

Acupuncture

A Chinese medical technique, acupuncture has been practiced for more than 4,000 years. It is used primarily for the relief of pain but also for curing disease and improving general health. Acupuncture consists of inserting hair-thin needles through particular spots in the skin. The acupuncture points are then stimulated by gentle twirling, by heat, or by stimulation with a weak electrical current. They also can be stimulated by pressure, ultrasound, and certain wavelengths of light.

Acupuncture appears to be effective in relieving pain. Western observers have witnessed ordinarily painful surgical operations carried out on fully conscious Chinese patients who were locally anesthetized only by acupuncture and exhibited no signs of discomfort. The reasons for acupuncture's success, however, are not understood. One theory suggests that the needle insertions stimulate the body's production of natural pain-killing chemical substances. Another theory suggests that acupuncture blocks the transmission of pain impulses from parts of the body to the central nervous system.

Acupuncture is still regarded legally in the United States as an experimental medical procedure. It has been used extensively in research projects in hospitals and medical centers throughout Asia, Europe, and North and South America. Acupuncture has been shown to relieve pain during and after dental procedures and in some surgical operations. It has also been used to control blood pressure and to relieve muscle spasms and arthritic pain. It has been used to alleviate symptoms associated with withdrawal from drug addiction, with appetite control, and with many other conditions. In some people and in certain medical conditions, it is not always effective. At one time, it was believed that acupuncture was related in some way to hypnosis, but extensive experiments with animals undergoing surgery in veterinary hospitals have disproved that assumption.

It has been difficult for modern physicians to accept acupuncture as an effective procedure for the treatment of certain conditions. This is primarily because of the elaborate systems of fanciful theories that were developed thousands of years ago by the early practitioners of acupuncture to explain its mechanisms of action.

In 1972, acupuncture received great publicity, particularly in the United States, as an indirect result of President Richard M. Nixon's trip to China. A newspaper correspondent who had accompanied Nixon reported on the pain relief provided by acupuncture after his emergency appendectomy. Since then, many United States physicians and dentists have been trained to administer acupuncture in courses authorized by state governments.

Reading Time _____

Recalling Facts

1. Acupuncture is used primarily for
 - a. curing disease.
 - b. relieving pain.
 - c. drug addiction.
2. Acupuncture involves
 - a. pinching the skin.
 - b. inserting thin needles into the skin.
 - c. skin grafts.
3. One theory of how acupuncture works is that
 - a. it blocks the transmission of pain impulses.
 - b. the patients are hypnotized.
 - c. it stimulates the body's electricity.
4. In the United States, acupuncture is regarded legally as
 - a. a miracle cure.
 - b. surgery.
 - c. an experimental medical procedure.
5. Acupuncture gained greater credibility in the United States following
 - a. President Nixon's trip to China.
 - b. World War II.
 - c. the introduction of acupuncture courses.

Understanding Ideas

6. Acupuncture points can be stimulated
 - a. only by a trained physician.
 - b. by a variety of methods.
 - c. primarily by electricity.
7. The United States has probably been reluctant to accept acupuncture treatment because
 - a. Chinese medicine is thought to be ineffective.
 - b. acupuncture is not clearly understood.
 - c. it is too expensive.
8. A major advantage of acupuncture used in surgical procedures is that
 - a. time is reduced.
 - b. surgery is always successful.
 - c. no anesthesia is necessary.
9. You can conclude from the article that acupuncture
 - a. is universally effective.
 - b. can cure most diseases.
 - c. is not for everyone.
10. It is likely that acupuncture treatment in the United States will probably
 - a. gain greater acceptance.
 - b. become less acceptable.
 - c. prove to be a hoax.

Veterinary Acupuncture

Junior, an elderly German shepherd, was in constant pain from arthritis in his hips and knees. He had trouble getting up, and he limped badly. When his vet could no longer help, she sent Junior and his owners to a veterinarian trained in acupuncture. Veterinary acupuncture is still relatively rare, but it is being used more often these days to treat animals like Junior, and it is proving effective.

Several years ago, a research scientist wanted to prove that acupuncture didn't really stop pain. He believed that acupuncture worked mostly on the mind, reducing pain only if people believed it would. For his experiments, therefore, he used animals. To his surprise, animals treated with acupuncture registered little or no response to pain. Researchers later discovered that acupuncture causes the brain to release chemicals called endorphins that block pain in animals as well as humans.

Junior's acupuncture veterinarian immobilizes him by having someone hold him or by giving him a mild drug. Then he inserts acupuncture needles at key points. In the beginning, Junior is treated once a week for eight weeks; later, about once a month.

Now Junior no longer limps. "He's like a young dog again," his owner says.

1. Recognizing Words in Context

Find the word *immobilizes* in the passage. One definition below is a *synonym* for that word; it means the same or almost the same thing. One definition is an *antonym*; it has the opposite or nearly opposite meaning. The other has a completely different meaning. Label the definitions S for *synonym*, A for *antonym*, and D for *different*.

- _____ a. moves around
- _____ b. holds motionless
- _____ c. examines

2. Distinguishing Fact from Opinion

Two of the statements below present *facts*, which can be proved correct. The other statement is an *opinion*, which expresses someone's thoughts or beliefs. Label the statements F for *fact* and O for *opinion*.

- _____ a. Junior's vet sent him to a veterinary acupuncturist.
- _____ b. Acupuncture causes the brain to release pain-blocking chemicals.
- _____ c. Junior acts like a young dog again.

3. Keeping Events in Order

Label the statements below 1, 2, and 3 to show the order in which the events happened.

- _____ a. Junior was limping badly from arthritis.
- _____ b. Junior received acupuncture treatments.
- _____ c. Junior no longer limps.

4. Making Correct Inferences

Two of the statements below are correct *inferences*, or reasonable guesses. They are based on information in the passage. The other statement is an incorrect, or faulty, inference. Label the statements C for *correct* inference and F for *faulty* inference.

- _____ a. Acupuncture does help block pain.
- _____ b. Acupuncture works mainly because people think it will.
- _____ c. Acupuncture is an effective way to treat pain in animals.

5. Understanding Main Ideas

One of the statements below expresses the main idea of the passage. One statement is too general, or too broad. The other explains only part of the passage; it is too narrow. Label the statements M for *main idea*, B for *too broad*, and N for *too narrow*.

- _____ a. Acupuncture has different uses.
- _____ b. The veterinarian treats the pet with acupuncture once a week by inserting needles at key points.
- _____ c. Veterinarians are now using acupuncture to treat animals for pain.

Correct Answers, Part A _____

Correct Answers, Part B _____

Total Correct Answers _____

A direct, written message that is usually sent some distance from one person to another or to a group of people or an organization is called a letter. Over time, letter writing has also developed into a popular literary prose form, a type of biographical or autobiographical literature, intended in some cases for reading by the general public.

Letter writing began in the ancient world as soon as rulers of nations, separated by distance, found the need to communicate with each other. It is known from a collection of documents found in Egypt that many rulers in the ancient Middle East kept up a lively correspondence with the pharaohs. Among the ancients, Cicero was a prolific writer of letters, especially to his friend Atticus. In the Bible, most of the books in the New Testament are letters from St. Paul and other Christian leaders to various congregations and individuals. Throughout history, many well-known persons have written letters that, although originally intended as private correspondence, have been collected and published. Such collections are far too numerous to list. For example, in the modern period, the letters of such famous people as Charles Lamb, Robert Louis Stevenson, William Dean Howells, Ernest Hemingway, Groucho Marx, Sigmund Freud, Woodrow Wilson, George Eliot, Henry James, Virginia Woolf, Katherine Mansfield, and D.H. Lawrence have been rich sources of information on the people themselves and on the world as they saw it. In the matter of published letters, it should be noted that a letter as a document becomes the property of the recipient, but the contents remain the property of the sender, who must consent to any publication.

In the late twentieth century, the practice of letter writing has diminished considerably. This is probably due to the influence of mass communication technologies such as telephones and computers. Still, some types of personal correspondence remain in use: formal invitations and replies, business letters, thank-you notes and letters, and letters of application. Of these kinds of correspondence, only the thank-you note and letter are generally written at the warm, personal level. Invitations, for example, hardly seem to be letters at all, since they often are engraved on high-quality paper and are very formal. One kind of correspondence that is more public than personal is the letter to the editor, an individual expression of opinion on some issue of current interest written to be published in newspapers and magazines.

Reading Time _____

Recalling Facts

1. Letter writing satisfies the need for
 - a. communication between people.
 - b. setting down facts for history.
 - c. practicing penmanship.
2. Cicero wrote many letters to his friend
 - a. Caesar.
 - b. Atticus.
 - c. St. Paul.
3. Most of the books in the New Testament are
 - a. biographical essays.
 - b. sermons given by Christian leaders.
 - c. letters from Christian leaders to congregations and individuals.
4. The contents of a letter are the property of the
 - a. public.
 - b. sender.
 - c. recipient.
5. A letter to the editor of a newspaper
 - a. expresses the opinion of the sender.
 - b. is not intended for publication.
 - c. expresses the opinion of the newspaper.

Understanding Ideas

6. You can conclude from the article that most letters are intended
 - a. for publication.
 - b. as private correspondence.
 - c. for personal diaries.
7. It is likely that modern communication technology has
 - a. eliminated the need for writing letters.
 - b. encouraged the need for writing letters.
 - c. lessened the need for writing letters.
8. Personal letters published after the death of famous persons are valued because
 - a. they provide a personal point of view on people and events.
 - b. the writers wanted them to be made public.
 - c. privacy has been violated.
9. You can conclude from the article that publishing a letter without the consent of the sender is
 - a. a common practice.
 - b. against the law.
 - c. acceptable if the sender is famous.
10. The article suggests that personal correspondence has generally become
 - a. more personal.
 - b. less formal.
 - c. more formal.

A Trip to Forget

Dear Amanda,

You're not going to believe what happened on our train trip to Seattle to spend Thanksgiving with Gram and Gramp. It took 57 hours to get there from Chicago. We arrived 12 hours late. And all because Dad thought going by train would be an adventure. It was, but not the kind of adventure he had in mind.

First, police boarded the train in Wisconsin and took off one of the passengers. Next, the train hit a car that had been abandoned on the tracks. We had to wait about an hour and a half for the wreckage to be hauled away. Luckily, no one was hurt.

We'd finally gotten as far as Idaho when a freight train up the line derailed. We sat there, going nowhere, for eight hours while workers cleared the tracks. Some people held a sing-along to pass the time. The worst thing was that the dining car ran out of food! The train stopped in Spokane, Washington, to pick up more food. I think the crew was afraid we'd revolt if they didn't feed us.

I tell you, Amanda, I was never so thankful for anything in my life as getting off that train. A stagecoach might have been faster.

Your friend,
Lily

1. Recognizing Words in Context

Find the word *boarded* in the passage. One definition below is a *synonym* for that word; it means the same or almost the same thing. One definition is an *antonym*; it has the opposite or nearly opposite meaning. The other has a completely different meaning. Label the definitions S for *synonym*, A for *antonym*, and D for *different*.

- _____ a. entered
- _____ b. left
- _____ c. covered

2. Distinguishing Fact from Opinion

Two of the statements below present *facts*, which can be proved correct. The other statement is an *opinion*, which expresses someone's thoughts or beliefs. Label the statements F for *fact* and O for *opinion*.

- _____ a. The train hit a car that was abandoned on the tracks.
- _____ b. A derailed freight train delayed the train eight hours.
- _____ c. The worst thing was that the dining car ran out of food.

3. Keeping Events in Order

Two of the statements below describe events that happened at the same time. The other statement describes an event that happened before or after those events. Label them S for *same time*, B for *before*, and A for *after*.

- _____ a. Crews cleared the derailed freight train from the tracks.
- _____ b. The train sat there, going nowhere, for eight hours.
- _____ c. The train arrived in Seattle 12 hours late.

4. Making Correct Inferences

Two of the statements below are correct *inferences*, or reasonable guesses. They are based on information in the passage. The other statement is an incorrect, or faulty, inference. Label the statements C for *correct* inference and F for *faulty* inference.

- _____ a. It is unusual for so many bad things to happen during a single train trip.
- _____ b. The train trip from Chicago to Seattle normally takes far less than 57 hours.
- _____ c. Every train trip is an adventure.

5. Understanding Main Ideas

One of the statements below expresses the main idea of the passage. One statement is too general, or too broad. The other explains only part of the passage; it is too narrow. Label the statements M for *main idea*, B for *too broad*, and N for *too narrow*.

- _____ a. Misadventures that happened on a train trip from Chicago to Seattle delayed the train's arrival for 12 hours.
- _____ b. Crews took eight hours to clear a derailed freight train from the tracks.
- _____ c. Taking a train trip can prove to be an adventure.

Correct Answers, Part A _____

Correct Answers, Part B _____

Total Correct Answers _____

Aborigine

From prehistoric times to the present, there have been many mass migrations of people throughout the world. In a few isolated locations, however, certain tribal or ethnic groups have lived without migrating for many thousands of years. Such people are called aborigines, from Latin, meaning "from the beginning." Aboriginal peoples lived in areas remote from other cultures, and their existence became known to the rest of the world only when outsiders intruded upon their territories.

Some anthropologists in the twentieth century question whether aborigines have always lived in the locations where they have been found in modern times. It is possible that some aborigines did migrate, but in a period so remote in time that there is no record of their migration. In the case of the Indians of the Americas, for instance, it is generally accepted that their ancestors came to the Western Hemisphere by way of the Bering Strait between Siberia and Alaska many thousands of years ago.

In the twentieth century, there are few regions of the world where outsiders have not encroached upon aboriginal cultures. Stone Age cultures exist in the jungles of South America and on the island of New Guinea. The Negritos, a pygmylike people of Malaysia and the Philippines, live in the mountainous interiors and have succeeded in preserving their primitive ways of life without much interference.

On Hokkaido, the large northern island of Japan, live a people called the Ainu, who were originally distinct physically from the surrounding Mongoloid population. Over the centuries, the processes of cultural assimilation and intermarriage have almost eliminated their distinctive characteristics. They now resemble the Japanese in appearance and use the Japanese language.

By virtue of their name, the Australian aboriginals (or aborigines, as they are also called) are probably the best known of the aboriginal societies. At the time of the first European settlement about 200 years ago, the aboriginals occupied all of Australia and the island of Tasmania. The estimate of the eighteenth-century population was at least 300,000, comprising more than 500 tribes.

Most anthropologists and archaeologists believe that the aboriginals migrated to Australia and Tasmania about 40,000 years ago. They probably originated in mainland Southeast Asia and may have reached Australia by way of a now-submerged land shelf that connected the continent with New Guinea. Since the arrival of European settlers in Australia, the traditional aboriginal way of life has been adversely affected.

Reading Time _____

Recalling Facts

1. The name *aborigine* comes from Latin meaning
 - a. "from the beginning."
 - b. "prehistoric times."
 - c. "migrating people."
2. Aborigines are people who have
 - a. recently moved to an area.
 - b. migrated frequently from place to place.
 - c. lived in one place for thousands of years.
3. The Ainu of Japan are an example of
 - a. people who have retained distinctive characteristics.
 - b. cultural assimilation and intermarriage.
 - c. an untouched primitive aboriginal culture.
4. Aboriginal cultures exist
 - a. around the world.
 - b. primarily in the East.
 - c. where rainfall is frequent.
5. The ancestors of some aborigines migrated from continent to continent by traveling
 - a. in boats.
 - b. on sleds.
 - c. over now-submerged land.

Understanding Ideas

6. The effect of outsiders on aboriginal cultures has been
 - a. positive.
 - b. negative.
 - c. neutral.
7. Some aboriginal cultures have remained unaffected by outsiders because
 - a. the aborigines are too primitive.
 - b. the aborigines live in very remote areas.
 - c. outsiders have no interest in meeting them.
8. The article suggests that nonmigrating peoples tend to
 - a. retain their distinct characteristics.
 - b. mix with other cultures.
 - c. lose their traditions.
9. Since the 1900s, the aboriginal population in Australia has
 - a. increased.
 - b. decreased.
 - c. remained the same.
10. The Indians of the Americas are considered
 - a. assimilated cultures.
 - b. Stone Age cultures.
 - c. aboriginal cultures.

The Songlines

The aborigines of Australia tell tales about the beginning of their people. Long ago, they say, in a time called the Dreaming or Dreamtime, their ancestors wandered the earth, which was flat and featureless. As the ancestors wandered, they sang, scattering musical notes and words along their path. As they sang, the mountains and the creeks and all the other features of the land appeared, created by their songs.

After the land came to be, the ancestors made humans and animals out of clay and sang life into them. The people that the ancestors made became the aboriginal people of Australia.

Long after those first beings vanished, their songs remained. Each geographical feature, every hill and water hole and rock, every streambed had its own story, its own sacred beginning, and, most importantly, its own song. The paths between the features are known as songlines. The aborigines did not have maps or charts or writing, and when they wanted to explain how to go from one place to another, they did not explain in words. Instead, they sang.

Today, an aboriginal person will often commence a long journey into wild places he or she has never been, taking no map and following no roads—just following the ancestors' songlines.

1. Recognizing Words in Context

Find the word *commence* in the passage. One definition below is a *synonym* for that word; it means the same or almost the same thing. One definition is an *antonym*; it has the opposite or nearly opposite meaning. The other has a completely different meaning. Label the definitions S for *synonym*, A for *antonym*, and D for *different*.

- _____ a. begin
- _____ b. end
- _____ c. talk about

2. Distinguishing Fact from Opinion

Two of the statements below present *facts*, which can be proved correct. The other statement is an *opinion*, which expresses someone's thoughts or beliefs. Label the statements F for *fact* and O for *opinion*.

- _____ a. Aboriginal people tell stories of their beginnings.
- _____ b. Aboriginal people often journey into wild places.
- _____ c. Aboriginal people prefer following songlines to following maps.

3. Keeping Events in Order

Label the statements below 1, 2, and 3 to show the order in which the events happened.

- _____ a. Aboriginal ancestors wandered the earth, singing.
- _____ b. The ancestors created Australia's animals and people.
- _____ c. The aborigines tell stories about their beginnings.

4. Making Correct Inferences

Two of the statements below are correct *inferences*, or reasonable guesses. They are based on information in the passage. The other statement is an incorrect, or faulty, inference. Label the statements C for *correct* inference and F for *faulty* inference.

- _____ a. Aboriginal people have a strong traditional culture.
- _____ b. Aboriginal people keep their traditions alive.
- _____ c. Aborigines are no longer interested in their background.

5. Understanding Main Ideas

One of the statements below expresses the main idea of the passage. One statement is too general, or too broad. The other explains only part of the passage; it is too narrow. Label the statements M for *main idea*, B for *too broad*, and N for *too narrow*.

- _____ a. Australia was created long ago.
- _____ b. Australia's geographical features came from the songs of aboriginal people.
- _____ c. According to Australian aborigine belief, their ancestors created the world through song.

Correct Answers, Part A _____

Correct Answers, Part B _____

Total Correct Answers _____

Calling All Engineers

The building of canals, bridges, and roads was carried out by specially trained civil engineers as early as the middle of the eighteenth century. With the advent of steam power at the beginning of the Industrial Revolution in the last part of the eighteenth century, mechanical engineers started to develop engines, locomotives, and various other machines. Originally, steam was used merely to extend power beyond that of animals. During the nineteenth century, however, mechanical engineering expanded to include such laborsaving devices as the sewing machine and the mechanical reaper.

The increasing need for metals furthered mining engineering. With the invention of the Bessemer steel-making process, steel began to replace iron in both machinery and construction. Large bridges and skyscrapers became possible. This led to the development of metallurgical engineering as a separate field. The invention of electric generators and motors and the development of the electric light bulb led to the growth of electrical engineering. This was originally a subspecialty of mechanical engineering. Advances in chemistry during the latter half of the nineteenth century demanded that small-scale laboratories be expanded to large-scale production. This opened the way for the chemical engineer. All these various fields of engineering had been established by 1900.

Following the introduction of the assembly line by Henry Ford, the demands of the growing automobile industry led to a specialty in automotive engineering. The rapid spurt of airplane development following World War I led to the new field of aeronautical engineering. The increasing need for petroleum products to provide fuels for transportation, energy generation, and heating fostered petroleum engineering. With the development of radio just after the turn of the twentieth century, electronic engineering was born. Radio, television, and almost all modern communications techniques depend on the electronic engineer. Following the invention of the transistor, new vistas in communications and computing were opened. The information revolution caused by the computer added computer engineering as a new specialty.

The advent of nuclear power was reflected in the field of nuclear engineering. Combinations of medicine and technology to build artificial limbs or organs and to improve medical instrumentation started the field of bioengineering.

The need to produce goods cheaply and efficiently became a primary responsibility of the industrial engineer. Following the development of space flight, aerospace engineering was added to aeronautical engineering. A number of further specialty areas also came about such as ceramic, safety, agricultural, environmental, and transportation engineering.

Reading Time _____

Recalling Facts

1. Steam power was introduced at the beginning of
 - a. the Industrial Revolution.
 - b. World War II.
 - c. the Revolutionary War.
2. Iron in machinery and construction was replaced by
 - a. aluminum.
 - b. ceramics.
 - c. steel.
3. Electronic engineering was fostered by the development of
 - a. the sewing machine.
 - b. the radio.
 - c. television.
4. Among other things, bioengineering involves building
 - a. nuclear power stations.
 - b. airplanes.
 - c. artificial limbs and organs.
5. Industrial engineers are concerned with
 - a. improving medical instrumentation.
 - b. producing goods cheaply and efficiently.
 - c. developing new areas of communication.

Understanding Ideas

6. You can conclude from the article that engineering
 - a. is a broad field with many specialty areas.
 - b. is restricted to industrial applications.
 - c. specializes in aeronautical applications.
7. Engineers are concerned with
 - a. the practical applications of science.
 - b. the aesthetics of science.
 - c. literary achievement.
8. Specialty areas in engineering developed as a result of
 - a. production demands.
 - b. advances in science and technology.
 - c. global conflicts.
9. Engineers are likely to be
 - a. methodical.
 - b. artistic.
 - c. disorganized.
10. You can conclude from the article that the field of engineering
 - a. is becoming too specialized.
 - b. is limited in the number of specialty areas that can be developed.
 - c. will probably continue to develop more specialty areas.

Engineering a Change

Henry Rowan stood in the melting room of the Philadelphia mint. The owner of Inductotherm, a small company that manufactured melting furnaces, he had made an outrageous claim. He could, he had said, change the melting units in the mint's furnaces in just ten minutes—a job that the mint foreman claimed took four hours. Moreover, Rowan had bragged, he would change the units with the furnaces loaded with metal and heated to 3,000 degrees.

Rowan had begun his engineering career with a company that built melt systems—furnaces that heated metal until it became liquid. He soon started Inductotherm with a few good workers and very little cash. Winning the mint's contract was essential if his fledgling company were to survive.

Rowan disconnected the cables from the old furnaces and began to connect the new ones. The first three connections went smoothly. The last one refused to catch. Finally, Rowan felt the cable tighten. Cold water poured into the furnace, preventing a meltdown. Rowan had succeeded.

Henry Rowan went on to build Inductotherm into a hugely successful business. In 1995, he donated \$100,000,000 to a small college in New Jersey for an engineering school that now bears his name: Rowan College.

1. Recognizing Words in Context

Find the word *fledgling* in the passage. One definition below is a *synonym* for that word; it means the same or almost the same thing. One definition is an *antonym*; it has the opposite or nearly opposite meaning. The other has a completely different meaning. Label the definitions S for *synonym*, A for *antonym*, and D for *different*.

- _____ a. young bird
- _____ b. established
- _____ c. new

2. Distinguishing Fact from Opinion

Two of the statements below present *facts*, which can be proved correct. The other statement is an *opinion*, which expresses someone's thoughts or beliefs. Label the statements F for *fact* and O for *opinion*.

- _____ a. Rowan's claim was outrageous.
- _____ b. Rowan founded Inductotherm.
- _____ c. Rowan gave \$100,000,000 to a college in New Jersey.

3. Keeping Events in Order

Label the statements below 1, 2, and 3 to show the order in which the events happened.

- _____ a. Inductotherm became hugely successful.
- _____ b. Rowan worked for a company that built melt systems.
- _____ c. Rowan founded his own company.

4. Making Correct Inferences

Two of the statements below are correct *inferences*, or reasonable guesses. They are based on information in the passage. The other statement is an incorrect, or faulty, inference. Label the statements C for *correct* inference and F for *faulty* inference.

- _____ a. Engineering can be an exciting field.
- _____ b. Henry Rowan was a risk taker.
- _____ c. Changing melting units is a simple task.

5. Understanding Main Ideas

One of the statements below expresses the main idea of the passage. One statement is too general, or too broad. The other explains only part of the passage; it is too narrow. Label the statements M for *main idea*, B for *too broad*, and N for *too narrow*.

- _____ a. Henry Rowan, whose gift created Rowan College, won business for his young company through a daring demonstration.
- _____ b. Henry Rowan took risks to get his company started.
- _____ c. Henry Rowan began his engineering career with a company that built furnaces and then founded a company of his own.

Correct Answers, Part A _____

Correct Answers, Part B _____

Total Correct Answers _____

Meteorology

Atmospheric conditions, particularly variations in the weather and their effects on the Earth, are the subject of meteorology. This science uses physics and chemistry to unravel the dynamics of the Earth's atmosphere in an attempt to understand, predict, and control atmospheric actions.

The sun is the engine that drives the Earth's weather. Due to the uneven heating of the Earth's surface, the atmosphere is in a constant state of imbalance, or disequilibrium. Weather conditions are a result of the atmosphere's attempt to gain equilibrium—a state it never achieves. This constant struggle for equilibrium combines with the influence of the Earth's rotation and the gravitational pulls of the sun and moon to keep the atmosphere in constant motion. Large masses of air move and mix, rise and sink, absorb and release energy to produce the vast panorama of atmospheric conditions that we commonly refer to as the weather.

Both meteorology and climatology are particular sciences concerned with the study and prediction of weather conditions. Meteorology deals with the specific weather conditions at a given time and place. Climatology is concerned with average weather conditions over extended periods of time and in areas all over the globe.

Synoptic and dynamic meteorology are two major branches of meteorology. Synoptic meteorologists use simultaneous weather reports to analyze the present state of the atmosphere and predict its future states. Dynamic meteorologists use mathematical equations to describe the motions of the atmosphere. Because the atmosphere behaves according to the laws of physics, dynamic meteorologists can use computers to solve equations and predict the future state of the atmosphere—a technique called numerical weather prediction (NWP). Synoptic meteorologists routinely modify these numerical weather predictions to account for the effects of local conditions and landforms such as large bodies of water, deserts, and mountains.

Virtually every segment of society benefits from weather forecasts: the aviation, maritime, and energy industries; potable-water-management and pollution-control agencies; agricultural organizations; defense departments; and, of course, the general public. Moreover, accurate weather forecasts are becoming increasingly important. Thus, most governments, many universities, and some private corporations sponsor meteorological research programs that range from investigations of the atmosphere to improved methods for modifying weather predictions. Modern research programs emphasize the numerical modeling of such local conditions as thunderstorms and heavy rainfall, and researchers are developing computer models that will provide forecasts of weather conditions as many as ten to thirty days in advance.

Reading Time _____

Recalling Facts

1. The Earth's atmosphere is in a state of imbalance due to
 - a. poor weather forecasts.
 - b. uneven heating of the Earth's surface.
 - c. moisture absorption.
2. The science that deals with extended global weather conditions is called
 - a. meteorology.
 - b. atmospheric.
 - c. climatology.
3. Scientists who use mathematical equations to describe the motions of the Earth's atmosphere are
 - a. dynamic meteorologists.
 - b. synoptic meteorologists.
 - c. synoptic climatologists.
4. NWP stands for
 - a. new wave precipitation.
 - b. national weather program.
 - c. numerical weather prediction.
5. The atmosphere behaves according to the laws of
 - a. technology.
 - b. physics.
 - c. mathematics.

Understanding Ideas

6. The article suggests that weather prediction is important to
 - a. most segments of society.
 - b. only a small part of society.
 - c. every single person on Earth.
7. The atmosphere will probably
 - a. eventually achieve a state of equilibrium.
 - b. remain in a constant state of imbalance.
 - c. vacillate between imbalance and equilibrium.
8. The article wants you to understand that weather prediction is
 - a. largely guesswork.
 - b. based on scientific principles.
 - c. usually inaccurate.
9. You can conclude from the article that scientists are able to
 - a. change the weather.
 - b. control weather patterns under certain conditions.
 - c. predict how local conditions will affect the future state of the atmosphere.
10. The article suggests that the prediction of weather conditions well in advance is
 - a. likely to happen.
 - b. unlikely to happen.
 - c. impractical.

Popularizing the Weather

In 1897, Charles Dudley Warner wrote, "Everybody talks about the weather, but nobody does anything about it." But in the late 1940s, people trained as meteorologists during World War II began to reenter the peacetime workforce, bringing their skills with them.

Another new technology was spreading in the 1940s—television. News programs began hiring weather forecasters. The first forecasters worked on a shoestring. They drew weather patterns on charts with chalk or used stick-on symbols. Some early forecasters were actors, not scientists. In 1959, the American Meteorological Society began certifying TV forecasters, thereby raising professional standards.

In 1955, viewers experienced radar images of weather for the first time as television tracked Hurricane Diane. In the early 1960s, a few stations began broadcasting images from the first weather satellites. By the 1970s, most stations featured satellite pictures, and people could see actual weather patterns for themselves.

In 1982, the Weather Channel, with its sophisticated computer graphics, was born. Today anyone can tune in to a scientifically accurate weather forecast for anywhere in the world, 24 hours a day. The National Weather Service relies heavily on television to disseminate information to the public about dangerous weather conditions. Televised weather warnings help save many lives each year.

1. Recognizing Words in Context

Find the word *tracked* in the passage. One definition below is a *synonym* for that word; it means the same or almost the same thing. One definition is an *antonym*; it has the opposite or nearly opposite meaning. The other has a completely different meaning. Label the definitions S for *synonym*, A for *antonym*, and D for *different*.

- _____ a. avoided
- _____ b. followed
- _____ c. traveled

2. Distinguishing Fact from Opinion

Two of the statements below present *facts*, which can be proved correct. The other statement is an *opinion*, which expresses someone's thoughts or beliefs. Label the statements F for *fact* and O for *opinion*.

- _____ a. Everybody talks about the weather, but nobody does anything about it.
- _____ b. Television tracked Hurricane Diane with radar in 1955.
- _____ c. The Weather Channel began in 1982.

3. Keeping Events in Order

Two of the statements below describe events that happened at the same time. The other statement describes an event that happened before or after those events. Label them S for *same time*, B for *before*, and A for *after*.

- _____ a. Television viewers saw radar images of Hurricane Diane.
- _____ b. People trained as meteorologists entered the workforce.
- _____ c. Television was becoming widespread.

4. Making Correct Inferences

Two of the statements below are correct *inferences*, or reasonable guesses. They are based on information in the passage. The other statement is an incorrect, or faulty, inference. Label the statements C for *correct* inference and F for *faulty* inference.

- _____ a. Knowing about approaching dangerous weather conditions is not particularly helpful.
- _____ b. Television helped popularize the science of meteorology.
- _____ c. The National Weather Service and television work well together.

5. Understanding Main Ideas

One of the statements below expresses the main idea of the passage. One statement is too general, or too broad. The other explains only part of the passage; it is too narrow. Label the statements M for *main idea*, B for *too broad*, and N for *too narrow*.

- _____ a. Meteorology, new to most people in the 1940s, became a popular science through television weather forecasts.
- _____ b. The history of television weather forecasts began in the 1940s.
- _____ c. Today anyone can get a scientifically accurate weather forecast for anywhere in the world, 24 hours a day.

Correct Answers, Part A _____

Correct Answers, Part B _____

Total Correct Answers _____