Chapter 9

Science Smart

A Guide to Passing the GED Science Test

"Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world."

—Louis Pasteur

What Is on the GED Science Test?

What is the GED science test like? You'll have 50 multiple choice questions to answer in 80 minutes. That means, on average you'll have about 1½ minutes per question. If you take about 75 seconds (1 minute, 15 seconds) per question, you'll have plenty of time. Remember, though, that this is an average. Some questions will be easier, and some will be more difficult.

The science test covers 35% Physical Science (about 17–18 questions), 45% Life Science (about 22–23 questions), and 20% Earth and Space Science (about 10 questions). Physical Science covers atoms, matter and energy, chemistry, and forces and motion. Life Science covers a wide range of issues about life and health, including cells, DNA and RNA, heredity, evolution, how plants and animals affect each other, and how plants and animals behave. Earth and Space Science includes questions about Earth's systems and origin, the universe, and bodies in space.

On the science test, it's important to have a good background in science and science thinking, but you won't need to know a lot of details like scientific formulas or facts. For the most part, the information you need to know is all on the test. What you need is a solid background to interpret and understand the information.

The context of the science test covers five areas. The Unifying Concepts and Processes area is about fundamental science concepts. You'll need to understand the overall idea of systems and organization in science, evidence and explanations, change and measurement, evolution and equilibrium, and form and function. Science as Inquiry involves asking questions, planning and carrying out experiments, tools to collect data or information, connecting evidence and conclusions, evaluating different explanations, and understanding science arguments. Science and Technology is about using science to develop technological solutions to problems. Science in Social and Personal Perspective is about how science affects the world. It covers natural resources, population, the environment, and government policy about science. History and Nature of Science addresses the human aspects of science and the history of science in different cultures.

The science test will cover both readings and visual information, including tables, charts and graphs, and diagrams. About 60% of questions may contain visual information, so it's important to be able to read and understand charts and graphs. About 25% of the test will be two to five questions about one chart, graph, or reading, but 75% of the test will be a single question about some information.

The science test covers comprehension, analysis, and application, but it does not break down specific percentages for different types of thinking skills.

Important Science Concepts

Your goal in studying for the GED science test is scientific literacy. That is, you should be familiar with broad science concepts and how science works. You should be able to read, analyze, and evaluate science information. Becoming familiar with important science subjects, concepts, and ways to present information will give you the background you need. However, you don't have to memorize science ideas. You don't need to remember all the terms. You do need to be able to read about science and understand what you're reading, so that you can answer questions that ask you to analyze and apply the information. So, don't focus on remembering everything you read. Focus on reading science better and comprehending more.

Understanding Science

For the GED science test, you need a broad understanding of what science is and how it works. Some GED science questions will assume you have knowledge of the scientific method and ways that scientists collect and understand data.

WHAT IS SCIENCE?

Science is a way to gain reliable knowledge about the world. Science isn't a collection of facts or information. It's a system for figuring out what's going on and how the world really works. Scientific thought is a way to think about the world, and so science is really a thinking skill. Scientists try to be objective about the world and find out the truth. Scientists are skeptical. They rely on

evidence, and they are willing to re-think their evaluation of the evidence if they find new evidence.

The Scientific Method

You will very likely run across questions on the GED science test that expect you to understand the scientific method. The scientific method is a process used in science to find out information about the world. The scientific method has five steps:

1. **Observe:** The first step is to notice what's happening around you. Science begins with curiosity about the world. That means looking around you, asking questions, and wondering about what's going on.
   Example: I love the lava lamp on my desk, and I wonder what makes the 'lava' inside the lamp float up to the top and come down again.

2. **Hypothesize:** **Hypothesis** is one of the important terms that you should understand for the GED test. A hypothesis is an idea that explains what you've observed or answers a question that you've wondered about. A hypothesis is what you suggest or think might be the answer. A hypothesis has not been proven; it's just your idea.
   Example: I hypothesize that, since the lava sinks to the bottom when the lamp is off, the light from the lamp makes the lava rise, and when the lava is at the top, in the darker part of the lamp, it falls.

3. **Predict:** After you have a hypothesis, predict something else that would be true if your hypothesis is true.

Prediction: If the bottom of the lamp is exposed to any bright light, while the top has minimal light, the lava lamp will work.

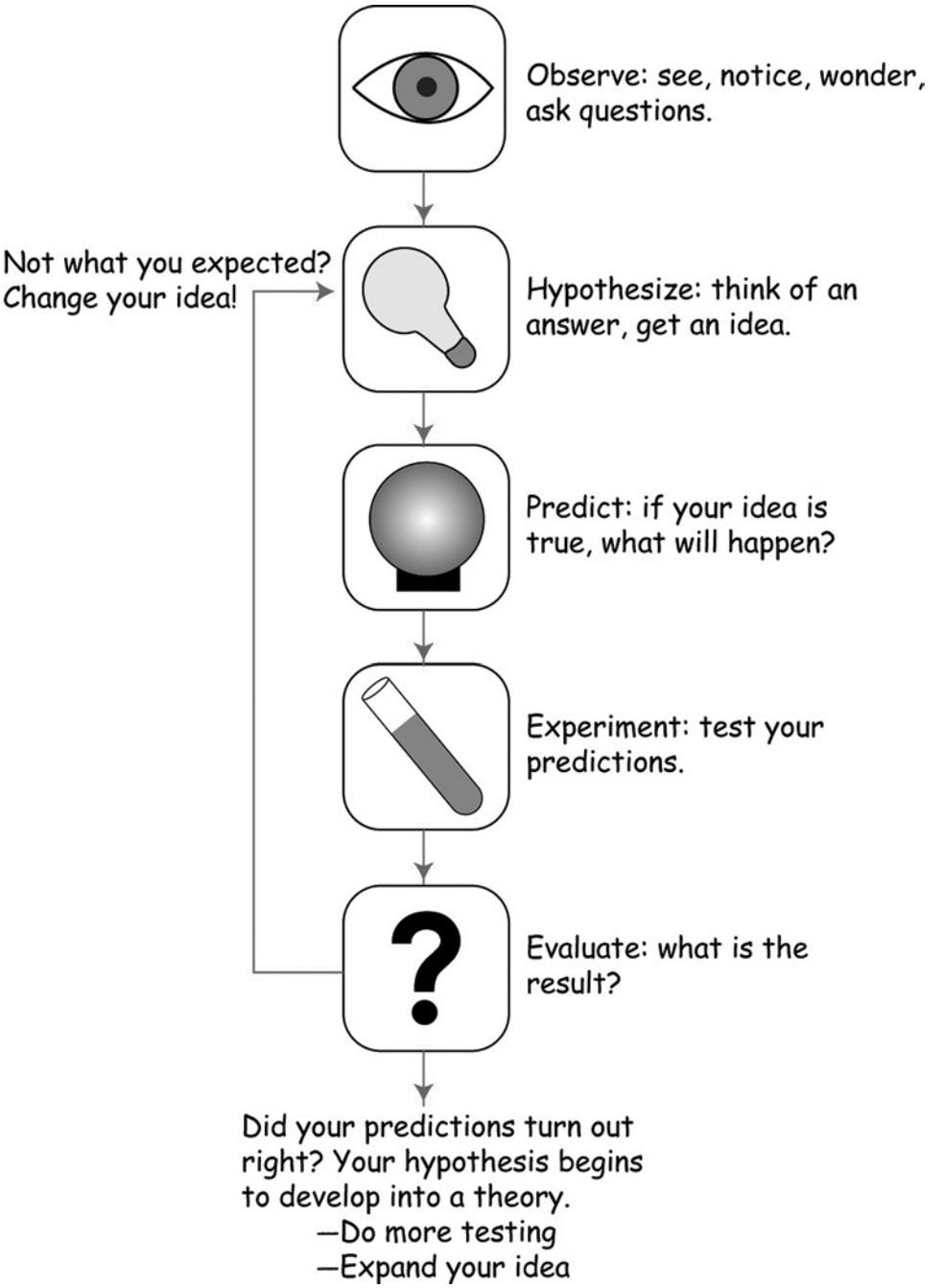
4. **Experiment:** Conduct an experiment to test your prediction.

   Example: I put two lava lamps on two light sources. One is the original light source, and the other is a light source that's equally bright but does not give off heat. I watch the lava lamps to see when they start working. The lava lamp on the original light source is the only one that works. The other lava lamp does not move.

5. **Evaluate:** Look at the results of the experiment. Is it what you would expect based on your prediction? If not, you need to go back and form a new hypothesis. If so, you can begin to develop your *hypothesis* (an idea that's not proven) into a *theory* (an idea that has evidence behind it). That will require more testing and expanding your idea.

   Example: The lava lamp does not work with a light source that only gives off light, not heat. That means that it's not the light that makes the lava move. I think about what the light in the lava lamp has that was not present in my alternate light source, and I make a new hypothesis that applying heat to the bottom of the lava lamp is what makes the lava move. I'll need to test my new hypothesis.

The Scientific Method



SCIENTIFIC METHOD PRACTICE QUESTION

A researcher is interested in finding out the effect on the brain of surgery that restores eyesight. His hypothesis is that once patients receive eyesight-restoring surgery, one specific location in the brain will become active. In a study, the researcher compares MRI images of brain activity in patients before and after eyesight-restoring surgery. However, he finds that the location he predicted would become active has remained inactive.

What is the best next step for this researcher?

1) The researcher should look at the MRI images again.
2) The researcher should find more test subjects to check.
3) The researcher should rethink his hypothesis that the location would become active.
4) The researcher should find new data to support his hypothesis that the location would become active.
5) The researcher should move on to a different field of study.

THINKING SKILL: ANALYSIS

This question tests your understanding of how science works, and especially the scientific method. A researcher performs a study, but it doesn't support his hypothesis. It doesn't show what he thought it would show. The best next step is to go back to the hypothesis and see where or how he might have been on the wrong track. Answer 3 is the best answer. The researcher should rethink his hypothesis.

You can use logic and a process of elimination to figure out the best answer. Answer 1 is to look at the MRI images again. This doesn't help much. What new information would the scientist hope

to find? Answer 2 is to find more test subjects. Although it's good to have a lot of test subjects, there's not any real reason to think that more test subjects will show different results. Answer 3 is to rethink the hypothesis. Since the evidence doesn't back up the researcher's hypothesis, that's a pretty good idea.

Answer 4 is to find new data to support the hypothesis. That would mean the researcher is ignoring the data that doesn't support his idea. That's not good thinking. Answer 5 is to move on to a different field of study. That's not good thinking, either. An unexpected result is a chance to learn something new, not a reason to give up and move to a different field of study.

More about Experiments

The GED science test will ask you to be familiar with how to conduct experiments and what kind of flaws there might be in an experiment. Here are some science experiment concepts you should be comfortable with.

Hypothesis	Your hypothesis is a *potential* explanation of something you've observed. It's not proven. It could turn out to be true, or it could turn out to be false. A hypothesis needs to be tested.
Variable	A variable is the part of an experiment that you change, to see how the results change. In the example of the lava lamp experiment, the light source is the variable. The experimenter changes the lava lamp's light source to see what happens.

Control	A control is what you're testing against. In the example of the lava lamp experiment, the control would be the lava lamp that has its original light source. It's used as a comparison against the changed light source.
Measurement and Recording Data	Measurement is important to any experiment. In the lava lamp experiment, it's pretty easy to measure the data. Does the lamp move or not? If one of the lamps started to move, but took longer, it would be valuable to measure *how long* it took for the light source to move. Measuring and keeping a record of data allows you to keep track of your experiment's results. Be familiar with measuring tools, such as flasks or beakers, scales, thermometers, rulers, stopwatches, or timers.
Validity	Validity of a measurement means whether you're measuring what you intend to measure. Does your information really tell you what you want to know?
Reliability	Reliability is how correct your measurement is. Reliability depends on accuracy and precision.
Accuracy	Accuracy is part of reliability. It means how accurate your measuring tool is. A ruler marked in quarter-inch increments is accurate to a quarter-inch but inaccurate at very small increments, like .001 inches. A scale may be accurate only to a tenth of a pound. Accuracy describes the limits of your measuring tool.

Precision	Precision is also part of reliability. Precision describes the correctness of your measurements. If your scale is consistently off by .2 pounds because it's not balanced correctly, then it's not precise.
Repeated Trials	In science experiments, scientists use repeated trials to verify whether their experiments were accurate and to account for differences in the reliability of their measurements. To give good data, an experiment must be repeatable. If the same experiment gives a different result at a different time, then there is something wrong with the experiment.

SCIENCE EXPERIMENT PRACTICE QUESTION

A student decides to do an experiment to test whether his friend Marta or his friend Dave is better overall at freethrows. Which experimental design will provide the best results?

1) Have Marta and Dave each try one freethrow shot in the gym
2) Have Marta and Dave each try 50 freethrow shots in the gym
3) Have Marta and Dave each try 50 freethrow shots on the outside court
4) Have Marta try 50 freethrow shots in the gym while at the same time Dave tries 50 freethrow shots on the outside court
5) Have Marta and Dave each try 25 freethrow shots in the gym and 25 freethrow shots on the outside court

THINKING SKILL: ANALYSIS

This question tests your understanding of measurement and repeated trials. There are two important concepts to understand. One is that having more trials leads to a more reliable result. Understanding this concept will eliminate answer 1. Marta might be the best at freethrows, but she could miss her first shot. One trial won't give you enough information.

All the other answers have Marta and Dave doing 50 shots each. So what's the difference whether the freethrows are done in the gym or outside? Each court has different conditions. Maybe the wind throws Marta off, but not Dave. Maybe the slick floor in the gym throws Dave off, but not Marta. If both Marta and Dave try 50 freethrows in the gym only or on the outside court only, the measurement might not be *valid.* The experiment might measure only how the players do in indoor or outdoor conditions, not how good they are overall.

Measuring each player in different conditions (having Marta shoot in the gym and Dave outside) isn't the answer. That gives an experiment with *multiple variables.* The location and the player are both variables. You wouldn't know whether the results were due to the player, or due to the location.

The best answer is answer 5. By having each player shoot half their shots in the gym and half outside, you can see how each player does in different conditions. It gives the best result to judge who is better at freethrows overall.

Understanding Data and Evidence

Data is information, like the results of experiments. If you measure how tall a plant grows in three days, that is a piece of data. If you measure a hundred different plants in two types of soil, you've got a collection of data that can be used as evidence. Scientists look for patterns in data. Do plants in one type of soil grow faster? If a pattern can be found, that pattern is *evidence.*

Not all science involves controlled experiments. Much science is based on *collected evidence.* That means measuring things found in nature. Collected evidence includes measuring the temperature of the Earth or the movement of planets. It also includes polling people about what they do or recording the number of people who visit an emergency room each year and why. Identifying what data means and using it as evidence can be tricky. When two types of data correspond, or seem to change at the same time, that's called a ***correlation.*** A correlation in data shows a relationship.

Here's an example. Every year in November and December, sales of game systems like Xbox or PlayStation rise. Every year in November and December, temperatures fall. Is there a ***correlation*** between falling temperatures and rising sales of game systems? Yes. There is a correlation. That just means there's a pattern in the data. The real question is, why?

A ***correlation*** is different than a ***causation***. It's not necessarily cause-and-effect. Low temperatures don't cause game system sales to rise, and high sales don't cause low temperatures. The change in seasons causes temperatures to fall, and the upcoming Christmas holiday causes game system sales to rise. The connection is that Christmas happens in winter. So, a correlation can mean:

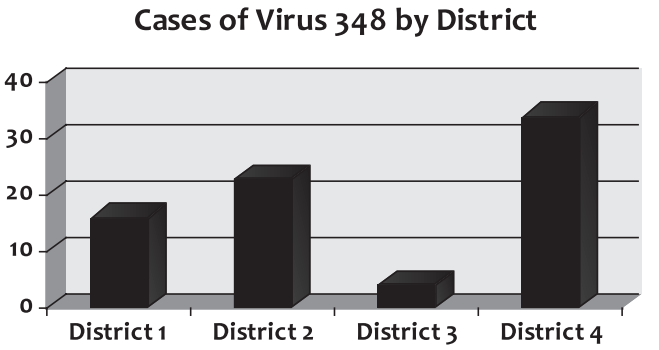
1. **Causation.** One thing causes another. Look for whether the two things are logically related. Why would one thing cause the other? For example, if the number of wolves go down because farmers shoot them, the number of jackrabbits might go up. Why? Wolves eat jackrabbits, so with fewer predators, more jackrabbits survive and have babies.

2. **Common Response.** Common response is when two things are both responding to the same variable. For example, shark attacks and ice cream sales correlate. When ice cream sales tend to go up, so do shark attacks. Why? The weather is hot, so more people are eating ice cream *and* more people are going in the water. Both are responding to the same variable, not to each other.

3. **Complex Relationships.** The general relationship between retail sales of game systems and low temperatures is not a common response to one variable. The timing of Christmas is related to the season of winter, if you look back into the past, but the relationship of retail sales of game systems and low temperatures (or low ice cream sales!) is not as straightforward as the relationship between shark attacks and ice cream sales.

4. **Coincidence.** Sometimes, a correlation is a coincidence, so it's important to look and see if that correlation is sustained over time or due to two unrelated variables that happen to have a similar pattern. It's impossible to prove a coincidence, so look carefully to see if there is any reason why or how the data might be related.

DATA AND EVIDENCE PRACTICE QUESTION



Scientists are tracking cases of a virus that has started appearing among local schoolchildren. What information would be most useful to analyze the data in the above chart to see how common the virus is in different areas?

1) The geographic size of each district
2) The number of schoolchildren in each district
3) The occurrences of other viruses in each district
4) The time it took in each case to identify the virus
5) Data for additional areas

THINKING SKILL: ANALYSIS

Data questions mean thinking through what the data means, and making good conclusions. The chart gives you the number of cases of the virus in different districts, but how common is the virus?

How common the virus is has to do with the number of people in the district. Answer 2 is the best answer. District 3 only has about 4 cases of the virus. If there are 40 schoolchildren in the district, 1 in 10 children is affected. That's 10%. But if there are 400

schoolchildren, only 1 in 100 is affected. That's only 1%. Knowing the number of schoolchildren in each district helps you understand what the data means.

Scientific Consensus

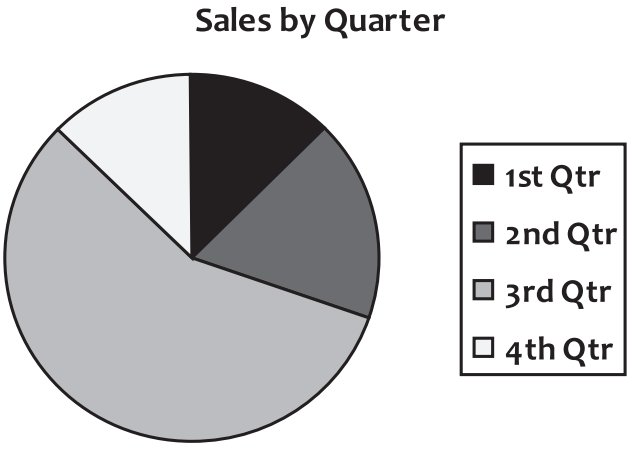
On a small level, one experiment is tried many times, to make sure the results are accurate. On a larger level, scientists from around the world look at many different studies, reports, and collections of data from other scientists. The scientific community is full of individual scientists, all reviewing each other's work. If one study seems to contradict other studies, scientists look for a reason. Either the study is telling them something new, or it's flawed in some way. The more collective information the scientific community has, the better scientific theories can be developed.

A scientific consensus reflects the views of most scientists based on a review of all the information from available studies and data. Not every scientist necessarily agrees, but the great majority of scientists agree. Often, scientific organizations develop reports on important scientific issues that reflect the scientific consensus.

Charts, Graphs, Tables, and Diagrams

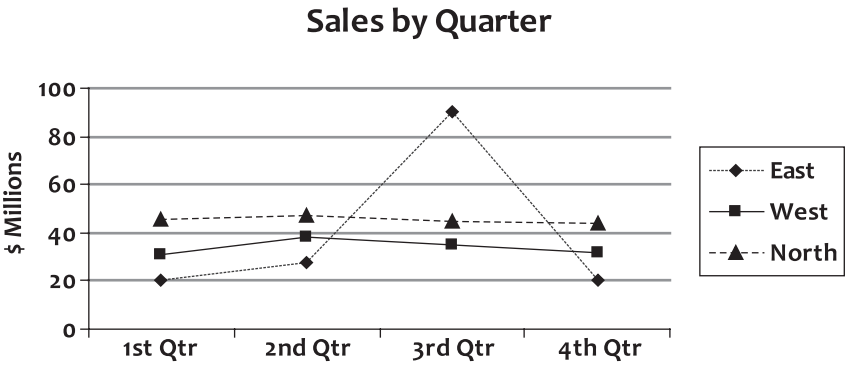
On the GED science test, you'll be expected to read charts, graphs, tables, and diagrams. Charts, graphs, tables, and diagrams are ways to show data and information so that it makes sense. You should be familiar with several ways to show information graphically.

PIE CHARTS



A pie chart breaks up a whole into parts. This pie chart breaks up sales by quarter of the year. The first and fourth quarter sales are smaller, compared to the rest of the year. The third quarter sales make up more than half the yearly sales. It's easy to see how much of the total sales each quarter makes up.

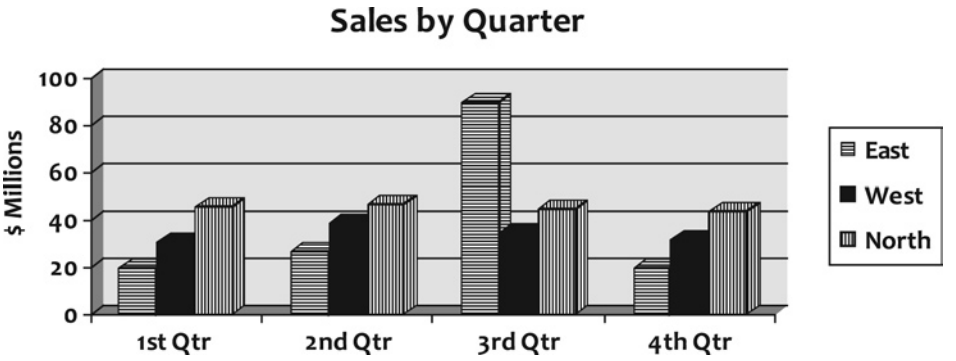
LINE GRAPHS



A line graph tracks two variables in relationship with each other. The *y* (up and down) axis shows the amount of sales in millions of dollars for the East, West, and North divisions. The lines

help show how the sales changed over time. The North division sales were consistent over the year, but the East division sales went up in the middle of the year. This chart compares *sales* to *time*.

BAR GRAPHS



Bar graphs compare information also. In this bar graph, the bars for the first quarter show the sales of the East, West, and North divisions. It's easy to see that the North division had the highest first-quarter sales. You can get that information from the line graph, too, but it's emphasized more in the bar graph. In every quarter except the third, the North division had the highest sales.

TABLES

Sales by Quarter

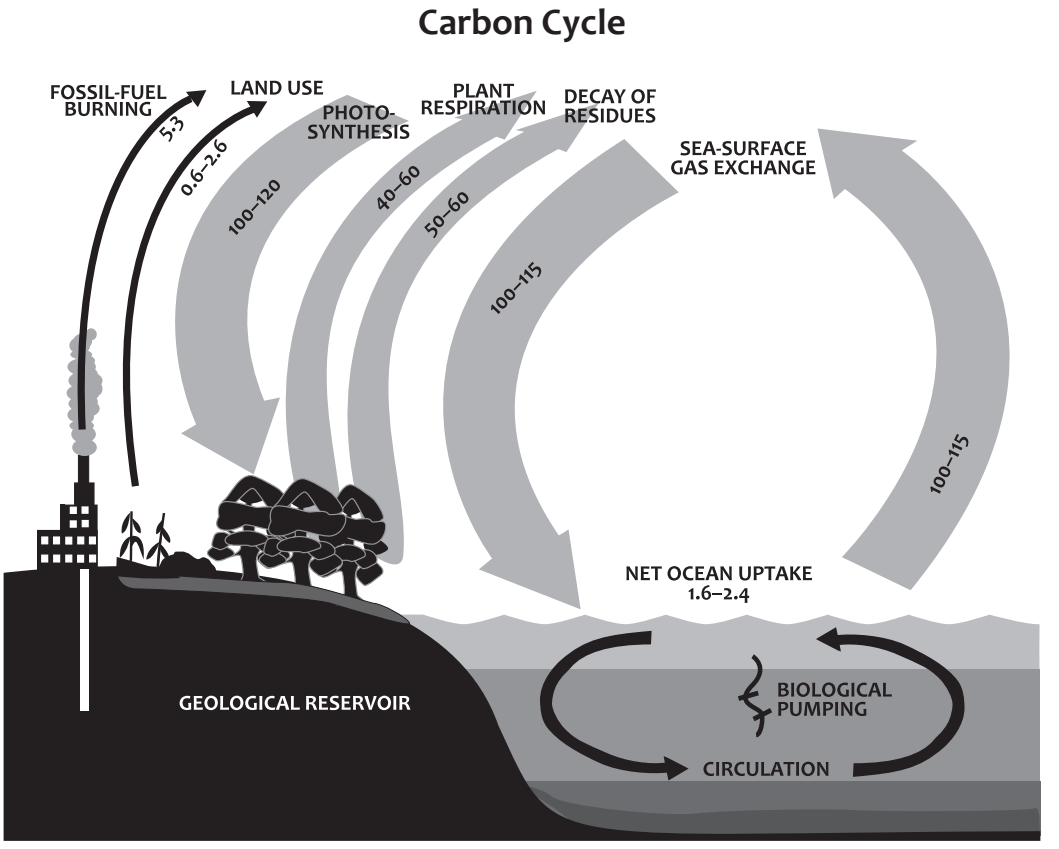
	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
East Division	$20.44 mill.	$27.40 mill.	$90.05 mill.	$20.45 mill.
West Division	$30.63 mill.	$38.62 mill.	$34.59 mill.	$31.66 mill.
North Division	$45.91 mill.	$46.91 mill.	$45.10 mill.	$43.93 mill.

A table gives information in rows and columns. Rows go across, and in this table, the rows show the three different divisions.

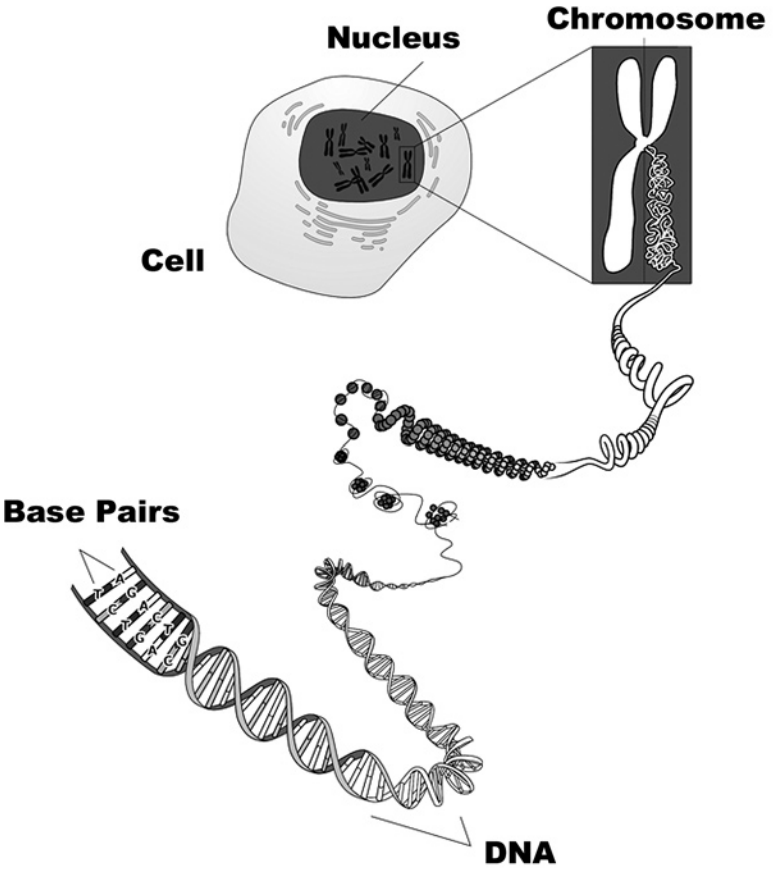
Columns go up and down, and in this table, the columns show the four different quarters. Tables are good at providing specifics, like the specific dollar amounts. They're not as good at showing visual comparisons.

DIAGRAMS

A science diagram shows relationships between things. The world is organized. Things interact with each other. The world has systems, groups of things that interact in a regular way. Diagrams help show systems and organization in the world.



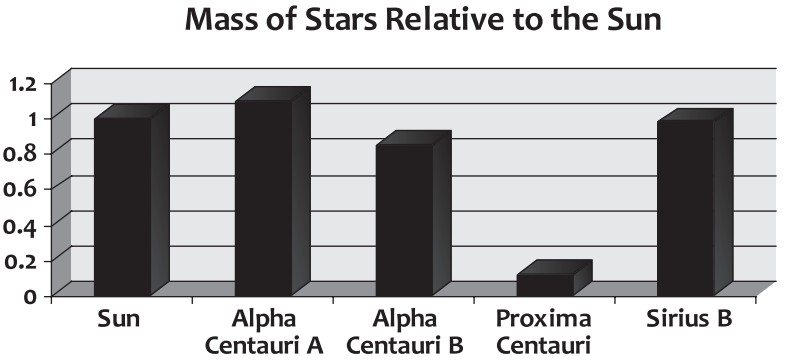
This diagram shows how carbon moves through the Earth. The arrows show the direction the carbon moves, and the labels explain what processes are happening. A diagram shows different parts of a system and how they relate.



Here's another diagram. This diagram shows the relationship of DNA to cells. It illustrates the base pairs that make up DNA, the DNA that makes up chromosomes, and where the chromosomes are located inside a cell nucleus. Like the previous diagram, this diagram shows relationships.

CHARTS, GRAPHS, TABLES, AND DIAGRAMS PRACTICE QUESTION

Gravity and mass are directly proportional. The mass of the star Sirius A is about 2.4 times the mass of the sun, and its gravitational pull is also about 2.4 times the mass of the sun.



Which of the following stars has the greatest gravitational pull?

1) The sun
2) Alpha Centauri A
3) Alpha Centauri B
4) Proxima Centauri
5) Sirius B

THINKING SKILL: APPLICATION

An application question gives you information, and you must apply that information to a new situation. This question gives you the information that gravity and mass are *directly proportional.* As mass goes up, gravitational force goes up. Since Sirius A is about 2.4 times the mass of the sun, it will have about 2.4 times the gravity of the sun. The star with the greatest (largest) mass will be the star with the greatest (largest) gravitational pull. Based on the

chart, Alpha Centauri A has the greatest mass, because the bar for Alpha Centauri A is tallest. The correct answer is answer 2. Alpha Centauri A has the greatest gravitational pull.

Technology

Technology is the application of science to real-life problems. When we talk about technology, we're talking about using science to find solutions and new ways of achieving things. Technology is all around us—your telephone, your computer, your stove, your refrigerator, and your eyeglasses are all technology. Science discovers information about how the universe works (like that light bends in specific ways when it passes through different substances), and technology creates useful tools that use that information (like eyeglass lenses that bend light in a specific way to correct for problems with your eyes).

Technology addresses questions of form and function. Form means how something is structured, and function is how it works. Form and function are found in nature. Animals, plants, planets, volcanoes, stars, and rivers all have certain forms. They're built a certain way. A plant's form allows it to perform a function, like taking light and converting it into food through photosynthesis. A star's form causes it to generate light radiation through chemical reactions.

In technology, the form is designed to perform a certain function. We design a clock with gears and balances, so that it will turn the dials at a certain speed. We design eyeglass lenses to bend light at the right angle to correct eyesight. Technology has a purpose. The form is designed to fulfill a specific function.

The GED will ask you to use problem-solving skills to answer questions about technology. You'll need to use science information to evaluate which solutions will work best.

TECHNOLOGY PRACTICE QUESTION

Jack's goal is to build a solar oven to cook using energy from the sun. His solar oven will have a window at the top to let in the sunlight, and a panel to reflect sunlight into the oven. The best material to line the panel with would be:

1) Waxed paper
2) Black construction paper
3) Recycled clear plastic
4) Recycled newspaper
5) Aluminum foil

THINKING SKILL: ANALYSIS/APPLICATION

Technology uses scientific information and applies it to problems to generate solutions. Jack is trying to build an oven. His goal is to reflect as much light as possible into the oven. He must apply a scientific idea, that different materials reflect different amounts of light. So, which material will reflect the most amount of light?

You probably know the answer from your everyday experience. The best choice is answer 5, aluminum foil. A metallic surface is reflective. It reflects light away from itself. That's why you can see a reflection in a metal surface. The aluminum foil will reflect the most light into the solar oven.

Science and Our World

One of the main ideas of science is that the world is predictable. It makes sense. It follows laws. The more we know about the laws of nature, the more we can understand why things happen and control what happens. We use this information to build technology, like light bulbs or electric razors. We also use this information to make decisions in politics and in society. Science shapes how we view the world. Science is also shaped by our culture, our desires, and our human nature. We pursue science that we think will be valuable.

Background in Science Subjects

Having a background in the science subjects on the GED test will help you read and understand the science questions. Remember, your goal isn't to memorize information, but instead to understand and think about what you're reading.

MATTER

Physical science includes the study of matter and what, exactly, makes up the physical objects around us. Matter is everything in the universe that occupies space and has mass, from the air we breathe to the dirt we stand in, to your own body.

In your study of matter, you should be able to read and understand texts, charts, graphs, and diagrams about:

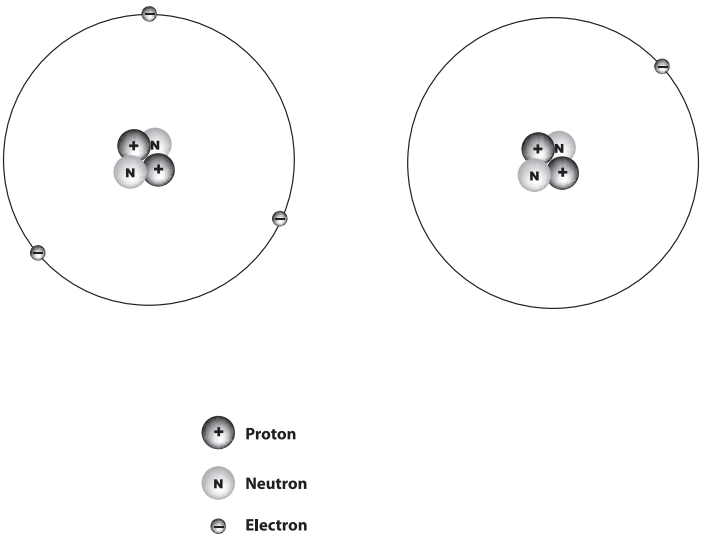
Atoms	An atom is the smallest unit of matter. Substances that are only made up of one type of atom are called ***elements.*** Many substances are made up of different types of atoms joined together. An atom has a center called a nucleus. The nucleus is made of ***neutrons*** and positively charged ***protons***. ***Electrons*** orbit around the nucleus. Electrons have a negative charge. Atoms that have the same number of protons and neutrons have no charge. Atoms that have more electrons than protons have a negative charge, and atoms that have fewer electrons than protons have a positive charge.
Molecules	A molecule is made up of two or more atoms joined together. ***Example:*** A water molecule is made of two hydrogen and one oxygen atoms, written H_2O. A water molecule is the smallest particle of "water." If a water molecule is broken up, you get hydrogen and oxygen.
Mass	Mass is the amount of matter in an object. Mass is similar to weight, but it's also different. Weight depends on the gravitational pull on an object, but mass depends only on how much "stuff" is in the object, how many electrons, protons, and neutrons make it up.
Volume	Volume is how big an object is, how much space it takes up.

Density	Density is how tightly packed an object is. How much mass is there, packed into the volume of the object? Density = Mass ÷ Volume You don't need to know this formula, but it will help to understand the concept... more mass in a smaller volume makes something more dense.
States of Matter	The states of matter are the different properties that matter has at different temperatures and pressures. For example, water can be a liquid (water), a solid (ice), or a gas/vapor (steam). Iron can also be a liquid (molten iron), a solid (iron), or even a gas/vapor (under extreme conditions!). Iron just changes to a liquid or a gas at much higher temperatures than water. Another state of matter that only occurs under special conditions is called plasma. A change in state is called a ***physical change***. It doesn't change the molecules of the matter. Ice has the same kind of molecules as water or steam. A change in the molecules of a substance is called a ***chemical change***.

Resource to Learn about Matter:
http://www.passGED.com/links/category/matter/

MATTER PRACTICE QUESTION

Objects that have the same charge are repelled from each other, and objects that have opposite charges are attracted to each other.



These two helium atoms will be:

1) Attracted
2) Repelled
3) Neither attracted nor repelled
4) Both attracted and repelled
5) None of the above

THINKING SKILL: APPLICATION

To answer this question, you need to apply the information you're given to the diagram of two helium atoms. The atoms are made up of electrically charged particles. Each helium atom has two positively charged protons, so two negatively charged electrons will make the atom neutral.

The first atom has three electrons. That means its total charge (two + charges and three – charges) is negative. The second atom has only one electron. That means its total charge (two + charges and one – charge) is positive. The two atoms have opposite charges. They will be attracted to each other. The answer is 1, attracted.

Energy

Physical science also includes the study of energy. Energy is often defined as the ability to do work. There are different kinds of energy. Energy holds together molecules, and energy comes from gas and electricity. It's what puts things in motion.

In your study of energy, you should be able to read and understand texts, charts, graphs, and diagrams about:

Waves	A wave is how energy travels. Think of an ocean wave. It's a type of movement that goes over the surface of the water, and it carries energy that you can certainly feel if you're hit by one! Sound and light are examples of energy that travels in waves.
Electromagnetic Radiation	Electromagnetic radiation is a type of energy that travels in waves. At different wavelengths (the distance from the peak of one wave to the peak of the next), electromagnetic radiation includes x-rays, ultraviolet light, visible light, infrared light, microwaves, radar, television, and radio waves.

Kinetic Energy	Kinetic energy is the energy of something in motion. The impact of a moving car in an accident is the impact of its kinetic energy.
Potential Energy	Potential energy is like stored energy. For example, imagine a picture frame hung on the wall by a nail. The pull of gravity on the picture frame gives it potential energy. If the nail comes loose, the picture frame falls and the potential energy is changed to kinetic energy.
Thermal Energy	Thermal energy is heat energy. At a greater temperature, an object has more thermal energy. Heat energy can be transferred, as when a hot stove burner transfers heat to a tea kettle.
Light Energy	Light energy is the energy of light. In some ways, light behaves like a wave, and in other ways it behaves like a particle. Particles of light are called photons.
Conservation of Energy	Conservation of energy means that in ***an isolated system*** (a group of things that interact with each other but that don't interact with anything else) the total amount of energy all stays the same. Energy might change into different forms (like potential energy becoming kinetic energy when a picture falls) or from one object to another (like a stove burner transferring heat to a tea kettle) but the total amount of energy remains the same.

Increase in Disorder	The idea of "increase in disorder" means that in the natural world, things tend to become less organized and orderly over time. Things spread out. One of the results of this is that when you put hot and cold things together (an ice cube in hot tea), the cold thing becomes hotter (the ice melts) and the hot things become colder (the tea cools). Everything becomes less organized and more the same, and the temperature spreads out (so you end up with one cup of slightly cooler, more watery tea instead of two separate things).
Energy Transfer	Energy transfer is the movement of energy from one place or object to another.

Resource to Learn about Energy:
http://www.passGED.com/links/category/energy/

ENERGY PRACTICE QUESTION

Potential energy increases with distance from the Earth. If three elevators are stopped at the first floor, the third floor, and the fourth floor of a building, which of the three elevators has the greatest potential energy?

1) The elevator on the first floor
2) The elevator on the third floor
3) The elevator on the fourth floor
4) All three have the same potential energy.
5) There is not enough information.

THINKING SKILL: APPLICATION

This question gives you the information that the amount of potential energy increases (gets bigger) when an object is farther from the Earth. Then, it asks you to apply that information to an example. Three elevators are stopped at the first, third, and fourth floors. The question asks which elevator has the most potential energy. That's the same as asking, which elevator is the farthest from the Earth? The elevator that's higher up has more potential energy (in other words, it'll be falling hardest if it falls to the ground). The elevator on the fourth floor has the most potential energy. The answer is 3.

Forces, Motion, and Work

Forces and motion are about how things interact. If you push something up a ramp, you're exerting a force on it to make it move. That's also called work. Forces, motion, and work are important to understanding a lot about technology and machines.

In your study of forces, motion, and work, you should be able to read and understand texts, charts, graphs, and diagrams about:

Work	Work is force multiplied by distance. For example, the amount of work it takes to lift a box is the amount of muscle (force) you must apply to the job times how far you need to lift the box (distance).
Force	A force is a push or a pull on something.

Simple Machines

Simple machines are very simple, basic devices with few or no moving parts, which can be used to reduce the amount of work you need to do to accomplish a task. Simple machines include:

Levers: A lever is like a see-saw, a board or stick that hinges on a point called a fulcrum. The position of the fulcrum changes how much work is needed to lift an object.

Inclined Planes: Ramps, like the ramp on the back of a moving van or a wheelchair ramp on a building, are inclined planes.

Pulleys: A pulley is a wheel with a rope strung over it. A pulley changes the direction of the force needed to lift an object, and multiple pulleys can be used to divide the force, so that an object is easier to lift.

Gears: Toothed wheels that fit together and can turn each other, like in a clock, are gears.

Wedges: Something that comes to a point and can be used to pry something apart, such as an axe or a knife, is a wedge.

Screws: A screw has an inclined plane, or ramp, wrapped around a center.

Wheels and Axles: A wheel on an axle is just like a car wheel and axle. A doorknob is also a wheel and axle. Turning the doorknob is easier than turning the small metal bar attached to the doorknob, because the doorknob is larger.

Action and Reaction	According to Newtonian (everyday) physics, every action (a force acting on something) has an equal (the same size) and opposite (the opposite direction) reaction. In other words, if you hit a ball with a bat, the ball will fly off in the opposite direction, and you'll feel the impact on the bat in the opposite direction you were swinging.
Frictional Force	Frictional force is the force caused by a moving object rubbing against something else, even the air. The nose of an airplane is pointed to lessen the friction of the air passing by. Friction makes it difficult to push a concrete block along a carpet.
Gravitational Force	Gravitational force is the force that very large objects (like the Earth or the sun) create. Gravity pulls things toward the center of the object. In other words, gravity pulls you toward the center of the Earth. Every object has some gravity, but unless the object is very large (like a planet), there is too little gravity to cause any reaction.
Acceleration	Acceleration is a change in velocity (speed). Acceleration is measured as the change in velocity divided by time. A negative acceleration would mean an object is slowing down, and a positive acceleration would mean an object is speeding up.

Inertia	Inertia is the tendency of an object that is not moving (at rest) to stay at rest, and of an object in motion to stay in motion, at the same rate and direction. In other words, an object will remain doing whatever it's already doing, unless a force acts on it. A golf ball will stay on the tee until you hit it. Once it's in the air, it's forces like friction and gravity that change its speed and direction and make it fall to the ground. The inertia of an object is greater if its mass is greater... It would be much harder to hit a bowling ball into the air!
Balanced and Unbalanced Forces	Balanced forces are equal in size and opposite in direction. When two balanced forces act on each other, they cancel each other out. For example, in a tug of war, each side is pulling in an opposite direction. If the sides are balanced (both are pulling with the same force), nothing will move. If the sides are unbalanced (one side is pulling with a stronger force), there will be movement in the direction of the stronger force.
Conservation of Momentum	Conservation of momentum is a physical law. It states that in a closed system (with nothing outside affecting it), the momentum, the product of mass and velocity (speed), remains the same.

Resource to Learn about Forces, Motion, and Work:
http://www.passGED.com/links/category/forces-motion-and-work/

FORCES, MOTION, AND WORK PRACTICE QUESTION

A shopper pushes his cart toward the shopping cart return area of the parking lot and lets it go. The shopping cart is moving toward a second, stopped shopping cart. When the two carts collide, which direction will the second shopping cart move?

1)

2)

3)

4)

5)

THINKING SKILL: APPLICATION/ANALYSIS

You can use your common-sense knowledge of everyday physics to answer this question. What happens to a shopping cart when another shopping cart bangs into it? It goes off in the direction the first shopping cart was moving. The force of the first shopping cart pushes the second shopping cart forward.

This problem has to do with the conservation of momentum. The total mass of the shopping carts doesn't change, and since the total momentum shouldn't change, the total velocity (speed) of the shopping carts won't change. The movement forward of both shopping carts together after the collision must equal the movement forward of the first shopping cart before the collision. The inertial force of the second shopping cart (its tendency to stay still) will stop or slow the first shopping cart, depending on how fast the first shopping cart is going. To make up the momentum,

the second shopping cart will pick up the forward motion from the first cart. The best answer is 1, and even without completely understanding the physics, you can use your everyday knowledge to get the right answer. So remember, don't over-think the questions.

Cells

Life science includes the study of cells. Cells are the smallest form of living matter. Our bodies, plants, and animals are all made up of cells, and we're surrounded by bacteria, single-celled organisms.

In your study of cells, you should be able to read and understand texts, charts, graphs, and diagrams about:

Nucleus	The nucleus is in the center of the cell. The nucleus contains the genetic material that tells how the cell will grow, act, and change.
Cell Membrane	The cell membrane is like a skin around the outside of the cell. Inside the cell membrane, there is plasma and the nucleus. Water and particles pass in and out of a cell through the membrane.
Cell Division	Cell division is how new cells are generally created. One cell divides into two cells. Mitosis is the most common type of cell division. In a series of steps, first the nucleus and then the whole cell divide into two new cells, identical to the original cell.

Osmosis	Osmosis is the way that water passes through a membrane (like a cell membrane). When there is water on both sides of a membrane, the water will flow toward the side where there is a higher concentration of things dissolved in the water. For example, in salt water, cells tend to dry out.
Chromosomes	Chromosomes are found inside a cell nucleus, and they contain the cell's genetic material. Chromosomes are made of DNA.
Viruses	A virus is a microscopic organism, smaller than a bacteria or a cell. It's made of an outer shell filled with unorganized genetic material, or RNA. A virus makes you sick because it attaches to a cell, injects genetic material into the cell, and uses the cell to make more viruses. This harms the cell.
Bacteria	Bacteria are microscopic organisms that have a single cell. Many bacteria are harmless, or even helpful. Bacteria in your digestive tract helps you digest food. Some bacteria, however, can cause infections and disease.

Resource to Learn about Cells:
http://www.passGED.com/links/category/cells/

CELLS PRACTICE QUESTION

In osmosis, if a membrane separates two solutions, liquid will tend to move from the side with the strongest solution to the side with the weakest solution.

A chef pours a sugary syrup over strawberries. The strawberries begin to release their juices into the syrup. Which is the best conclusion?

1) The sugary syrup is full of membranes and has a weak solution.
2) The sugar in the syrup is a different kind of sugar than is in the strawberries.
3) The syrup and the strawberries have the same concentration of sugar.
4) The strawberries have a higher concentration of sugar than the syrup.
5) The syrup has a higher concentration of sugar than the strawberries.

THINKING SKILL: APPLICATION/ANALYSIS

In this question, you need to apply the idea of osmosis to the example of the strawberries. One thing you need to know is that all plants (like strawberries) are made of cells, and cells are enclosed in membranes. So, basically, membranes hold the liquid inside of plants.

A sugary syrup is a solution of sugar and water. The sugar is dissolved in the water, so it's a solution. If the solution is stronger (higher concentration of sugar) than the strawberry juice, the juice will come out of the strawberries. If the solution is weaker (lower concentration of sugar) than the strawberry juice, liquid will get

absorbed into the strawberries. Since the strawberries "release their juices," the juice is coming out of the strawberries. That means, the syrup has a higher concentration of sugar than the strawberries. The best choice is answer 5.

Genetics and Heredity

The study of cells is related to the study of genetics and heredity, because all of our genes are contained in the chromosomes in cells. Genes determine how a plant or animal grows, what it looks like, and how it's structured. Whether you're tall or short, male or female, and green-eyed or brown-eyed is all determined by genes. Heredity is the process by which genes are passed down from parents to children. Some diseases are genetic, and are passed on through heredity, as well as eye color, hair color, and other qualities.

In your study of genetics and heredity, you should be able to read and understand texts, charts, graphs, and diagrams about:

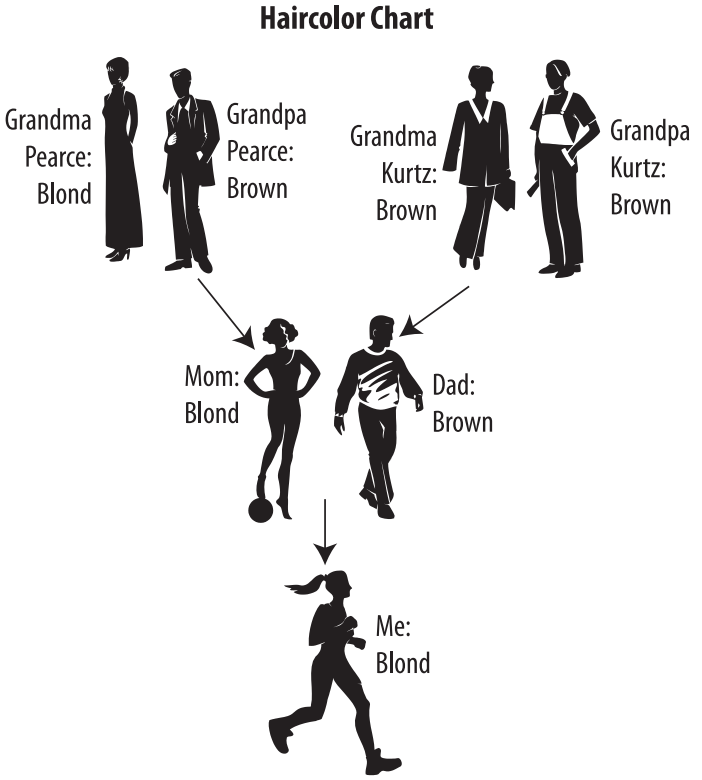
DNA	DNA is a molecule that contains all the genetic information of a living thing. DNA is made of two strands joined together by groups of two bases called "base pairs." The combinations of base pairs (made up of four possible bases) form a kind of code that contains genetic information.
RNA	RNA is a molecule that's usually a single strand of genetic material, found in viruses and in cells.

Genes	A gene is a sequence of DNA in a particular place in a chromosome. A gene determines a specific trait in an individual. For example, you might have a gene for green eyes or a gene for black eyes.
Genetic Variation	Genetic variation within a species of plant and animals means that a number of traits vary, or change, from individual to individual. Dogs have a lot of genetic variation. They're different colors and sizes, with different lengths and textures of fur. They have different muzzle lengths, eye colors, types of tails, and types of ears.
Dominant and Recessive Traits	You inherit genes for traits from your mother and father. Some genes, or traits, are dominant. That means, you only need one gene to show that trait. Other traits are recessive. That means, you need genes from both your mother and father to show that trait. For example, you might inherit a gene for green eyes from your father and a gene for black eyes for your mother. Since the gene for black eyes is dominant, you'll have black eyes. But, you could still pass on the recessive gene for blue eyes to your child.

Resource to Learn about Genetics and Heredity:
http://www.passGED.com/links/category/genetics-and-heredity/

GENETICS AND HEREDITY PRACTICE QUESTION

Blond hair is a recessive trait, and brown hair is a dominant trait.



Janice created a chart showing the hair colors of herself, her parents, and her grandparents. Based on this chart, which of the following is the best conclusion?

1) Grandpa Pearce carries a gene for blond hair.
2) Janice's father has no genes for blond hair.
3) Janice's mother inherited a gene for brown hair from her father.
4) Women are more likely to have blond hair than men.
5) Neither Grandma Kurtz nor Grandpa Kurtz carries a gene for blond hair.

THINKING SKILL: APPLICATION/ANALYSIS

This question expects you to understand some basics about heredity. A recessive trait is one that you need two genes for, and a dominant trait will show up with only one gene. One gene is inherited from your father, and one is inherited from your mother. Since Janice's mother had blond hair, she must have inherited a blond gene from her mother *and* one from her father. Her father, though he had brown hair, must have had a blond gene to pass down to his daughter. The best answer is answer 1.

Answer 2 cannot be true. If Janice's father had ***no*** genes for blond hair, Janice could not be blond, because she would need to inherit a blond gene from her father. Answer 3 also cannot be true. Janice's mother cannot have inherited a brown-hair gene, or she would not be blond. Answer 5 also cannot be true. Either Grandma Kurtz or Grandpa Kurtz must have passed down a blond gene to Janice's father, since Janice inherited a blond gene from her father.

Answer 4 says that women are more likely to have blond hair than men. Although more women on the chart have blond hair than men, there's no reason to believe that this is true of all men and women. The best choice is answer 1.

Evolution

Evolution is one of the foundations of modern science and is closely linked with genetics and heredity. Evolution is the process through which the inherited properties of organisms change over time and different species separate from each other.

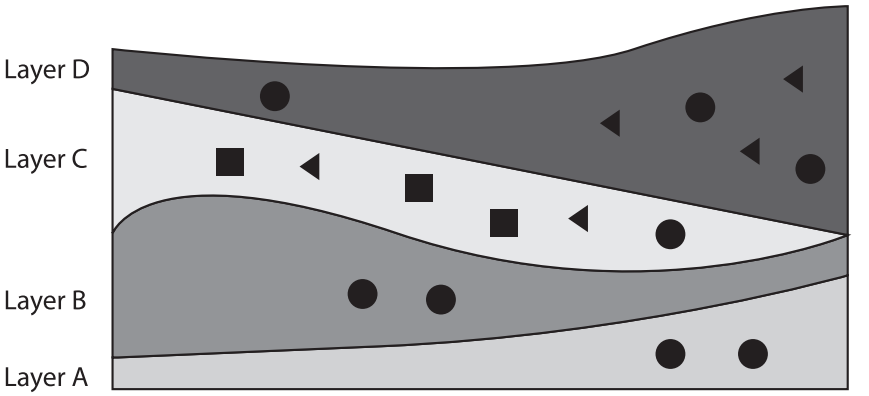
In your study of evolution, you should be able to read and understand texts, charts, graphs, and diagrams about:

Natural Selection	Natural selection is a process which causes animals or plants with useful genetic traits to reproduce more, spreading that genetic trait. Animals or plants with harmful genetic traits (ones that make it harder to find food or make it easier to become prey) are less likely to reproduce, causing that trait to appear less and less.
Mutation	When DNA reproduces, sometimes the new DNA is not exactly like the original DNA. Some of the base pairs in the DNA can be randomly changed. These changes are called mutations.
Biological Classification	Biological classification is a way that scientists group living things based on how similar they are to each other. For example, here are the biological classifications for a house cat: ***Kingdom:*** Animalia (all animals) ***Phylum:*** Chordata (animals with spines, or vertebrates) ***Class:*** Mammalia (mammals) ***Order:*** Carnivora (carnivores) ***Suborder:*** Feliformia (cat-like carnivores) ***Family:*** Felidae (cats) ***Genus:*** Felis (a group of cats including a jungle cat, wildcat, and sand cat, among others) ***Species:*** Felis catus (a house cat)

Adaptation	An adaptation is a behavior or a trait that helps a living organism survive in its environment.
Fossils	Fossils are the remains of animals or plants preserved in the soil and rocks of the Earth. Fossils give scientists information on animals and plants that are extinct, such as dinosaurs.

Resource to Learn about Evolution:
http://www.passGED.com/links/category/evolution/

EVOLUTION PRACTICE QUESTION



The squares, circles, and triangles represent fossils of three different species found in layers of earth. Which of the following statements is the best conclusion?

1) Life became continuously more diverse over time in this area.
2) Layer B was deposited at the same time as Layer A.
3) The species represented by circles existed over a longer time in this area than the other two species.
4) The species represented by triangles is extinct.
5) Layer A represents the most recent period of time.

THINKING SKILL: ANALYSIS

This question shows you a diagram of layers of soil with three types of fossils deposited in it. To answer this question, you need to be familiar with the idea that deeper layers of soil or rocks were deposited first, and that the way fossils are distributed in the soil shows a distribution over time.

Answer 1 isn't the best answer. It says that life became more diverse continuously over time, but the only layer that shows more types of life forms than the previous layer is Layer C. There's no change from Layer A to Layer B, and from Layer C to Layer D, there are fewer species.

Answer 2 isn't the best answer. Layer B is above Layer A, so Layer B was likely deposited after Layer A.

Answer 3 is a better answer. The circles are present in all four layers, so it's logical to conclude that the species represented by circles has been around longer, during all four time periods.

Answer 4 isn't the best answer. There's no evidence to show whether the species represented by triangles is extinct or not. The only information in the diagram is that the species existed when Layer C and Layer D were deposited.

Answer 5 also isn't a good choice. Layer A is the deepest layer. It was likely deposited the longest ago, not the most recently.

The best choice is answer 3.

Ecosystems

Animals and plants live together in ecosystems, where different species maintain a balance with each other. Animals and plants are dependent on each other for food and for survival.

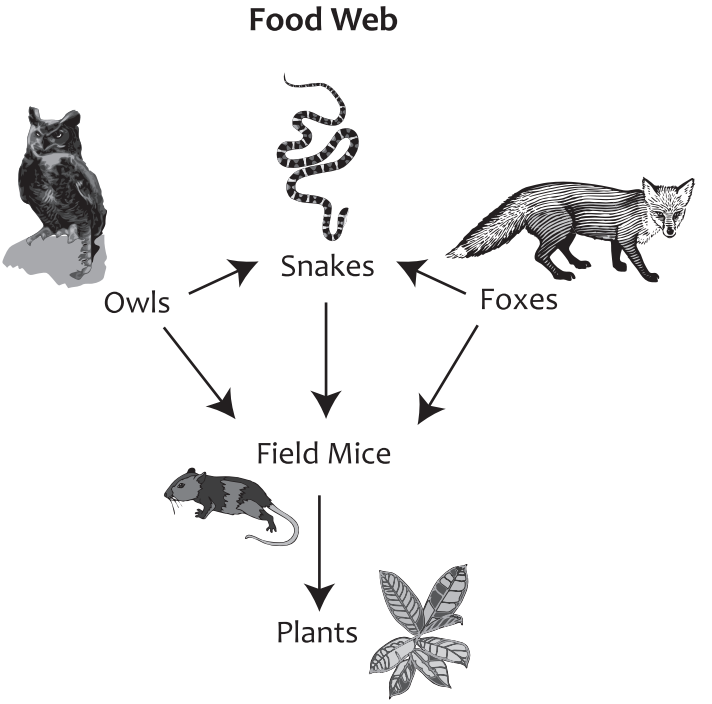
In your study of ecosystems, you should be able to read and understand texts, charts, graphs, and diagrams about:

Food Chains and Webs	A food chain or web shows the relationships between different animals, plants, and microorganisms in an ecosystem. A simple food chain might start with grass and flowers growing. Grazing gazelles eat the grass, and butterflies feed off the flowers. Lions hunt and eat the gazelles, while birds eat the butterflies. Animals and plants depend on each other for food sources.
Biodiversity	Biodiversity is the variety and diversity of life, including the number of different species, the amount of genetic variation, the variety of habitats, and the variety of interactions between plants, animals, and other living things.
Photosynthesis	Photosynthesis is a process that happens in plants that changes light into food energy. Plants take in light, water, and carbon dioxide, and they generate oxygen and sugars.
Carnivores	Carnivores are meat-eating animals.
Herbivores	Herbivores are plant-eating animals.
Omnivores	Omnivores eat both meat and plants.

Scavengers/ Decomposers	Scavengers or decomposers eat dead or decaying plants or animals, helping the dead plants or animals to decompose.
Biomass	Biomass is the total amount of living material (animals, plants, and microorganisms) within a certain area or ecosystem.
Primary Producers	Primary producers make biomass (living material) from non-living things. Most primary producers are plants, which turn sunlight and water into sugars and plant material. Primary producers create food for other living things.

Resource to Learn about Ecosystems:
http://www.passGED.com/links/category/ecosystems/

ECOSYSTEMS PRACTICE QUESTION



Which of the following occurrences would cause the most disruption to this ecosystem?

1) The death of all snakes
2) The death of all owls
3) The death of all foxes
4) The death of all field mice
5) The death of all plants

THINKING SKILL: ANALYSIS

This question asks you to think about what would happen if one part of the ecosystem were removed. If there were no foxes, there would likely be more snakes and field mice for the owls

to eat. The situation would be reversed if there were no owls. If there were no snakes, the foxes and owls might go hungry, and if there were no field mice, the snakes, foxes, and owls might starve. If there were no plants, however, the field mice, owls, snakes, and foxes would all starve. The mice eat plants, and all the other animals eat mice. The food ultimately comes from the plants. The best choice is answer 5.

Earth Systems

Earth science includes studying Earth's systems. The systems on Earth include the movement of carbon, water, and heat through the Earth, affecting all the plants and animals that live here.

In your study of Earth's systems, you should be able to read and understand texts, charts, graphs, and diagrams about:

Carbon Cycle	The carbon cycle shows how carbon moves through Earth's systems. Decaying plants and animals put carbon into both the soil and the air. Animals put carbon dioxide into the air when they breathe. Burning fuel also releases carbon into the air. Plants pull carbon out of the air and release more oxygen.
Water Cycle	The water cycle shows how water moves through Earth's systems. Water exists in lakes, rivers, and oceans, and also is held in ice and snow. In the atmosphere, water is stored in clouds. Water evaporates off the Earth's surface and ice melts when temperatures rise. When the clouds become full of water, water comes down in rain.

Nitrogen Cycle	The nitrogen cycle shows how nitrogen moves through Earth's systems. Nitrogen is contained in the air and soil. Plants remove nitrogen from the soil, and waste, decaying plants, and decaying animals return nitrogen to the soil.
Atmosphere	The Earth's atmosphere consists of layers of gasses held to the Earth by its gravity.
Greenhouse Effect	The greenhouse effect describes how the Earth's atmosphere holds in heat to warm the Earth.
Energy Budget	Earth takes in energy from the sun and also releases energy into space. Earth's energy budget shows how energy moves through the Earth's system and how incoming and outgoing energy are balanced.
Core	The center of the Earth is the Earth's core. Scientists believe the outer core (down to about 3,000 miles below the surface) is made of hot, liquid iron and nickel. The center of the Earth, its inner core, is believed to be solid iron and nickel.
Mantle	The Earth's mantle is the area between the Earth's core and the Earth's crust. The mantle is about 1,800 miles deep and is made of thick, solid rock.
Crust	The Earth's crust is the outer layer of the Earth, about 10 miles deep, made of rock, dirt, and other loose materials.

Tectonic Plates	The Earth's crust and the hard, uppermost part of the mantle is broken into tectonic plates, which move on the middle part of the mantle, where the rock is softer. The movement of tectonic plates causes earthquakes and volcanoes, forms mountain ranges and continents, and creates the geography of the ocean floor.

Resource to Learn about Earth Systems:
http://www.passGED.com/links/category/earths-systems/

EARTH SYSTEMS PRACTICE QUESTION

The Earth is made up of four main parts. The inner core and outer core are at the center of the Earth. The Earth's mantle, between the crust and the core, is made of rock. The Earth's crust is a thin shell of rock and earth. The crust and the top of the mantle are broken up into many sections, called tectonic plates, which move slowly across the surface of Earth. As the tectonic plates slide past each other, they get stuck together. Pressure builds on the divides, called faults, between the plates. When enough pressure builds up on the fault line, there is an earthquake.

A tectonic plate goes completely through the depth of:

1) The Earth's inner core
2) The Earth's outer core
3) The Earth's mantle
4) The Earth's crust
5) The Earth

THINKING SKILL: COMPREHENSION

This question is a comprehension question, like many of the questions on the GED. That means, it simply wants to know whether you've understood what you've read. In this case, the question wants to know if you understand the location of tectonic plates. All the information you need is in the reading.

The text says, "The crust and the top of the mantle are broken up into many sections, called tectonic plates." That sentence tells you where the tectonic plates are. They go through the crust and the *top* of the mantle. The only part of the Earth that the tectonic plate goes completely through is the crust. They only go down through the top of the Earth's mantle, its second layer. The correct answer is answer 4.

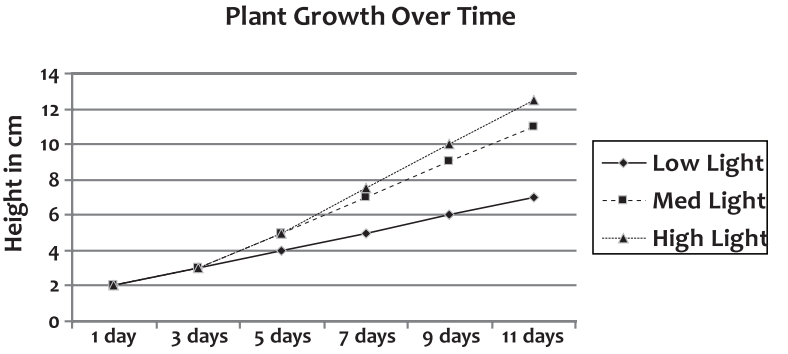
Practice Questions

1. A student plants four African violet plants in four identical pots to compare whether and how much they will bloom. He places the pots in four ventilated glass cases with controlled temperature and humidity. He places the first box in 1,200 lumens of light, the second in 1,500 lumens, the third in 1,800 lumens, and the fourth in 2,100 lumens.

What is the variable in this experiment?

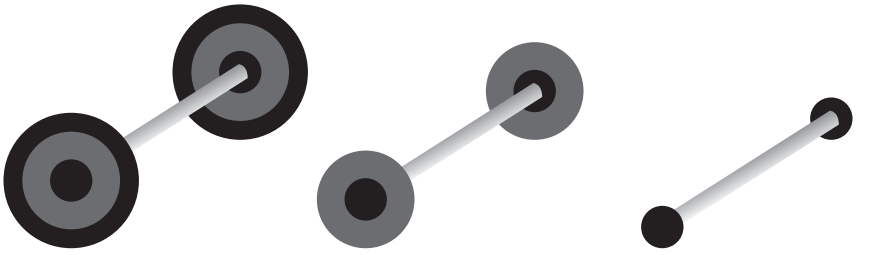
1) The temperature
2) The ventilation
3) The humidity
4) The light
5) The plants

2. Which statement is the best conclusion based on the following chart?



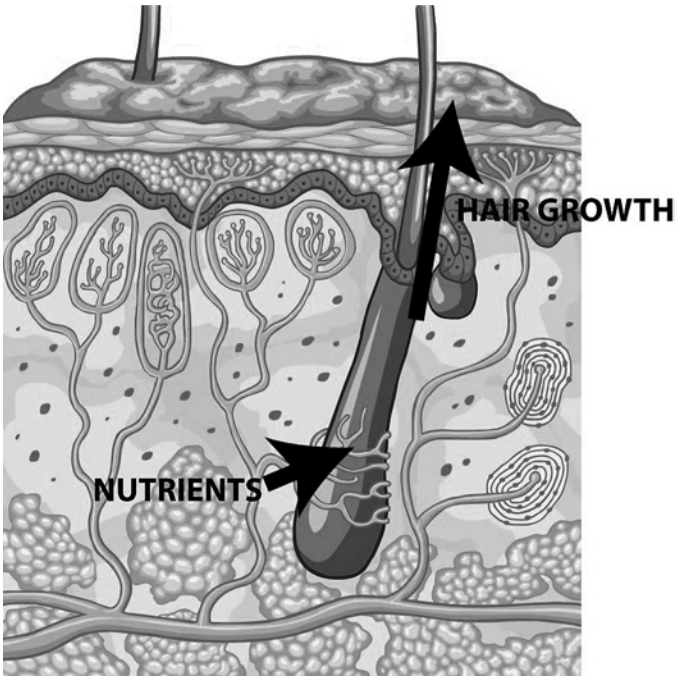
1) Low light prevents plants from growing.
2) Using low light for some plants causes other plants to grow faster.
3) Increased light causes increased growth over time.
4) Increased light causes increased growth immediately.
5) Decreased light causes increased growth over time.

3. Jack is building a makeshift wheelbarrow by putting a box on top of two wheels and an axle. Which wheels and axel will require the least force to move the wheelbarrow?



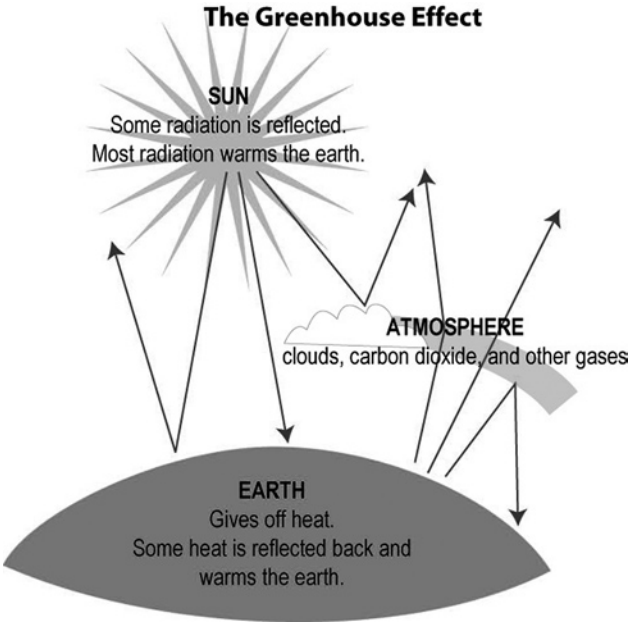
1) Wheel A
2) Wheel B
3) Wheel C
4) Wheels A and C
5) All require the same force.

4. The hair follicle is a sac in the skin, and hair grows out of the follicle. Nutrients enter hair follicles from blood vessels, allowing the hair to grow.



Which of the following statements is true?

1) The skin contains blood vessels.
2) Hair could grow without nutrients.
3) The roots of the hair are beneath the skin.
4) Skin is uniform, without differentiated layers, segments, or parts.
5) Hairs contain follicles.



5. The above diagram shows the greenhouse effect that warms the Earth. Based on the diagram, which of the following statements is true?

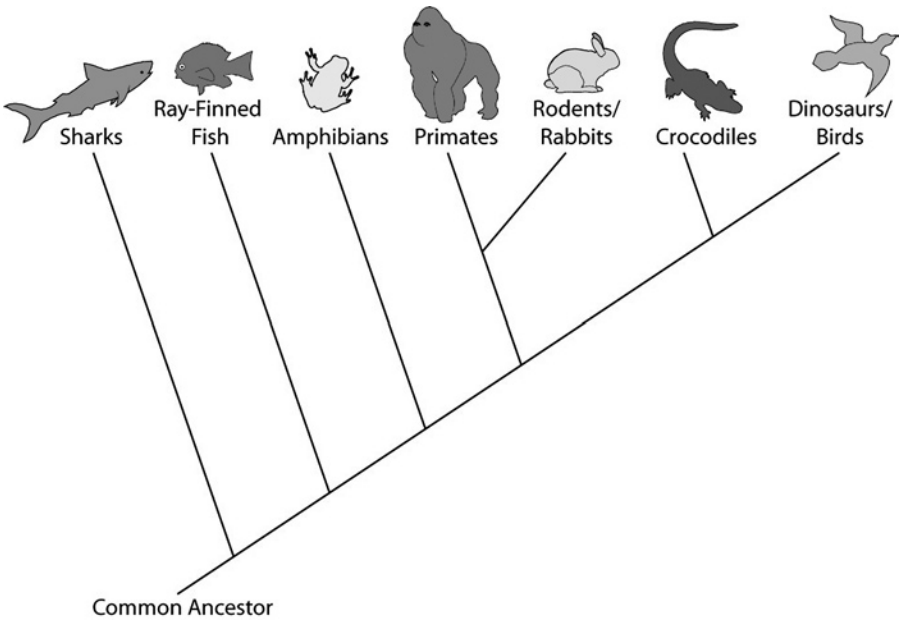
1) Carbon dioxide in the atmosphere reflects all radiation from the Earth back to the Earth.

2) All incoming solar radiation is reflected from either the atmosphere or the Earth's surface.

3) The Earth absorbs all incoming solar radiation.

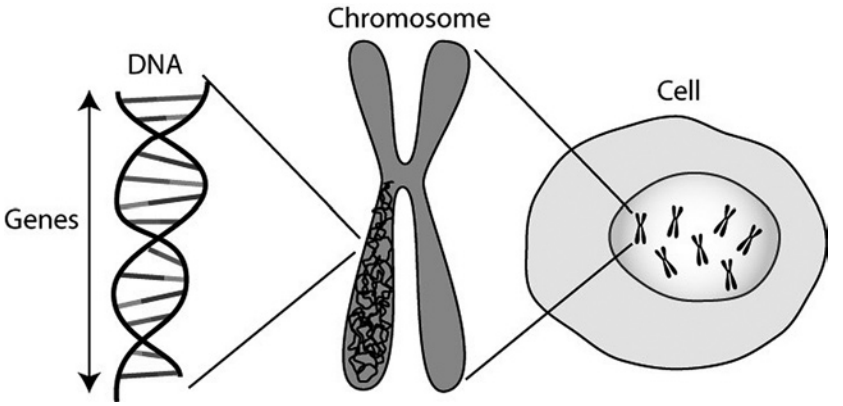
4) The Earth both absorbs and reflects incoming solar radiation.

5) The Earth reflects all incoming solar radiation.



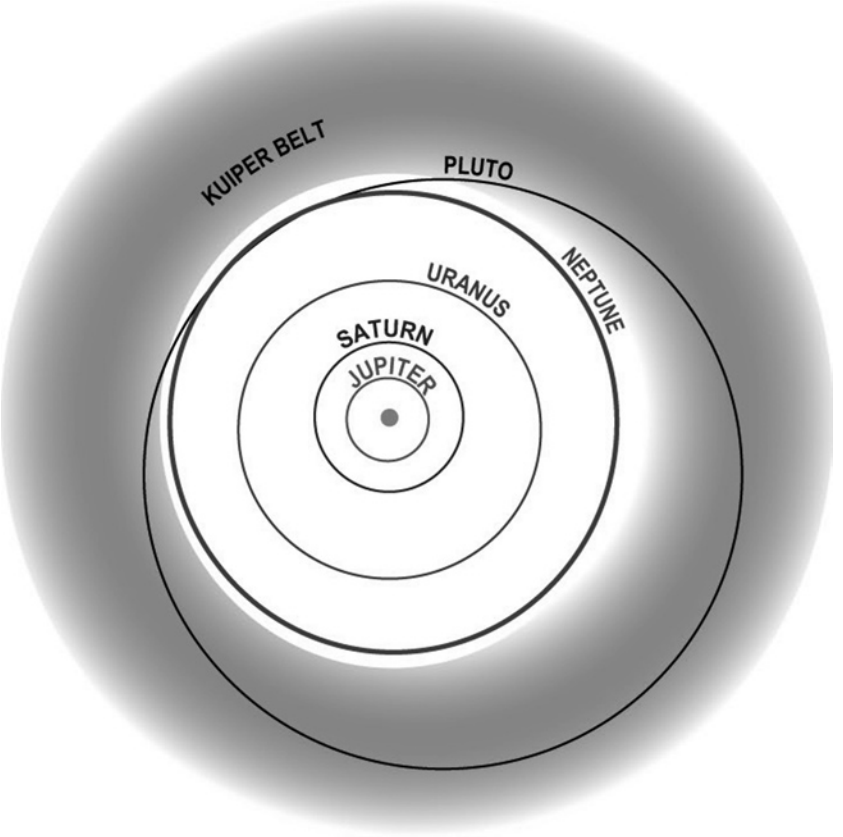
6. The above diagram shows the relationships between groups of animals. Based on this diagram, which of the following animals are most closely related?

1) A salmon and a hawk
2) A salmon and a mouse
3) A mouse and a chimpanzee
4) A hawk and a chimpanzee
5) A hawk and a mouse



7. When a cell divides, chromosomes divide, giving each new cell a duplicate set of chromosomes. The new cells contain:

1) The reverse of the original chromosome
2) Identical genetic material
3) DNA inside of genes
4) A new cellular structure
5) Half of the original genes



8. This diagram shows the orbits of the planets in the outer solar system. The central body in this diagram would be:

1) Jupiter
2) Saturn
3) Earth
4) Mercury
5) The sun

Practice Question Answers

Practice Question 1

The best answer is 4, the light. The variable is something about the experiment that the experimenter changes, to see what effect it has. The scientist changes the level of light for each plant. The goal is to see what effect light has on the plants. A variable is something that varies, or changes. Notice that you don't need to know what a "lumen" is to answer this question. You only need to notice that the text says "lumens **of light.**" This context clue gives you the information you need to understand that "lumens" is a measure of light.

Practice Question 2

The best answer is 3, increased light causes increased growth over time. The chart compares growth of plants in three levels of light. There is no reason to believe that one plant's growth changes the other plants. The growth remains the same for about the first three days, and then the plants in higher levels of light begin to grow faster. The increased (more) light causes increased (more) growth over time.

Practice Question 3

The best answer is 1, Wheel A. Work = Force × Distance, so any machine that spreads work out over a greater distance (i.e., the distance it takes to roll the wheel completely around)

needs less force. A smaller wheel, in other words, is harder to turn. A bigger wheel is easier to turn. You might know this from your everyday experience.

Practice Question 4

The best answer is 1, the skin contains blood vessels. To answer this question, you must understand the diagram and relate it to the text. The text says that nutrients enter the hair follicle from blood vessels, and the diagrams show the nutrients entering the blood stream. The diagram must show blood vessels in the skin, attached to the hair follicle. There are blood vessels in the skin.

Practice Question 5

The best answer is 4, the Earth both absorbs and reflects incoming solar radiation. The diagram shows that some of the radiation from the sun is absorbed into the Earth, and some of the radiation is reflected (bounced off of) the Earth. None of the other answers are true based on the diagram.

Practice Question 6

The best answer is 3, a mouse and a chimpanzee. The lines for primates (like chimpanzees) and rodents (like mice) meet closest to each other. Since you might know from your experience that chimpanzees and mice are both mammals, you might be able to answer this question based on your everyday knowledge. Both animals have fur and other similarities, while a hawk and a salmon are very different.

Practice Question 7

The best answer is 2, identical genetic material. The chromosomes contain the cell's DNA, which contains its genes. Since each new cell contains a duplicate of the original cell's chromosomes, each new cell contains the same genetic material.

Practice Question 8

The best answer is 5, the sun. You need to use your everyday knowledge of the solar system to answer this question. All the planets shown in the diagram (like Jupiter, Saturn, and Uranus) orbit around the sun.

"Science is facts; just as houses are made of stones, so is science made of facts; but a pile of stones is not a house and a collection of facts is not necessarily science."

—Henri Poincaré