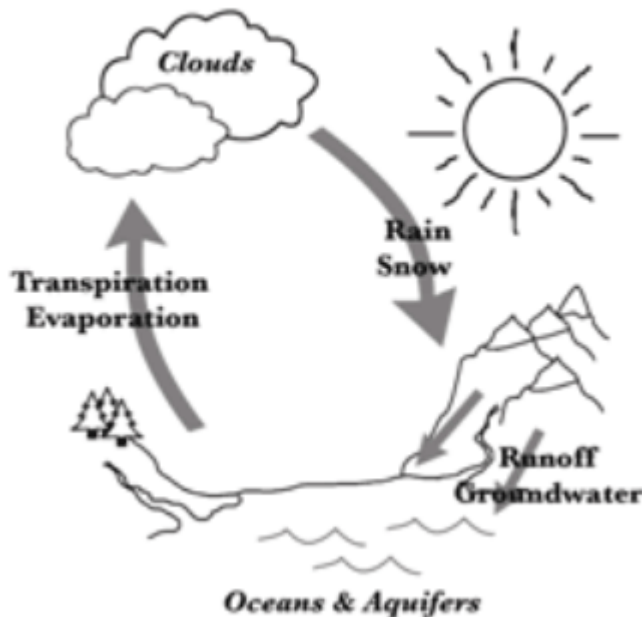
9. The digestion of starch begins:

1. In the mouth
2. In the stomach
3. In the pylorus

4. In the duodenum
5. In the ileum

Questions 10-13 are based upon the following figure and text:

THE WATER CYCLE



Energy from the sun heats the water in the oceans and causes it to evaporate, forming water vapor that rises through the atmosphere. Cooler temperatures at high altitudes cause this vapor to condense and form clouds. Water droplets in the clouds condense and grow, eventually falling to the ground as precipitation. This continuous movement of water above and below ground is called the hydrologic cycle, or water cycle, and it is essential for life on our planet. All the Earth's stores of water, including that found in clouds, oceans, underground, etc., are known as the hydrosphere.

Water can be stored in several locations as part of the water cycle. The largest reservoirs are the oceans, which hold about 95% of the world's water, more than 300,000,000 cubic miles. Water is also stored in polar ice caps, mountain snowcaps, lakes and streams, plants, and below ground in aquifers. Each of these reservoirs has a characteristic residence time, which is the average amount of time a water molecule will spend there before moving on. Some typical residence times are shown in the table.

Average reservoir residence times of water.

Reservoir	Residence Time
Atmosphere	days 9
Oceans	years 3000
Glaciers and ice caps	years 100
Soil moisture	months 2
Underground aquifers	10,000 years

The water cycle can change over time. During cold climatic periods, more water is stored as ice and snow, and the rate of evaporation is lower. This affects the level of the Earth's oceans. During the last ice age, for instance, oceans were 400 feet lower than today. Human activities that affect the water cycle include agriculture, dam construction, deforestation, and industrial activities.

10. Another name for the water cycle is:

1. The hydrosphere
2. The atmosphere
3. The reservoir
4. The hydrologic cycle
5. The residence cycle

11. Water is stored underground, as well as in oceans and ice caps. Such underground storage reservoirs are called:

1. Storage tanks
2. Aquifers
3. Evaporators
4. Runoff
5. Transpiration

12. Other than atmospheric water, water molecules spend the least time in:

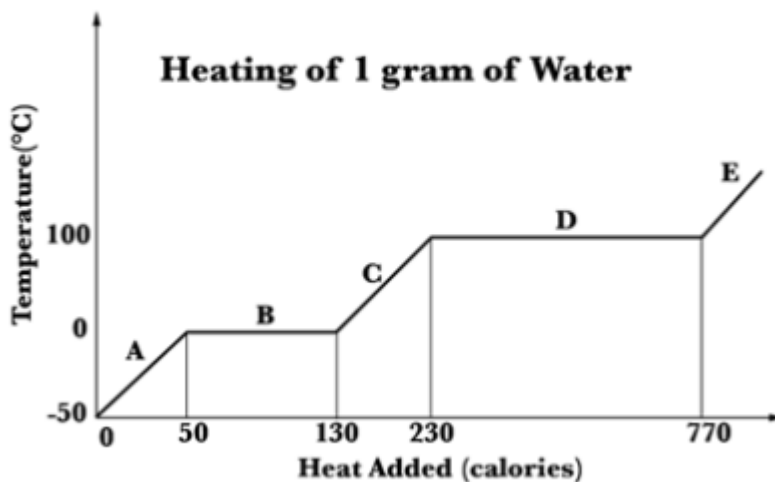
1. Aquifers
2. Oceans
3. Glaciers
4. Ice caps
5. Soil

13. Which of the following statements is NOT true?

1. Cutting down trees affects the water cycle.
2. Ocean levels rise during an ice age.
3. Oceans hold most of the world's water.
4. Clouds are formed because of cold temperatures.
5. Rain and snow are forms of precipitation.

Questions 14-15 are based upon the following figure and text:

Heat and the States of Matter



When the molecules of a substance absorb energy in the form of heat, they begin to move more rapidly. This increase in kinetic energy may be a more rapid vibration of molecules held in place in a solid, or it may be motion through molecular space in a liquid or a gas. Either way, it will be observed as either a change in temperature or a change in state. Heat has traditionally been measured in terms of calories. One calorie is equal to 4.186 Joules. The specific heat capacity of a substance is the energy required to raise the temperature of 1 kg of the substance by 1°C. For water, this is 1000 calories. If heat continues to be applied to ice that is already at its melting point of 0°C, it remains at that temperature and melts into liquid water. The amount of energy required to produce this change in state is called the heat of fusion, and for water it is equal to 80 calories per gram. Similarly, the amount of energy required to change a gram of liquid water at 100°C into steam is called the heat of vaporization, and equals 540 calories. The graph shows an experiment in calorimetry: 1 gram of water at -50°C is heated slowly from a solid state until it has all turned to gas. The temperature is monitored and reported as a function of the heat added to the system.

14. Heat is a form of:

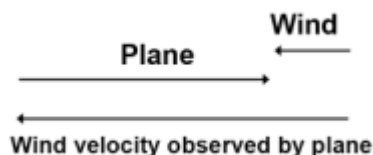
1. Potential energy
2. Chemical energy
3. Kinetic energy
4. Temperature
5. Electromagnetic energy

15. Which of the following statements is true?

1. Adding heat to a system always increases its temperature.
2. The average speed of a gas molecule is slower than the average speed of a liquid molecule of the same substance.
3. Adding heat to a system always increases the average speed of the molecules of which it is comprised.
4. Heat must be added to liquid water to make ice.
5. It takes more energy to melt a gram of water at 0°C than it does to turn a gram of water at 100°C into steam.

GED Science Answers and Explanations

1. 1: The velocities of both the wind and the aircraft can be represented by vectors, with the length of the vector representing the speed and the direction of the vector representing the direction of either the wind or the airplane. Since the wind speed opposes that of the plane, the pilot will measure the sum of the actual wind speed plus that of his aircraft:



2. 3: The chart shows that plastic and cardboard materials both comprise 15% of the collected materials, so it is incorrect to say that there is more plastic than cardboard. They are present in equal quantities.

3. 2: Oogenesis is the process that gives rise to the ovum, or egg, in mammals. The oocyte is the immature egg cell in the ovary. In humans, one oocyte matures during each menstrual cycle. It develops first into an intermediate form called the ootid, and eventually into an ovum. The prefix oo- is derived from Greek, and means "egg."

4. 1: The reactions described in the text are ones during which negatively charged electrons are produced by a reaction that reduces the positively-charged lead anode. The reducing agent, in turn, is oxidized by this reaction. These electrons travel through the wire to the negatively-charged cathode, where they react with the sulfuric acid oxidizer and reduce it, forming lead sulfate. In a car battery, the anode is the positively-charged electrode, and is normally indicated by a red marking.

5. 1: In an oxidation reaction, an oxidizing agent gains electrons from a reducing agent. By contributing electrons, the reducing agent reduces (makes more negative) the charge on the oxidizer. In the car battery, reduction of the positively-charged anode provides electrons, which then flow to the cathode, where an oxidation takes place. In an oxidation, an oxidizing agent increases (makes more positive) the charge on a reducer. In this way, the extra electrons in the negatively charged cathode are neutralized by the surrounding oxidizing agent.

6. 4: The reaction described in the text is one during which two water molecules (H_2O) are produced for each lead oxide (PbO_2) molecule that reacts at the cathode.

7. 3: The data indicates that up until about 4 weeks, the silk production from both colonies was similar. This suggests that the worms from each colony produced the same amount of silk, and that choices A and B are incorrect. The data does indicate that, over the long term, the silk produced by the entire colony of genetically diverse worms was greater than the silk produced by the entire colony of genetically uniform worms. This might be because the worms produce for a longer time, or because of some other mechanism. The experiment does not indicate what that mechanism might be.

8. 2: The increase in productivity from the diverse culture occurs at about 4 weeks, coinciding with the time at which new worms are hatched and begin to produce silk.
9. 1: The digestion of starch begins with its exposure to the enzyme amylase, which is present in the saliva. Amylase attacks the glycosidic bonds in starch, cleaving them to release sugars. This is the reason why some starchy foods may taste sweet if they are chewed extensively. Another form of amylase is produced by the pancreas, and continues the digestion of starches in the upper intestine. The di- and tri-saccharides, which are the initial products of this digestion, are eventually converted to glucose, a monosaccharide that is easily absorbed through the intestinal wall.
10. 4: The term hydrologic cycle is defined in the first paragraph, where it is described as being equivalent to the water cycle. It is derived from the Greek root hydros, which means "water."
11. 2: The second paragraph gives examples of different storage reservoirs for water in the water cycle. Underground aquifers are one of the examples given. An aquifer (a word derived from the Latin root aqua, meaning water) is any geologic formation containing ground water.
12. 5: According to the table, the average residence time of water in soil is only two months. Only its residence time in the atmosphere, 9 days, is shorter. Residence time is defined in the text as the average amount of time that a water molecule spends in each of the reservoirs shown in the table before it moves on to the next reservoir of the water cycle.
13. 2: According to the final paragraph of the text, ocean levels actually fall during an ice age. This is because more water is stored in ice caps and glaciers when the prevailing temperatures are very cold, so less water remains in the oceans.
14. 3: Because the addition of heat causes the molecules of a substance to increase their rate of motion, it is considered a form of kinetic energy. The temperature of a substance is proportional to the kinetic energy of the molecules of which it is made. Addition of heat to a system usually results in an increase in temperature, but temperature is not a form of heat. It is a measure of the amount of kinetic energy present in a system.
15. 3: Energy in the form of heat is always absorbed by the molecules of a substance to make them move faster. During a change of state, some molecules are absorbing energy and escaping the solid phase to become liquid, or escaping the liquid phase to become gas. Since molecules in a gas move faster than those in a liquid and molecules in a liquid move faster than those in a gas, the average speed increases. Note that choice E is incorrect since the heat of vaporization for water is greater than its heat of fusion.