GEORGIA'S

Connecting Reading to Technology Education

TECHNOLOGY Education

GEORGIA DEPARTMENT OF EDUCATION

Kathy Cox

State Superintendent of Schools

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Table of Contents

Implementation

This reading activities manual has been developed to enhance the nonverbal, cognitive, and creative skills of students studying in the area of technology education. To further develop the connection with reading and Technology Education, the manual presents of variety of activities in the systems of information, physical, and bio-technological. The manual can be used as a supplementary resource to reinforce the concepts discussed in the technology education laboratory. In addition, the activities presented incorporate safety, career awareness, terminology, research, and information useful in an ever-changing society.

Some suggested uses for this manual are:

1. Integrate reading activities into the curriculum
2. Supplementary activities during modular assignments
3. Continue curriculum excellence when absent from the technology education laboratory
4. Meaningful homework assignments
5. Enrichment development for all students

Why Read ?

Reading well is much more than a required career skill. It is not enough to simply learn "how" to read. We must learn to digest and understand information so that we may become literate and informed citizens of our community, our country and a continuously shrinking world. Information is very critical to good communication. We must learn to communicate with our friends, our neighbors and co-workers. The ability to read and understand what you read gives you power. When you read , you can see the world through another person's eyes. You can see in to the future and out of the past. You will expand the limits of your knowledge and imagination. Here are a few advantages of reading well.

1. ***Communication -*** *Reading well* will develop and enhance your communication skills.

   The most technologically efficient machine that man has ever invented is the book. - Northrop Frye

2. ***Self-Actualization -*** *Reading well* helps you to learn more about yourself as well as others.

   When you read a classic you do not see in the book more than you did before. You see more in you than there was before. – Clifton Fadiman

3. ***Imagination -*** Can you think of something more important to the ideas and concepts of technology and invention?

   Books give not wisdom where none was before. But where some is, there reading makes it more. - John Harington

4. ***Career Performance / Advancement -*** *Reading well* provides information. Information is power. The more you know, the more you can accomplish.

   Some books are to be tasted, others to be swallowed, and some few to be chewed and digested. - Francis Bacon

5. ***Self-Fulfillment -*** *Reading well* can help solve some of the great mysteries of life.

   In the case of a good book, the point is not how fast you can get through, but rather how much of it gets through to you. - Mortimer J. Adler

Reading well will be the key to building your confidence in the operation and adaptation of technology. The ability to read about and understand opposing viewpoints, make evaluations and compare ideas are key factors in the basic job description of engineers and technologists. Learn to **read well.**

The Reading Workout

Sometimes when you need to read a book or assignment for school, it's not enough just to read the words. You will need to digest and understand what you are reading so that you can share your knowledge in class discussions and tests. One way to help improve your reading comprehension is by practicing the strategies below.

Warm Up

Before starting, do a mental warm-up exercise. Think about your assignment for a minute. Why did the teacher assign it ? Ask yourself if you already know anything about the topic. Example: For an electronics assignment about current flow, ask yourself, "What are electrons? Didn't the instructor say something about atoms and electrons ? Does the word electricity have anything to do with electrons?" This activity will get your mental muscles warmed up and ready to learn.

Work Out

When you begin to read, try to keep your brain active. Instead of just skimming text, look for key ideas in your reading. Ask yourself, "What is the main idea here ? What are they trying to say ? How is it important ?" If you can't spot the main idea, try to read the paragraph or chapter again. Technical books and manuals may require you to read some sections several times while applying the information to pictures or tables. A good tip: Pay special attention to subheadings and the first sentence of each paragraph.

Cool Down

When you finish reading, cool down slowly by following these steps. First, try to remember what you have just read. Does it make sense? Try to organize the information in your head. Then, write a brief outline in your notes. If you have some questions, write them all down so that you can ask the teacher when you return to class.

By following these guidelines, you will be able to build your database of ideas and knowledge to become more successful in class and in life. Reading can promote learning. Learning creates exercise for your brain. Anytime you are going to exercise, warm up, work out, and cool down.

Connecting Reading to Technology Education

Name _______________

Reading Logbook

Date	Title	Type	Required ?	No. of Pages

Building Reading Skills **Connecting Reading to Technology Education**

Do you have trouble comprehending some of what you read? Do you ever fall behind in your high school reading? Do you read only when necessary? Let's assume you have just read a chapter or assignment from one of your most difficult classes. Did you follow the message from the author? Many times, we read the words and we know what each of the words mean, but we fail to internalize the message. This "internalizing" is more commonly known as reading comprehension. There are at least two kinds of reading comprehension skills. Literal comprehension involves knowing the words that you read. Evaluative comprehension involves a critical analysis and evaluation of what you read. You must practice both skills to become a competent reader.

First ask yourself; will good reading skills be important to your success in life? If your answer is yes, then it is time to build skills every day. Imagine you are the place kicker for a professional football team. Do you simply show up for the game (test) without practice? Place kickers practice over and over again so that their job becomes almost automatic. Good reading skills can be developed with practice and effort. But you will need to read more.

In high school, you should continue to develop important cognitive reading skills, which improve your reading comprehension. To improve, you must read with the purpose of literal and evaluative comprehension. Does the reading make sense? Do the ideas and facts come together in a meaningful way? What was the author trying to say? This process will improve with meaningful practice. After reading the assignment, can you express the information and ideas in your own words? This process may take more time at first, but eventually, you will be able to see results and reach your goals.

To closely align the activities in this manual with the educational requirements for the Georgia Department of Education, the following Quality Core Curriculum standards will be addressed:

1. Topic: Reading
   Standard: Demonstrates the ability to accurately identify, locate, understand, and interpret written information (manuals, graphs, work orders, schedules, publications, etc.).

2. Topic: Writing
   Standard: Communicates thoughts and information accurately in writing by creating and editing documents (letters, memos, directions, manuals, reports, graphs, flowcharts, etc.).

4. Topic: Listening
   Standard: Receives, comprehends, interprets, and responds to verbal and nonverbal messages appropriate to a given situation.

6. Topic: Creative Thinking
   Standard: Creates, combines, and connects ideas and information.

7. Topic: Decision-Making
   Standard: Specifies goals, generates choices, considers risks, evaluates, and chooses workable alternatives.

8. Topic: Problem-Solving
   Standard: Recognizes a problem, identifies the cause, develops and implements solutions, and evaluates results.

9. Topic: Accountability
   Standard: Takes initiative to accomplish tasks in a conscientious and timely manner.

12. Topic: Ethics
    Standard: Demonstrates the ability to be trusted.

13. Topic: Ethics
    Standard: Demonstrates an understanding of proper business/work ethics.

15. Topic: Teaching
    Standard: Shares knowledge and skills with others.

17. Topic: Leadership
    Standard: Understands and respects leadership roles.

20. Topic: Negotiation
    Standard: Demonstrates the ability to resolve issues.

21. Topic: Working with Diversity
    Standard: Demonstrates the ability to perform in a work environment with people of different age, gender, culture, attitude, and ability.

22. Topic: Using Technology
    Standard: Knows and applies changing technology.

24. Topic: Work Environment
    Standard: Maintains safety, health, and environmental standards in the vocational lab classroom and in work-based learning situations.

25. Topic: Work Environment
    Standard: Understands and applies health, safety, and environmental standards when using and disposing of hazardous materials, including knowledge and use of appropriate governmental forms.

26. Topic: Career Awareness
Standard: Makes potential career decisions based upon interests, abilities, and values and formulates appropriate plans to reach career goals.

28. Topic: Career Awareness
Standard: Identifies key elements that comprise professional standards and appropriate behavior.

29. Topic: Career Awareness
Standard: Understands that people must be prepared for career changes.

31. Topic: Transitions
Standard: Demonstrates an understanding of education as a lifelong learning process.

32. Topic: Application of Technology Systems
Standard: Demonstrates knowledge and skill regarding diverse technology systems, including their functions and applications.

33. Topic: Application of Technology Systems
Standard: Demonstrates an understanding of the evolution of technology.

34. Topic: Application of Technology Systems
Standard: Demonstrates knowledge of and perform tasks representative of technology-based careers (engineers, technicians, draftspersons, etc.)

35. Topic: Problem Solving using technology
Standard: Solves problems using technology using a systems approach and a variety of resources including information, tools and materials.

36. Topic: Identify and describe resources
Standard: Identifies and describes the basic resources used for technological concepts being studied.

37. Topic: Nature, Impacts, and Evolution of Technology
Standard: Demonstrates knowledge of the nature of technology and the relationships and impacts among technological achievement, the environment, the advancement of science, the individual, and society. The context for this knowledge shall be historical, current, and futuristic.

38. Topic: Problem solving using Technology
Standard: Demonstrates the ability to solve problems with technology using a systems approach, higher-order thinking skills, individual and collaborative ingenuity, and a variety of resources including information, tools, and materials.

39. Topic: Informed Decisions about Technological Issues
Standard: Makes ethical decisions about technological issues, including the development and use of Technology and technological resources.

40. Topic: Use Technology Resources
Standard: Demonstrates in an experiential setting the safe, effective, and creative use of technology Resources, including tools, machines, and materials, in performing technological processes.

41. Topic: Application of Science, Mathematics, and Other areas
Standard: Applies Science, mathematics and technological concepts to solve practical problems and extend human capabilities.

42. Topic: Analyze Impact
Standard: Analyzes the positive and negative impact of technological concepts being studied on society and the environment.

43. Topic: Research
Standard: Retrieves current information about technological concepts being studied using periodicals indices and computer data bases.

Connecting Reading to Technology Education

Biotechnological Systems

Name _____

What is Cancer?

Directions: Read the passage below taken from the National Cancer Institute's web site. Write three paragraphs that could be read to a child that would answer the questions, "What is cancer, can I catch it from someone, and how do you treat cancer?"

Cancer is a group of more than 100 diseases. Each type of cancer has its own name (such as lung cancer, breast cancer, leukemia), its own treatment, and its own chances of being cured. Each type of cancer is different from the others in many ways, but every cancer is the same in this way: Certain cells become abnormal and grow without control.

The millions of tiny cells that make up the human body are so small that they can be seen only through a microscope. Although there are different kinds of cells, such as hair cells, skin cells, and blood cells, each type of cell makes new cells by dividing into two. This is how worn out, old cells are replaced with new ones.

What happens when someone has cancer is that a cell changes and doesn't do the job it should do for the body. When a cancer cell divides, it makes more cells like itself-cells that are not normal. These cells keep dividing into more cells. Eventually, they crowd out and destroy the normal, healthy cells and tissues the body needs.

A group of cells that keeps growing and crowding out normal cells is called a tumor (TOO-mur). There are two kinds of tumors. A benign (bee-NINE) tumor is not cancer. The cells of a benign tumor can crowd out healthy cells, but they cannot spread to other parts of the body. A malignant (ma-LIG-nant) tumor is cancer. Like a benign tumor, it can crowd out healthy cells around it. Unlike a benign tumor, however, a malignant tumor also can spread to other parts of the body. To do this, a cell or group of cells breaks away and moves, usually through the blood or lymphatic system, to other parts of the body. There they divide and grow and form tumors made up of cancer cells like the cells they came from. When this happens, it is called metastasis (me-TAS-ta-sis).

Cancer: It's Not Contagious

Scientists know that you can't "catch" cancer from someone who has it. It does not spread like chicken pox or the flu. You can't catch it from being with a person who has cancer or by drinking from the same glass as that person. You may know that you can't "catch" cancer, but you may wonder if having someone in your family who has cancer means that you also are going to get cancer. Instead of worrying, it is best to talk with your parents and the doctor about this. They can tell you that cancer usually doesn't run in families, and you can talk about what scares you.

Cancer Treatment:

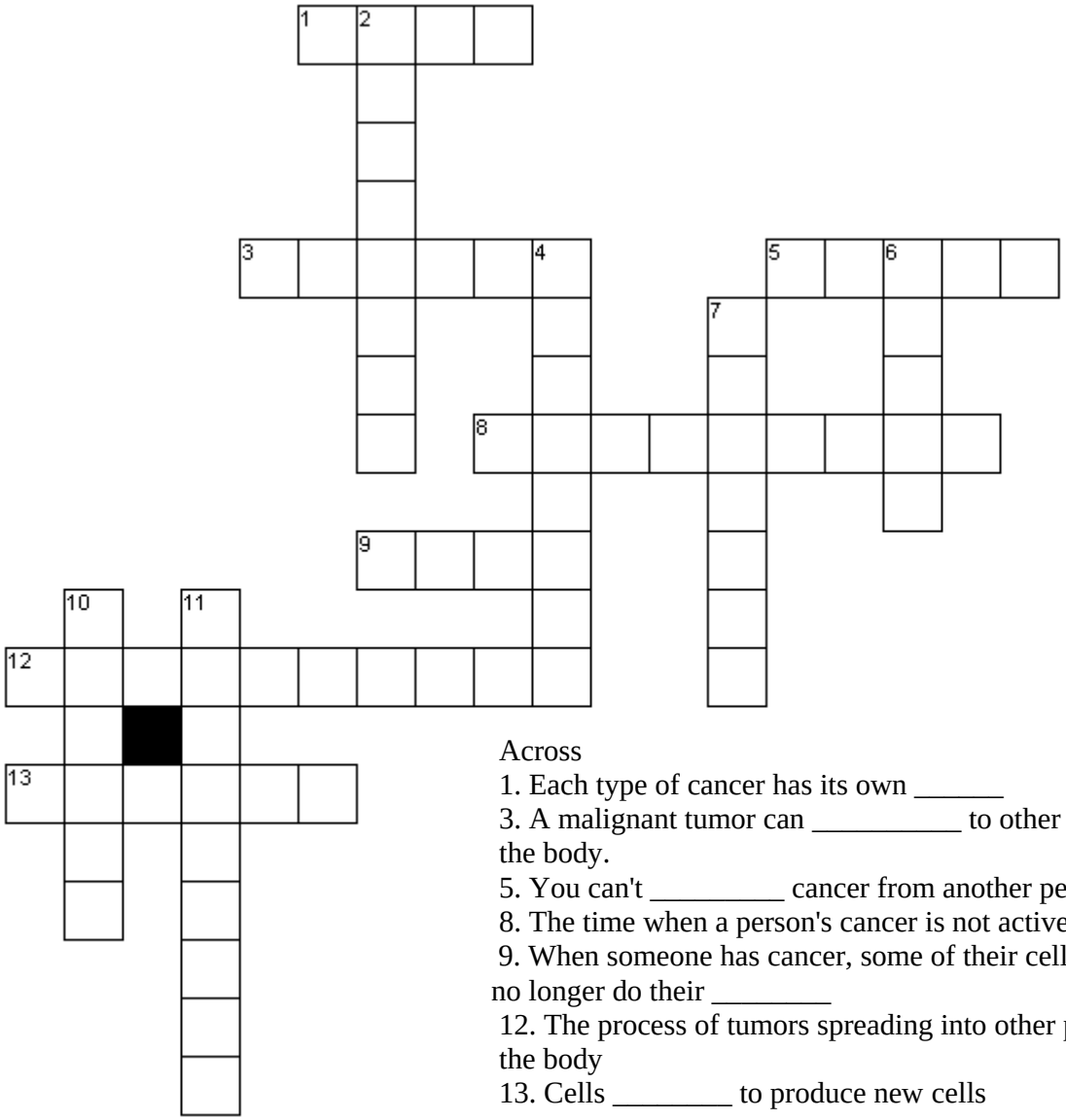
There are four main kinds of treatment for cancer-surgery, chemotherapy, radiation therapy, and biological therapy. These are used to destroy cancer cells and bring about a remission. Depending on what type of cancer people have, they could have one kind of treatment or a combination of treatments.
Treatments for cancer sometimes cause unwanted side effects such as hair loss, nausea, and weakness. Side effects are problems caused by the treatment. This happens because cancer treatment that destroys cancer cells also can hurt some normal cells.
Sometimes, people with cancer are treated in studies that test different types of cancer treatment. You may hear someone in your family talk about "clinical trials"; these are carefully designed studies that test new and promising treatments.

Biotechnological Systems **Connecting Reading with Technology Education**

Name _____

What is Cancer?

Directions: Use the passage on the previous page to complete the following crossword puzzle.



Across

1. Each type of cancer has its own _____
3. A malignant tumor can _____ to other parts of the body.
5. You can't _____ cancer from another person
8. The time when a person's cancer is not active
9. When someone has cancer, some of their cells can no longer do their _____
12. The process of tumors spreading into other parts of the body
13. Cells _____ to produce new cells

Down

2. Cancer causes certain cells to become _____
4. Cancer is more than 100 _____
6. A group of cells that keeps growing and crowding out normal cells
7. Cancer cells keep dividing into more cells and eventually crowd out and _____ the normal, healthy cells
10. A _____ tumor is not cancer
11. A _____ tumor is cancer.

Name _____

What is Cancer?

Directions: Define the following cancer related terms in your own words. You can use a dictionary or the following website for assistance.**www.cancer.gov**

Benign

Biopsy

Cancer

Diagnosis

Hematology

Immune cells

Lump

Lymphatic system

Malignant

Metastasis

Oncology

Prognosis

Recurrence

Relapse

Remission

Tissue

Tumor

Biotechnological Systems **Connecting Reading with Technology Education**

Name _____

What is Cancer?

Directions: Complete the word search.

H B C D T M Z P N R R T Z T P

Z E D E E J L S E O M U Q N H

M Q M T L M P C H L E M L A R

S H S A P L U X U Z T O V N C

C Y F V T R S M Z W A R N G R

S I G A R O P C S F S N L I E

O I T E H E L I B F T R B L L

J N N A S I S O N G A I D A A

R C C H H O P B G C S A L M P

E E Q O N P E U F Y I S P E S

M K C G L N M T I S S U E N E

L T O N I O P Y S P O I B U Y

M R W G A T G Y L K V Z M M O

P F N P L C E Y S X F D O M P

R E M I S S I O N Q K D U I P

BENIGN	BIOPSY	CANCER
CELLS	DIAGNOSIS	HEMATOLOGY
IMMUNE	LUMP	LYMPHATIC
MALIGNANT	METASTASIS	ONCOLOGY
PROGNOSIS	RECURRENCE	RELAPSE
REMISSION	SYSTEM	TISSUE
TUMOR		

Name_____

An Interview with an Earthworm

Directions: Go to the following website and read the *Dirt with Eddie the Earthworm*. After reading the interview, write 7-10 sentences explaining in your own words what you learned about earthworms and how they help the environment.
http://yucky.kids.discovery.com/noflash/worm/pg000216.html

Name_____

All About the Ozone

Directions: Read the following excerpt from the Environmental Protection Agency. Create a poster that shows a picture of the Ozone and warns people of the causes of its depletion.

What is the ozone layer and why is it important?

The ozone layer is a concentration of ozone molecules in the stratosphere. About 90% of the planet's ozone is in the ozone layer. The layer of the Earth's atmosphere that surrounds us is called the troposphere. The stratosphere, the next higher layer, extends about 10–50 kilometers above the Earth's surface. Stratospheric ozone is a naturally occurring gas that filters the sun's ultraviolet (UV) radiation. A diminished ozone layer allows more radiation to reach the Earth's surface. For people, overexposure to UV rays can lead to skin cancer, cataracts, and weakened immune systems. Increased UV can also lead to reduced crop yield, disruptions in the marine food chain, and other harmful effects.

How does ozone depletion occur?

It is caused by the release of chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODS), which were used widely as refrigerants, insulating foams, and solvents. The discussion below focuses on CFCs, but is relevant to all ODS. Although CFCs are heavier than air, they are eventually carried into the stratosphere in a process that can take as long as 2 to 5 years.

When CFCs reach the stratosphere, the ultraviolet radiation from the sun causes them to break apart and release chlorine atoms, which react with ozone, starting chemical cycles of ozone destruction that deplete the ozone layer. One chlorine atom can break apart more than 100,000 ozone molecules.

Other chemicals that damage the ozone layer include methyl bromide (used as a pesticide) and halons (used in fire extinguishers). As methyl bromide and halons are broken apart, they release bromine atoms, which are 40 times more destructive to ozone molecules than chlorine atoms.

How do we know that natural sources are not responsible for ozone depletion?

While it is true that volcanoes and oceans release large amounts of chlorine, the chlorine from these sources is easily dissolved in water and washes out of the atmosphere in rain. In contrast, CFCs are not broken down in the lower atmosphere and do not dissolve in water. The chlorine in these human-made molecules does reach the stratosphere. Measurements show that the increase in stratospheric chlorine since 1985 matches the amount released from CFCs and other ozone-depleting substances produced and released by human activities.

What is being done about ozone depletion?

In 1978, the use of CFC propellants in spray cans was banned in the U.S. In the 1980s, the Antarctic “ozone hole” appeared and an international science assessment more strongly linked the release of CFCs and ozone depletion. It became evident that a stronger worldwide response was needed. In 1987, the Montreal Protocol was signed and the signatory nations committed themselves to a reduction in the use of CFCs and other ozone-depleting substances.

Since that time, the treaty has been amended to ban CFC production after 1995 in the developed countries, and later in developing. Today, over 160 countries have signed the treaty. Beginning January 1, 1996, only recycled and stockpiled CFCs will be available for use in developed

countries like the US. This production phase out is possible because of efforts to ensure that there will be substitute chemicals and technologies for all CFC uses.

Will the ozone layer recover? Can we make more ozone to fill in the hole?

The answers, in order, are: yes and no. We can't make enough ozone to replace what's been destroyed, but provided that we stop producing ozone-depleting substances, natural ozone production reactions should return the ozone layer to normal levels by about 2050. It is very important that the world comply with the Montreal Protocol; delays in ending production could result in additional damage and prolong the ozone layer's recovery.

Name_____

Reduce, Reuse, and Recycle

Directions: Read various articles on the Internet, in books, newspapers, and or magazines that explain how different materials are recycled. Fold a piece of paper in half to create a small booklet. Draw a picture of your material on the front and give your book a title. On one of the inside pages, explain the actual process of how your material is recycled. On the other page, list products or show pictures of products that have been created from this recycled product. On the back, list three other places that people can find more information on the product that you are encouraging them to recycle.

Need help getting started? Try these websites.

Fact Monster
http://www.factmonster.com/ipka/A0775891.html

The American Plastics Council
http://www.plasticsresource.com/

How Stuff Works
www.howstuffworks.com

Now That's HOT

Directions: The following information is to be used with the *Now That's HOT* worksheet.
Source: National Climatic Data Center, Asheville, N.C., and Storm Phillips, STORMFAX, INC

State	Temp. °F	Temp. °C	Date	Station
Alabama	112	44	Sept. 5, 1925	Centerville
Alaska	100	38	June 27, 1915	Fort Yukon
Arizona	128	53	June 29, 1994	Lake Havasu City
Arkansas	120	49	Aug. 10, 1936	Ozark
California	134	57	July 10, 1913	Greenland Ranch
Colorado	118	48	July 11, 1888	Bennett
Connecticut	106	41	July 15, 1995	Danbury
Delaware	110	43	July 21, 1930	Millsboro
D.C.	106	41	July 20, 1930	Washington
Florida	109	43	June 29, 1931	Monticello
Georgia	112	44	Aug. 20, 1983	Greenville
Hawaii	100	38	Apr. 27, 1931	Pahala
Idaho	118	48	July 28, 1934	Orofino
Illinois	117	47	July 14, 1954	E. St. Louis
Indiana	116	47	July 14, 1936	Collegeville
Iowa	118	48	July 20, 1934	Keokuk
Kansas	121	49	July 24, 1936*	Alton (near)
Kentucky	114	46	July 28, 1930	Greensburg
Louisiana	114	46	Aug. 10, 1936	Plain Dealing
Maine	105	41	July 10, 1911*	North Bridgton
Maryland	109	43	July 10, 1936*	Cumberland & Frederick
Massachusetts	107	42	Aug. 2, 1975	New Bedford & Chester
Michigan	112	44	July 13, 1936	Mio

Minnesota	114	46	July 6, 1936*	Moorhead
Mississippi	115	46	July 29, 1930	Holly Springs
Missouri	118	48	July 14, 1954*	Warsaw & Union
Montana	117	47	July 5, 1937	Medicine Lake
Nebraska	118	48	July 24, 1936*	Minden
Nevada	125	52	June 29, 1994	Laughlin
New Hampshire	106	41	July 4, 1911	Nashua
New Jersey	110	43	July 10, 1936	Runyon
New Mexico	122	50	June 27, 1994	Waste Isolat. Pilot Pit
New York	108	42	July 22, 1926	Troy
North Carolina	110	43	Aug. 21, 1983	Fayetteville
North Dakota	121	49	July 6, 1936	Steele
Ohio	113	45	July 21, 1934*	Gallipolis (near)
Oklahoma	120	49	June 27, 1994*	Tipton
Oregon	119	48	Aug. 10, 1898	Pendleton
Pennsylvania	111	44	July 10, 1936*	Phoenixville
Rhode Island	104	40	Aug. 2, 1975	Providence
South Carolina	111	44	June 28, 1954*	Camden
South Dakota	120	49	July 5, 1936	Gannvalley
Tennessee	113	45	Aug. 9, 1930*	Perryville
Texas	120	49	Aug. 12, 1936	Seymour
Utah	117	47	July 5, 1895	Saint George
Vermont	105	41	July 4, 1911	Vernon
Virginia	110	43	July 15, 1954	Balcony Falls
Washington	118	48	Aug. 5, 1961*	Ice Harbor Dam
West Virginia	112	44	July 10, 1936*	Martinsburg
Wisconsin	114	46	July 13, 1936	Wisconsin Dells
Wyoming	114	46	July 12, 1900	Basin

Name _____

Now That's HOT

Directions: Use the Now That's HOT charts to answer the following questions.

1. What is the highest temperature recorded in the United States?

2. What is the earliest recorded temperature in the United States according to this chart?

3. What was the highest temperature recorded in Georgia?

4. How many states have a record high temperature of 112°F?

5. How many states have never had a temperature hotter than 101°F?

6. What is the lowest recorded high temperature in the United States according to this chart?

7. Where was the highest temperature recorded in Kentucky?

8. Do any states have their record high temperatures recorded on the same exact date? If so, list.

9. What is the most recent record high temperature recorded in the United States according to these charts?

10. Create a chart below to help you figure out the most common recorded high temperature.

Name _____

Genetic Modification

Directions: Read the following excerpt taken from the *How Stuff Works* website on Genetic Modification and answer the questions on the following page.

Man has been "genetically modifying" everything from food to dogs for many centuries, but in the past the only tool has been **selective breeding**. For example, if you wanted to create a breed of corn with resistance to a certain fungus, you would plant a plot of corn and see how individual plants did with the fungus. Then you would take seeds from the plants that did well, plant them, look at their performance against the fungus… and so on over the years until you had created a strain of corn plant that had very high resistance to the fungus in question. Using selective breeding techniques, people have created everything from variegated roses to giant pumpkins to strains of wheat with twice the yield and very high disease tolerance. In the same way, you can take chickens, analyze their eggs and find chickens whose eggs contain less cholesterol. Then you can breed them to create a strain of low-cholesterol chickens. You can select on any trait you can detect and selectively breed members of the species that do well on that trait.

Genetic engineering techniques now allow scientists to insert specific genes into a plant or animal without having to go through the trial and error process of selective breeding. Genetic engineering is therefore extremely rapid compared to selective breeding. With genetic engineering you can also cross species very easily (for example, you can create a plant that produces human insulin).

There are a variety of ways that scientists now modify plants and animals with genetic engineering techniques. For example, there is a widely used herbicide called Roundup, made by Monsanto. Roundup kills any plant that it touches. Monsanto has genetically modified soybeans and other crop plants to create "Roundup Ready" strains that are not affected by Roundup. By planting Roundup Ready seeds, a farmer can control weeds by spraying Roundup right over the crop. The crop completely ignores the herbicide, but the weeds are eliminated. Roundup Ready seeds reduce production costs and increase yield, so food becomes less expensive. Other scientists have inserted genes that produce a natural insecticide into corn plants to eliminate damage from corn borers, and a variety of anti-fungal genes can be inserted as well. The list goes on and on, because there really is no limit to what can be done

Name_____

Genetic Modification Worksheet

1. Explain selective breeding in you own words. Give one example that you can think of that was not discussed in the paragraphs on Genetic Modification.

2. List three examples of selective breeding discussed in the previous paragraphs.

3. What is a drawback to selective breeding?

4. What is genetic engineering?

5. What is the main advantage of genetic engineering as opposed to selective breeding?

6. How were “Roundup Ready” seeds generated?

7. Do you feel that it is ok to use genetics to alter plants? What about animals? Why?

8. Imagine that you are a genetic engineer. Explain how you would alter either a plant or an animal to help extend or improve its life. Attach more paper if necessary.

Name _____

Aspirin: The Bayer Facts

Directions: Read the excerpt taken from the How Stuff Works website and develop a timeline that traces the history of Aspirin. Use the Internet or books and magazines to illustrate your timeline. You must have at least 6 events sited in your timeline.

Aspirin is a member of a family of chemicals called **salicylates** (see below for chemistry and structure). These chemicals have been known to people for centuries. One of the first and most influential physicians, Hippocrates, wrote about a bitter powder extracted from willow bark that could ease aches and pains and reduce fevers as long ago as the fifth century B.C. In the 1700s, the scientist Reverend Edmund Stone wrote about the success of the bark and the willow in the cure of the "agues," or fevers with aches. With a bit of chemical detective work, scientists found out that the part of willow bark that was (1) bitter and (2) good for fever and pain is a chemical known as **salicin**.

The body converts this chemical after it is eaten to another chemical, **salicylic acid**. It was a pharmacist known as Leroux who showed in 1829 that salicin is this active willow ingredient, and for many years it, salicylic acid (made from salicin for the first time by Italian chemist Piria), and close relatives were used at high doses to treat pain and swelling in diseases like arthritis and to treat fever in illnesses like influenza (flu).

The problem with these chemicals was that they upset the user's stomach fairly badly. In fact, some people had bleeding in their digestive tracts from the high doses of these chemicals needed to control pain and swelling. One of these people was a German man named Hoffmann. His arthritis was pretty bad, but he just couldn't "stomach" his salicylic acid. Enter this man's son, German chemist **Felix Hoffmann**, who worked for a chemical company known as Friedrich Bayer & Co. Felix wanted to find a chemical that wouldn't be so hard on his dad's stomach lining; reasoning that salicylic acid may be irritating because it is an acid, he put the compound through a couple of chemical reactions that covered up one of the acidic parts with an acetyl group, converting it to **acetylsalicylic acid** (ASA). He found that ASA not only could reduce fever and relieve pain and swelling, but he believed it was better for the stomach and worked even better than salicylic acid.

Unfortunately, Hoffmann had to wait for fame. He finished his initial studies in 1897, and his employers didn't pay much attention to it because it was new and they were cautious -- they didn't think it had been tested enough. By 1899, though, one of Bayer's top chemists, a scientist named Dreser, had finished demonstrating the usefulness of the potent new medicine and even gave it a new name: **aspirin**. It is believed that the name comes from a plant relative of a rose that makes salicylic acid (several plants make this compound, not just the willow). The Bayer Company could then support the tested medicine; they spread the word and marketed the new pill widely.

Over the next hundred years, this medicine would fall in and out of favor, at least two new families of medicines would be derived from it, and innumerable research articles would be published about aspirin. Thousands have been published in the past five years alone! One of the most important pieces of research about aspirin came in the early 1970s, when a British scientist named John Vane and his colleagues showed how aspirin works (see the following sections). His work was so important that he and his colleagues were awarded the Nobel Prize in Medicine in 1982. Dr. Vane was even made a British knight for his work!

Name_____

Acid Rain

Directions: Read the following questions. Find the answers by performing an Internet search.

1. What is acid rain? _____
2. What are some examples of damage caused by acid rain? _____
   _____
   _____
   _____
3. How is acid rain measured? _____
   _____
   _____
4. How can we reduce the effects of acid rain? _____
   _____
   _____
   _____
5. What does ANC stand for? _____
6. What is deposition? _____
   _____
   _____
7. What is eutrophication? _____
   _____
   _____
8. What is leaching? _____
   _____
9. What is wet deposition? _____
   _____
   _____
10. What does EPA stand for and what does this agency do? _____
    _____
    _____
    _____

Name_____

Weather Terminology

Directions: Read the following questions. Find the answers by performing an Internet search.

1. What is NEXRAD?
   _____
2. What are gusts? _____
   _____
   _____
   _____
3. What is visibility? _____
   _____
   _____
4. What are the four different explanations for sky conditions?
   _____
   _____
   _____
   _____
5. What does the term dew point represent?
   _____
   _____
   _____
6. What is wind chill? _____
   _____
   _____
7. What is barometric pressure?
   _____
   _____
8. What is Doppler radar?
   _____
   _____
9. What is the formula to convert Fahrenheit to Celsius and vise-versa?
   _____
   _____

Name:_____

Insect Repellant

Directions: Read the statements and list the words whose meanings you do not know. Look up each word you have listed and write a brief definition. Use the back of this sheet if you need more room.

These statements are in the directions for using an insect repellant:

> **HAZARDS TO HUMANS**—Harmful if swallowed. Avoid contact with eyes And lips. To apply to face, spray palm of hand and rub on. In case of contact with eyes, flush with plenty of water. If irritation persists, get medical attention. Do not apply to excessively sunburned or damaged skin. Do not use near heat, sparks, or open flame. Keep treated surfaces away from fire or flame until dry. Store away from heat or flame in an area inaccessible to children.

Circle the letter of the best answer for each question

1) If this product is not properly used, can it cause harm to humans?
   A) Yes B) No C) Not given D) I don't know

2) Mrs. Smith told her husband to spray her palm and then rub her palm on her lips. Is she correct?
   A) Yes B) No C) Not Given D) I don't know

3) Mrs. Risk accidentally got some of the repellent in her eye. She immediately went to the doctor without doing anything else first. Should she have done this?
   A) Yes B) No C) Not given D) I don't know

4) Billy sprayed the repellent on his arms while sitting very close to a campfire. Should he have done this?
   A) Yes B) No C) Not given D) I don't know

5) Mrs. Elmore stores the repellent in a locked cabinet and hides the key from her young children. Is she following directions?
   A) Yes B) No C) Not given D) I don't know

Name:_____

Germicidal Monitor

Directions: Define the terms listed below then read the statements and list the words whose meanings you do not know. Look up each word you have listed and write a brief definition, and answer the questions below the statement. Use the back of this sheet if you need more room.

Exposure-_____
_____

Germicidal-_____
_____

Ballast- _____
_____

Interlock_____
_____

These statements are in the directions for using a Germicidal Monitor:

WARNING:
Exposure to Germicidal Rays may be harmful to eyes and skin. Do not attempt to bypass the safety interlocks.

Do not view lamp while fully energized.

Never attempt to substitute any other lamp or ballast that is not designed for this monitor.

Immediately replace any product that may ever become discolored or seem brittle.

1) Is it safe to open the doors and look inside of the monitor while it is fully energized?
   A) Yes B) No C) Not Given D) I don't know.

2) Would it be okay to change out the burnt lamp with a lamp from a different product?
   A) Yes B) No C) Not Given D) I don't know

3) Should Ms. Smith replace the items that have change color while being cleansed by the germicidal rays?
   A) Yes B) No C) Not Given D) I don't know

Name:_____

Medical Search

Directions: Read the following questions then using the Internet find the answer.

1) What operation did Christian Barnard pioneer in 1967?
2) What did William Harvey discover about blood?
3) What is an analgesic?
4) Which kind of surgery can restore or improve a patient's appearance?
5) What is the common name of the disease that doctors call rubella?
6) A, B, AB, and O – What are they?
7) Which part of the body is affected by conjunctivitis?
8) What does a pharmacist do?
9) What did the French scientist Louis Pasteur discover about germs?
10) What is the term "flu" short for, and what type of illness is it?
11) What is an oncologist?
12) What is a hematologist?
13) What is a dermatologist
14) What is a podiatrist?
15) What is the difference between an LPN and a RN?

Name:________________

Medical Terminology

Directions: Find the words below in the word search. Then, find out what letters fall in the phrase. After you complete this, define each word as it would be used in the field of biotechnology.

A	A	S	S	A	I	S	T	I	N	B	G	T	H	E
L	M	I	V	I	M	N	S	G	W	I	O	R	L	D
E	B	O	R	E	A	I	J	E	Q	O	X	R	X	F
T	B	Q	N	Q	E	U	N	G	T	T	Y	B	T	R
J	S	I	G	I	H	E	B	O	R	E	A	N	A	B
H	E	U	O	O	C	J	G	A	G	C	B	X	X	Z
W	S	W	L	M	H	R	N	Q	Q	H	L	A	P	Y
D	T	S	Y	L	A	T	A	C	F	N	A	C	I	N
I	G	Q	J	Q	I	S	E	C	J	O	N	H	B	D
C	E	S	G	G	G	C	S	K	T	L	I	R	Z	L
A	L	L	E	L	E	S	A	V	Y	O	T	O	L	M
V	W	N	C	C	H	R	M	B	G	G	B	M	O	E
J	Q	J	E	C	O	L	O	G	Y	Y	I	O	Y	S
N	E	G	O	N	I	C	R	A	C	V	O	S	G	D
E	T	Y	H	P	O	D	N	E	N	E	T	O	D	Y
Z	I	C	X	B	X	M	S	Z	G	G	I	M	I	M
R	N	H	T	V	K	Y	B	H	C	O	C	E	H	Q

ACID	AEROBE	ALLELES
AMINO	ANAEROBE	ANITBIOTIC
ANTIGEN	BACILLUS	BIOMASS
BIOTECHNOLOGY	CARCINOGEN	CARCINOMA
CATALYST	CHROMOSOME	DIABETES
ECOLOGY	ENDOPHYTE	

— — — — — — — — —   — — —   — — — — — —
— — — — —

Name:_____

Vegetable Cooking Oil

Directions: Read the warning statement below then answer the following questions.

WARNING: Oil will catch fire if overheated. Damage or serious burns may result.
Do heat carefully, uncovered, on medium heat.
Do reduce heat if smoking occurs.
Do not leave unattended while heating.
Do not leave unattended while heating.
Do not refill plastic bottle with hot oil.

IF OIL CATCHES FIRE:
Do turn off heat
Do cover pot until cooled to room temperature to avoid re-ignition
Do not carry pot until cool
Do not put water on hot or flaming oil.

1) Define the following words:
   Unattended—

   Re-ignition—

2) Why should you not refill plastic bottles with hot oil?

3) What would occur if you tried to extinguish flaming oil with water?

4) Why would someone cover a flaming pot?

Name:_____

Water Budget

Directions: Examine the water table below and answer the following questions.

Rainfall (mm)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Credit	72	83	89	74	82	136	174	182	155	78	52	72
Debit	22	28	41	96	127	166	174	157	125	78	30	20
Surplus	50	55	48	0	0	0	0	25	30	0	22	52
Deficit	0	0	0	22	45	30	0	0	0	0	0	0

A water budget shows how much rainfall a city receives compared with how much the community uses.

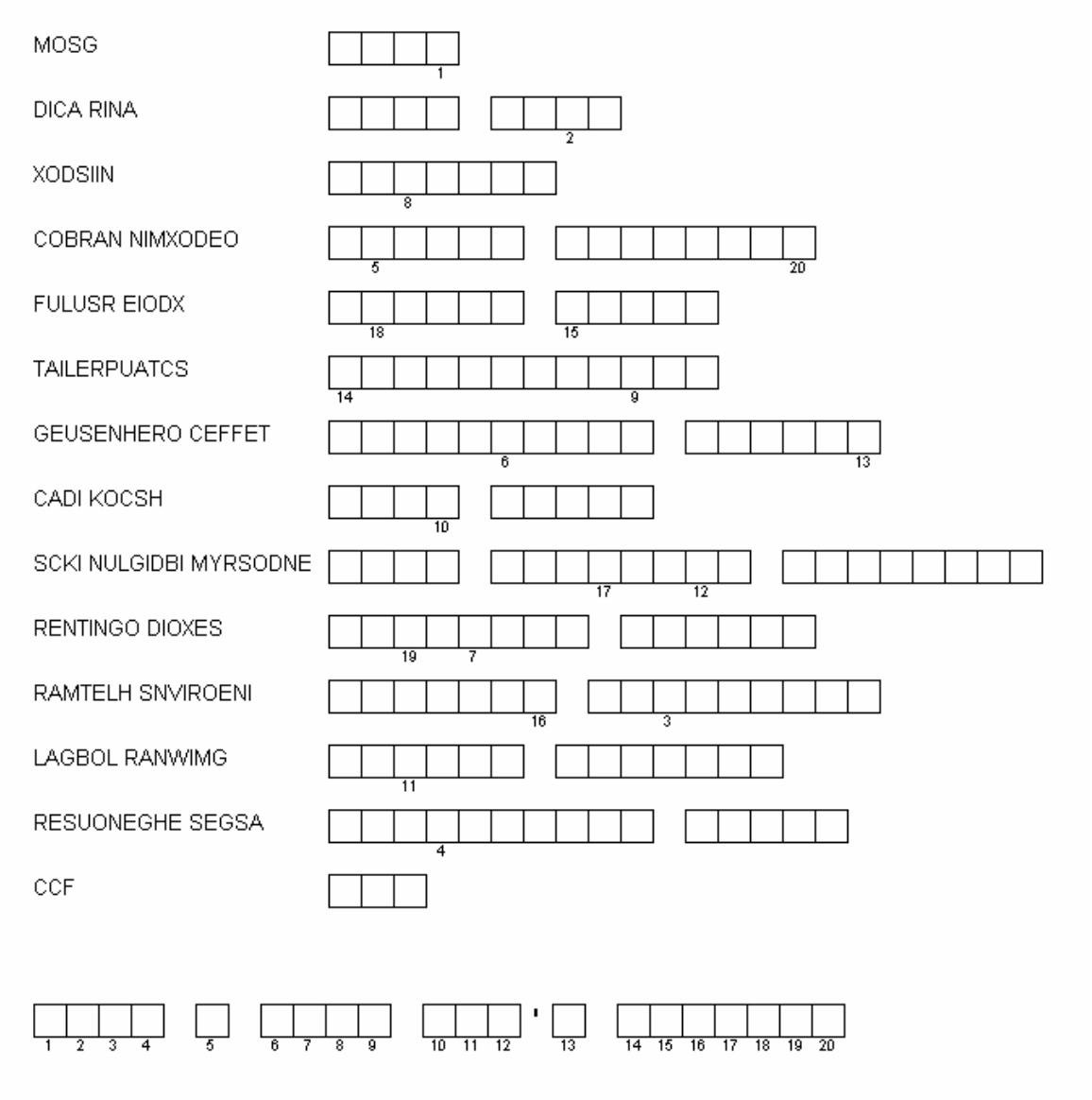
Define the following terms:
Credit-
Debit-
Surplus-
Deficit-

1) What months had equal amounts of rainfall in millimeters?
2) What month had the largest amount of rainfall, and how much?
3) What month had the largest amount of water usage, and how much?
4) What months show the largest water shortage, how much?
5) What month shows a balanced budget?
6) How can water use be guaranteed during months with a deficit?

Name:_____

Pollution

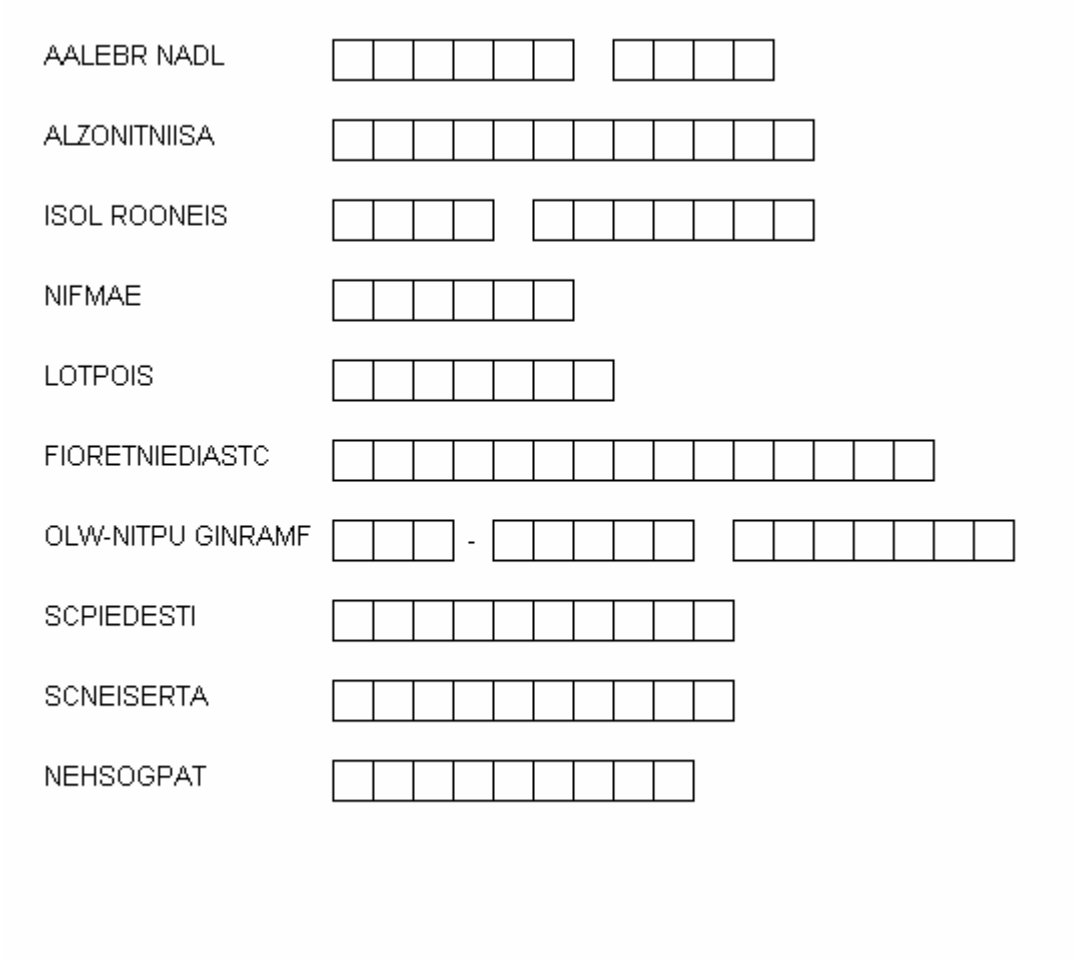
Directions: Unscramble the following words then define them. Once this is complete solve the missing phrase.



Name:_____

Environmental Concerns in Agriculture

Directions: Unscramble the following words then define them. Write a brief sentence using each word.



Name:_____

Cholesterol

Directions: Go to the following web site and research cholesterol, then answer the following questions as you read through the material. http://www.howstuffworks.com/cholesterol.htm

1) What is cholesterol?

2) What is cholesterol essential for in the human body?

3) What is the difference between blood and dietary cholesterol?

4) What does the term endogenous mean?

5) Define arteriosclerosis.

6) How many milligrams of cholesterol does the average man eat per day?

7) Define apoproteins.

8) Define lipoproteins.

9) What determines if cholesterol is good or bad?

10) Name and describe 6 factors that effect cholesterol levels.

11) Describe ways to reduce cholesterol?

12) Define statins.

13) Define resins.

14) What is the job of the drugs in the fibrate category?

Name_____

Oceans / Fishing

Directions: (If the web site listed below no longer exists, inform your instructor.)
Get on the Internet and go to: http://www.environmentaldefense.org/home.cfm
Go to "OCEANS" on the tool bar provided by this page and select: Overview.
Read: Safeguarding the Oceans…and continue reading by selecting: What we are doing?
Answer the following questions below.

1. What types of things have put the oceans at risk?

2. Over fishing threatens how many species of fish in U.S. waters?

3. How are catch limits going to be determined?

4. Explain how fishermen benefit from the fishing quotas…how does it work to help the fish populations and the fishermen in the end?

5. What fishery was restored using this technology?

6. Where does much ocean pollution originate…and explain how it make its way to the ocean?

7. What is being done to help buffer rivers and streams from farm run off?

8. Describe what the Marine Protected areas in coastal waters can do for the fish and for us?

9. What do communities where these sanctuaries are located often do to help?

10. What is your opinion about unrestricted fishing, agricultural and industrial run off…the polluting of the oceans, streams, lakes and rivers? What do you think we should do?

Name_____

Artificial Limbs / Organs

Directions: You will be using the Internet to do some research on the subjects of artificial limbs, organs, artificial hearing or seeing, or voice box replacement. Some examples are, artificial hearts, voice box replacement, hearing aids, prosthetics, and valve replacement surgery.

1. Pick a specific area on which to do research.
2. Use a search engine to find web sites on the subject.
3. Read about the technologies that have been developed, or are being developed.
4. Find out, if you can, about costs to people who might receive an artificial limb / organ.
5. Take notes.
6. What you need to do is gather enough information to be able to tell someone else about the subject you chose to research.
7. After you have read what you think is enough information to be able to tell someone else about the area you looked up, use your notes to write a short description about what you found out.

Name_____

Biometrics (Retinal Scans, Fingerprints, DNA Scans)

Directions: (If the Web page listed below no longer exists, inform your instructor.)
Research the following Internet sites: biometrics.netfirms.com/retinal%20scan.html
Do not use the www at the beginning of the URL web address.
Read the article about Retinal Scanning, then scroll and select: Fingerprint Scanning.
Read the article and then scroll and select: DNA Scanning.
Read the article and then scroll and select: HOME
Read the information and then answer the questions below.

1. Describe what Retinal Scans are…how they work…what is it that they do?

2. What is Retinal Scanning's false acceptance rate?

3. What are problems / difficulties with Retinal Scanning?

4. What are Iris Scans?

5. What are some of the good things about Iris Scans?

6. What happens the Second time a person uses a fingerprint scanning devise…what is it that is compared to verify the person's identity?

7. What is infrared used for in fingerprint scanning?

8. What are some reasons why DNA scanning is not in use?

9. A. What is the definition of Biometrics?
   B. What are the uses of biometrics and where is it being used?

10. What is your opinion of Biometric Technology…its purpose, and uses?

Name_____

Noise Pollution

Directions: (If the website below no longer exists, **Inform your instructor,** then use a search engine to investigate the topic of Noise Pollution and try and find the answers to the questions below.)
Get on the Internet and go to: www.nonoise.org
Scroll down and select: NPC Law Library
Scroll down and select: City Ordinances
Scroll down to Georgia and select: Atlanta
Scan through the Article using information provided in the questions below to find the answers.

1. Under Definitions…Define: Noise-Sensitive area.

2. Define: Public right-of-way.

3. Define: Residential area.

4. Under Specific prohibitions…(2) Radios and similar devices (a. and b.) …How loud are they allowed to be without violating the law? EXPLAIN

5. Under Specific prohibitions…(5) Animals…Describe the limits for barking dogs.

6. Under Specific prohibitions…(9) Motor vehicles…Describe the only thing concerning the vehicle itself that is governed by City Noise ordinances.

7. Under Specific prohibitions…(11) Commercial garbage collection…After reading this section, why do they have this as a law…how does it help anyone?

8. Under Special Permits…How many days in advance does someone have to apply for special permission to be relieved from the noise ordnance for construction and demolition (Specific prohibitions #6).

9. Under Penalties…Describe what is an available option for a violation involving a motor vehicle.

10. What is your opinion about noise pollution and laws against it?

Name_____

Pollution (Various Related Topics)

Directions: Use an Internet search engine, to look up a topic below that is of interest to you. Find and read an article, or two, on the topic you have selected. Once you have read the information, write in your own words a brief description about what you have read. Write a summary of the main points. You may be asked to share with the class.

Water Treatment Facilities
Food Poisoning
Fluoridation of Water
Toxic Wastes
Mercury Poisoning
Landfills
Greenhouse Gasses
Oil Spills
Waste Disposal
HEPA Filters
Rodent Infestation
Soil Erosion
Mold Spore Contamination
Contaminated Soil
Farmland Water Runoff
Smog
Ocean Dumping
Electromagnetic Radiation
Black Lung Disease
Asbestos Removal
Ambient Air Pollution
Noise exposure limits
Pollution
Pasteurization
Respirators
Nuclear Waste
Salmonella
Catalytic Converters
Greenhouse Effect
Water Purification
Automobile Pollution
Recycling
Herbicide Contamination
Radon Contamination
Air Particulate Removal
Air Precipitators
Soil PH testing
Air Quality Testing
Microwave Radiation
Legionnaires Disease
Second Hand Smoke
PCB Contamination
"Sick" Buildings
Air Filtration Systems
Noise Pollution
Toxic Waste Disposal
Lead Poisoning
E.*coli*
Carbon Monoxide
Contaminated Fish
Hearing Protection
Ultraviolet Protection
Mosquito Infestation
Pesticide Contamination
Radon Detection
Water Pollution
Air Ionization
Noise Dampening
Ozone Depletion
Radioactive Contamination
Asbestosis
Lead Paint Removal
Dioxin Contamination
Acid Rain

Name_____

Rain Forests

Directions: (If the Website listed below no longer exists, inform your instructor.)
Get on the Internet and go to: www.ran.org/kids_action
There needs to be an underline mark after kids and before action.
Scroll down and select: Fact Sheets for students on the bottom left.
Scroll down to Grades 6 and up on the right side of the page and select:
Facts about the rain forest
Read the article and answer the following questions.

1. What percent of plant and animal species do rain forests contain?
2. How long have tropical rain forests been around?
3. How much rain forest area is it estimated is being destroyed each year?
4. About how many plants is it thought are yet to be discovered in rain forests?
5. What is the link between Cancer research and rain forests?
6. What percentage of rain forest plants has been examined for their chemical compounds?
7. Concerning today's medicines, how much of them came from the use of plants?
8. What is the connection between rain forests and the atmosphere…the weather?
9. Discuss where the nutrients are in the rain forest, and what happens when the land is cleared there and why.
10. What is your opinion about rain forests?…(You may want to consider: plant research, medical research, clearing the land for lumber and raising cattle, how they affect the climate of the earth.)

Name_____

Wind Energy

Instructions: (If the Website listed below no longer exists, use a search engine to find the answers to the questions below about Wind Energy.)

Get on the Internet and go to: www.inventors.about.com
Select: Historical Inventions A to Z.
Select: The letter "W"
Scroll down and select: Windmills
Scroll down and select: Wind Energy
Read the information and answer the questions below.

1. Describe some of the early uses of wind energy to do work for us.

2. Briefly describe the main parts of a Wind Turbine…what is connected to what starting with the blades?

3. What if the wind blows too fast, describe what happens to prevent damage to the Blades.

4. Where in the United States are Wind Turbines used for electricity?

5. During what period of the year are they primarily used…describe what happens concerning how the wind blows?

6. How fast does the wind need to blow in order for the Turbines to be able to produce electricity?

7. What range or amount of electricity do each of the turbines usually produce?

8. In 1995, how many Turbines were in California, and what are they called when they are grouped together?

9. What other countries are listed as using a lot of wind generated electricity?

10. Concerning Alternative Energy Sources (Not Fossil Fuels), what is your opinion about the use of Wind Energy…should we try and capture more of it, is it a positive thing for the future, did you know about the Turbines in California?

Name_____

Safety (Flight Crash Human Factors Checklist)

Instructions: (If the website listed below no longer exists, inform your instructor)
Get on the Internet and go to: http://web.nps.navy.mil/~avsafety/gouge/hfchklst.doc
The little wavy symbol (~) is found on your keys at the top left, to the left of the number 1.

This is a check sheet used by the Navy when they investigate plane crashes where the cause of the crash is suspected to be the result of "Human Error." The items are listed on the check sheet in order of the most often occurring cause. The first item in a list is the most common cause…the second item is the second most common…and so forth.

Scan through the checklist…answer the questions below.

1. List the 8 major sections of the checklist.
2. At the end of the first section, List the first 4 items under "Conditions that affect attention and
   Situation awareness.

3. What are the first 5 items listed at the beginning of the second section under "Medical and
   Physiological Factors?

4. In the third section, List the 4 items listed under "Misuse of procedures (performance of Cockpit tasks).

5. Section 5 includes the items listed in section 4. What are the first two items listed under "Conditions leading to poor judgment" at the end of section 5?

6. List the first two…and the last items listed in section 6 under "Communications/Crew
   Coordination Factors."

7. In the last section, 8, what are the first 3 items listed under "Conditions leading to supervisory
   Failures?"

8. Discuss what you think about these top Human Error Causes for Navy plane crashes.

Name _____

The Light of Life

You're reading a paragraph from your homework assignment and suddenly ……... the "light goes on". What do we mean here? Are we talking about the sunrise or a light bulb? Why do we see ideas and creativity represented by little light bulbs? This is because light is what drives all life. Light gives our minds sight through our eyes and allows us to read. Reading connects us with all of the ideas and stories of past and present generations. The "light going on" represents an understanding or comprehension of what we have read.

How do we perceive information with our brain? Primarily through the five senses of touch, smell, hearing, taste and sight. One of the most important sensory organs is the eye. If you disagree, try going a day without them. From this little 1" sphere we are able to gather volumes of information. One of the most important activities it performs is helping us to read. Pictures allow for varied perception and can compliment and reinforce reading comprehension. However, if we need the details, if we need to know if we're on the same page, or if we want to make sure the information is passed along as required, we will need to explain it with words. Even the most sophisticatedly engineered drawings, are accompanied by notes and words. On the next two pages, see if you can use the Internet or other sources to complete the exercises.

Name _____

Brain Quiz

Question 1: Which of the following is not a disorder or disease of the brain?

a. Lou Gehrig's Disease

b. Obsessive / compulsive disorder

c. Learning disabilities

d. Pain

e. Alcohol addiction

f. All are disorders of the brain

Question 2: There is not solid scientific evidence that eating certain foods can enhance brain functions.

a. True

b. False

Question 3: Highly intelligent people have larger-than-average brains.

a. True

b. False

Question 4: Physical activity is closely linked to life-long brain health.

a. True

b. False

Question 5: A newborn baby's brain is equipped with all of the basic "wiring" - the connections between brain cells that direct all of the body's functions - ever needed in life.

a. True

b. False

Brain Quiz (page 2)

Question 6: You are more likely to remember an event clearly - even decades later - if the event evoked a strong emotional reaction.

a. True

b. False

Question 7: Emotional stress can lead to physical symptoms.

a. True

b. False

Question 8: The left and right hemispheres of the brain operate separately, with one side responsible for creativity and the other for intellect.

a. True
b. False

Question 9: Significant memory loss is inevitable as we grow older, and the degree of loss is directly linked to age.

a. True
b. False

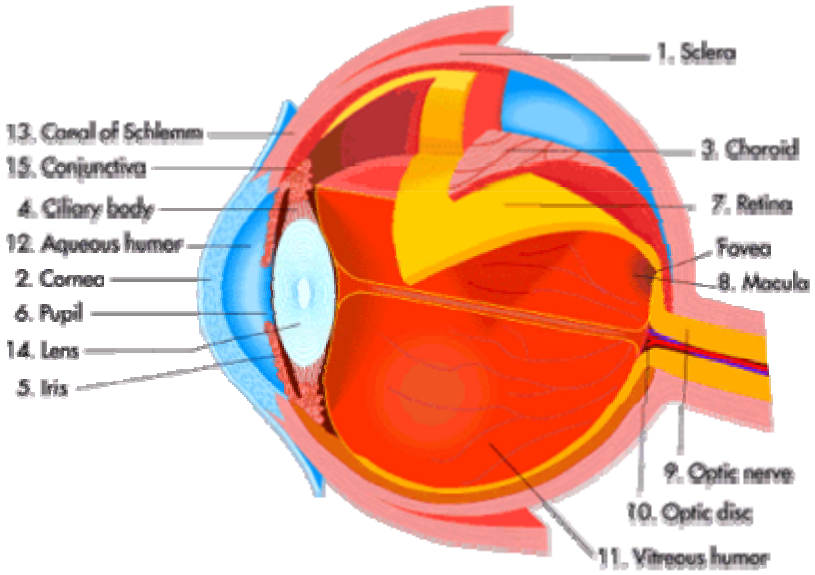
Question 10: By the middle of the 21st century, more than 16 million Americans are likely to suffer from which brain disorder?

a. Depression
b. Cerebral Palsy
c. Alzheimer's Disease
d. Spinal Cord Injury

Name _____

Visual Processing

Directions: Use the diagram to help unscramble the words below.



CALMAU

RIATEN

REASCL

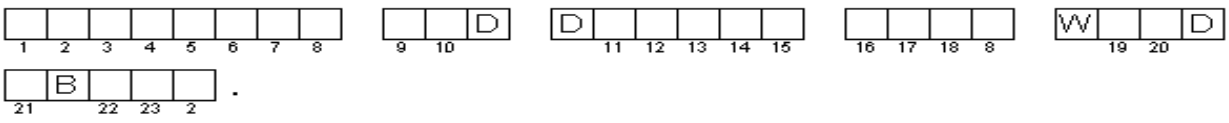
VAEFO

RITSUEVO

CAUTIVOJCNN

RYLAICI

LEHMMSC



Name _____

Historical Research

Directions: Using an internet search engine, such as www.google.com or www.go.com , type in the name of your assigned person. After reading from at least three sources, prepare a short essay using the Recording Historical Information worksheet.
Plan B: The instructor can provide printed materials on selected persons for the students to use as their reference material.

1. **Meteorology** – Horace Bénédict de Saussure, Leon Battista Alberti, Robert Hooke, Evangelista Torricelli, Christopher Wren, Gabriel Fahrenheit, Green Peace

2. **Medical** - Raymond Damadian, Benjamin Rubin, Willem Kolff, Louis Pasteur, Philip Drinker, Dr. Charles Richard Drew, Daniel DiLorenzo, Lloyd Conover, Max Tishler

3. **Bio-materials** - Richard Seed, Stanley Cohen, Herbert Boyer

Name _____

Recording Historical Information Worksheet

Historical Person _____

Area of Contribution _____

References: www._____
(At least three) www._____
www._____
www. _____

Use the remainder of the page to summarize the person's contribution to technology.

Name _____

Designer Genes?

Directions: Read the paragraph below and find the bold words in the word search below.

Given the choice, would you rather have been born with a different eye color, hair color or skin tone? Maybe you would have chosen to be taller, thinner or more muscular. Of course, you didn't have these options. The physical and personal traits a person winds up with are just one big roll of the dice, with only the **biological** parents' genes to draw from. However, within a few decades, there's a good chance that **biotechnology** could give us the ability to pre-choose our children's physical and personality traits like we pick out options on a new car. Scientists have only begun to unravel the secrets hidden within the human **genome** -- the genetic **blueprint** for a human being. A working draft of the human genome has already been published. Once the mapping of the **human** genome is finished, scientists will begin to discover what each gene does and how it functions. At that point, it might be possible to manipulate the genes of **embryos**. Imagine your doctor taking your order: "Okay, that's blue eyes, blonde hair, button nose. And will that be 6 feet 2 inches or 6 feet 4 inches?" The idea of **designing** our babies is not as far-fetched as it may have seemed just a decade ago. Scientists are already tinkering with the genetic makeup of animals. Human-genome **research**, now allows us to weed out **genetic** diseases and we are learning more about how the **engineering** of human genes will work.

Z G P S Y I W H E G O V M Q R
Z V E J J L G S N C Z Q N I Z
H B M N R J O N G Z S O C U B
C J I N O Y Q C I Z F D E I L
R K G O R M U T N N G T O R H
A K O B T D E W E V G L M A U
E O M Z L E E D E I O I G H M
S E J E M T C Y R G Y B S R A
E H Y I H M K H I Z M R P E N
R G E N E T I C N N S K F B D
Y P I Y B K A A G O B K L U F
S M Z S A L D M J E L T O L G
T N I R P E U L B X G O F M S
S P H R Y Y Q T Q G P N G Q N
E U D M K G M H Q R D Y E Y Y

Name _____

Divide and Conquer

Instructions: Sometimes, in order to remember or organize information, it is important to divide your reading into segments and take notes on each section. Boot up and log on to www.howstuffworks.com and search for one of the topics below. Each topic will have several sub-topics explaining its theory or operation. Read a section at a time, record the heading for each section and write a paragraph summarizing each section before reading the next. When completed, you may be asked to report your findings to the class.

Alternative plan: the instructor can pull the topics from the Internet.

cells	**anthrax**
aids	**genes**
DNA	**cancer**
carbon-14 dating	**photosynthesis**

Name _____

Occupational Outlook Handbook

Directions: Using your WEB browser, type in the address for the Occupational Outlook Handbook (http://stats.bls.gov/ocohome.htm) If this address does not work, use a search engine to locate the current address. Use the handbook to research information on Biotechnological Systems careers. If you are unsure about different careers in this area, ask your instructor to provide a list. Select one career to read about. After reading each section as listed below, write a short paragraph explaining what you have read.

Alternate plan: The instructor can find and print information on careers.

1. *Nature of the work*
2. *Working conditions*
3. *Employment*
4. *Training and qualifications*
5. *Job outlook*
6. *Earnings*
7. *Related occupations*

Name _____

The Need for Speed

Directions: Read the passage below, and then answer the five questions. Review the paragraph as necessary in order to answer the questions properly.

Understanding the role of speed in the reading process is essential. Research has shown a close relation between speed and understanding. For example, in checking progress charts of thousands of individuals taking reading training, it has been found in most cases that an increase in rate has been paralleled by an increase in comprehension, and that where rate has gone down, comprehension has also decreased. Although there is at present little statistical evidence, it seems that plodding word-by-word analysis (or word reading) inhibits understanding. There is some reason to believe that the factors producing slow reading are also involved in lowered comprehension. Most adults are able to increase their rate of reading considerably and rather quickly without lowering comprehension. These same individuals seldom show an increase in comprehension when they reduce their rate. In other cases, comprehension is actually better at higher rates of speed. Such results, of course, are heavily dependent upon the method used to gain the increased rate. Simply reading more rapidly without actual improvement in basic reading habits usually results in lowered comprehension.

T F 1. Reading comprehension may increase with reading speed.

T F 2. Good reading habits usually increase comprehension.

T F 3. Many readers can increase speed without sacrificing comprehension.

T F 4. A poor vocabulary may decrease reading speed.

T F 5. Reading speed and reading comprehension have an inversely related.

Name _____

The FIRST LETTER IN THE TERM Bio-related Game!

Directions: Students will list a minimum of two technology or science related terms that begin with the same letter as the letter that is typed in bold print.

E _____
N _____
V _____
I _____
R _____
O _____
M _____
E _____
N _____
T _____
A _____
L _____

B _____
I _____
O _____
L _____
O _____
G _____
I _____
C _____
A _____
L _____

Name _____

Tri-Board Presentation

Directions: Students will develop a tri-board presentation on a topic related to biotechnology (e.g. pollution, waste disposal, global warming, etc.). The presentation can have a theme such as historical development, social impact, solutions, etc.

Name _____

Biotechnology Newscast

Directions: The teacher should discuss various hot topics related to fields in biotechnology. The students will select a topic and read various documents related to this topic. The students will use the information gathered to write and produce a informative newscast. The content will have relevance to local school concerns such as the school lunch menu, allergies, safety, a periodic editorial from the physical education teacher or school nurse, etc.

Name:_____

Are Bio-engineered Foods Safe?

Directions: The student will read the following article written by Larry Thompson, a member of the Food and Drug Administration (FDA). This exercise consists of two parts. In part one, read the following article and find the scrambled, misspelled, or misused words. Unscramble each word and write the correct spelling in the space provided at the end of the article.

In part two, there are several questions located in the part two section of this exercise. Please answer the questions. The information needed to answer the questions correctly is located within the contents of the article.

Are Bio-engineered Foods Safe?
by Larry Thompson

Cents 1994, a growing number of foods developed using the tools of the science of biotechnology have come onto both the domestic and international markets. With these products has come controversy, primarily in Europe where some question whether these foods are as save as foods that have been developed using the more conventional approach of hybridization.

Ever since the latter part of the 19th century, when Gregor Mendel discovered that characteristics in pea plants could be inherited, scientists have been improving plants by changing their genetic makeup. Typically, this was done through hybridization in which two related plants were cross-fertilized and the resulting offspring had characteristics of both parent plants. Breeders then selected and reproduced the offspring that had the desired traits.

Today, to change a plant's traits, scientists are able to use the tools of modern biotechnology to insert a single gene--or, often, two or three genes--into the crop to give it new, advantageous characteristics. (See "Methods for Genetically Engineering a Plant.") Most genetic modifications make it easier to grow the crop. About half of the American soybean crop planted in 1999, for example, carries a gene that makes it resistant to an herbicide used to control weeds. About a quarter of U.S. corn planted in 1999 contains a gene that produces a protein toxic to certain caterpillars, eliminating the need for certain conventional pesticides.

In 1992, the Food and Drug Administration published a policy explaining how existing legal requirements for food safety apply to products developed using the tools of biotechnology. It is the agency's responsibility to ensure the safety of all foods on the market that come from crops, including bio-engineered plants, through a science-based decision-making process. This process often includes public comment from consumers, outside experts and industry. FDA established, in 1994, a consultation process that helps ensure that foods developed using biotechnology methods meet the applicable safety standards. Over the last five years, companies have used the consultation process more than 40 times as they moved to introduce genetically altered plants into the U.S. market. *Continued on next page…*

Although the agency has no evidence that the policy and procedure do not adequately protect the public health, there have been concerns voiced regarding FDA's policy on these foods. To understand the agency's role in ensuring the safety of these products, FDA Consumer sat down with Commissioner Jane E. Henney, M.D., to discuss the issues raised by bio-engineered foods:

FDA Consumer: *Dr. Henney, what does it mean to say that a food crop is bio-engineered?*

Dr. Henney: When most people talk about bio-engineered foods, they are referring to crops produced by utilizing the modern techniques of biotechnology. But really, if you think about it, all crops have been genetically modified through traditional plant breeding for more than a hundred years.

Since Mendel, plant breeders have modified the genetic material of crops by selecting plants that arise through natural or, sometimes, induced changes. Gardeners and farmers and, at times, industrial plant breeders have crossbred plants with the intention of creating a prettier flower, a hardier or more productive crop. These conventional techniques are often imprecise because they shuffle thousands of genes in the offspring, causing them to have some of the characteristics of each parent plant. Gardeners or breeders then look for the plants with the most desirable new treat.

With the tools developed from biotechnology, a gene can be inserted into a plant to give it a specific new characteristic instead of mixing all of the genes from two plants and seeing what comes out. Once in the plant, the new gene does what all genes do: It directs the production of a specific protein that makes the plant uniquely different.

This technology provides much more control over, and precision to, what characteristic breeders give to a new plant. It also allows the changes to be made much faster than ever before.

No matter how a new crop is created--using traditional methods or biotechnology tools-breeders are required by our colleagues at the U.S. Department of Agriculture to conduct field testing for several seasons to make sure only desirable changes have been made. They must check to make sure the plant looks right, grows right, and produces food that tastes right. They also must perform analytical tests to see whether the levels of nutrients have changed and whether the food is still safe to eat.

As we have evaluated the results of the seeds or crops created using biotechnology techniques, we have seen no evidence that the bio-engineered foods now on the market pose any human health concerns or that they are in any way less safe than crops produced through traditional breeding.

FDA Consumer: *What kinds of genes do plant breeders try to put in crop plants?*

Continued on next page…

Dr. Henney: Plant researchers look for genes that will benefit the farmer, the food processor, or the consumer. So far, most of the changes have helped the farmer. For example, scientists have inserted into corn a gene from the bacterium Bacillus thurigiensis, usually referred to as BT. The gene makes a protein lethal to certain caterpillars that destroy corn plants. This form of insect control has two advantages: It reduces the need for chemical pesticides, and the BT protein, which is present in the plant in very low concentrations, has no effect on humans.

Another common strategy is inserting a gene that makes the plant resistant to a particular herbicide. The herbicide normally poisons an enzyme essential for plant survival. Other forms of this normal plant enzyme have been identified that are unaffected by the herbicide. Putting the gene for this resistant form of the enzyme into the plant protects it from the herbicide. That allows farmers to treat a field with the herbicide to kill the weeds without harming the crop.

The new form of the enzyme poses no food safety issues because it is virtually identical to nontoxic enzymes naturally present in the plant. In addition, the resistant enzyme is present at very low levels and it is as easily digested as the normal plant enzyme.

Modifications have also been made to canola and soybean plants to produce oils with a different fatty acid composition so they can be used in new food processing systems. Researchers are working diligently to develop crops with enhanced nutritional properties.

FDA Consumer: *Do the new genes, or the proteins they make, have any effect on the people eating them?*

Dr. Henney: No, it doesn't appear so. All of the proteins that have been placed into foods through the tools of biotechnology that are on the market are nontoxic, rapidly digestible, and do not have the characteristics of proteins known to cause allergies.

As for the genes, the chemical that encodes genetic information is called DNA. DNA is present in all foods and its ingestion is not associated with human illness. Some have noted that sticking a new piece of DNA into the plant's chromosome can disrupt the function of other genes, crippling the plant's growth or altering the level of nutrients or toxins. These kinds of effects can happen with any type of plant breeding--traditional or biotech. That's why breeders do extensive field-testing. If the plant looks normal and grows normally, if the food tastes right and has the expected levels of nutrients and toxins, and if the new protein put into food has been shown to be safe, then there are no safety issues.

FDA Consumer*:* You mentioned allergies. Certain proteins can cause allergies, and the genes being put in these plants may carry the code for new proteins not normally consumed in the diet. Can these foods cause allergic reactions because of the genetic modifications?

Continued on next page…

Dr. Henney: I understand why people are concerned about food allergies. If one is allergic to a food, it needs to be rigorously avoided. Further, we don't want to create new allergy problems with food developed from either traditional or biotech means. It is important to know that bioengineering does not make a food inherently different from conventionally produced food. And the technology doesn't make the food more likely to cause allergies.

Fortunately, we know a lot about the foods that do trigger allergic reactions. About 90 percent of all food allergies in the United States are caused by cow's milk, eggs, fish, shellfish, tree nuts, wheat, legumes, and especially peanuts and soybeans.

To be cautious, FDA has specifically focused on allergy issues. Under the law and FDA's biotech food policy, companies must tell consumers on the food label when a product includes a gene from one of the common allergy-causing foods unless it can show that the protein produced by the added gene does not make the food cause allergies.

We recommend that companies analyze the proteins they introduce to see if these proteins possess properties indicating that the proteins might be allergens. So far, none of the new proteins in foods evaluated through the FDA consultation process have caused allergies. Because proteins resulting from biotechnology and now on the market are sensitive to heat, acid and enzymatic digestion, are present in very low levels in the food, and do not have structural similarities to known allergens, we have no scientific evidence to indicate that any of the new proteins introduced into food by biotechnology will cause allergies.

FDA Consumer: *Let me ask you one more scientific question. I understand that it is common for scientists to use antibiotic resistance marker genes in the process of bioengineering. Are you concerned that their use in food crops will lead to an increase in antibiotic resistance in germs that infect people?*

Dr. Henney: Antibiotic resistance is a serious public health issue, but that problem is currently and primarily caused by the overuse or misuse of antibiotics. We have carefully considered whether the use of antibiotic resistance marker genes in crops could pose a public health concern and have found no evidence that it does.

I'm confident of this for several reasons. First, there is little if any transfer of genes from plants to bacteria. Bacteria pick up resistance genes from other bacteria, and they do it easily and often. The potential risk of transfer from plants to bacteria is substantially less than the risk of normal transfer between bacteria. Nevertheless, to be on the safe side, FDA has advised food developers to avoid using marker genes that encode resistance to clinically important antibiotics.

FDA Consumer: *You've mentioned FDA's consultative process a couple of times. Could you explain how genetically engineered foods are regulated in the United States?*

Continued on next page*...*

Dr. Henney: Bio-engineered foods actually are regulated by three federal agencies: FDA, the Environmental Protection Agency, and the U.S. Department of Agriculture. FDA is responsible for the safety and labeling of all foods and animal feeds derived from crops, including biotech plants. EPA regulates pesticides, so the BT used to keep caterpillars from eating the corn would fall under its jurisdiction. USDA's Animal and Plant Health Inspection Service oversees the agricultural environmental safety of planting and field-testing genetically engineered plants.

Let me talk about FDA's role. Under the federal Food, Drug, and Cosmetic Act, companies have a legal obligation to ensure that any food they sell meets the safety standards of the law. This applies equally to conventional food and bio-engineered food. If a food does not meet the safety standard, FDA has the authority to take it off the market.

In the specific case of foods developed utilizing the tools of biotechnology, FDA set up a consultation process to help companies meet the requirements. While consultation is voluntary, the legal requirements that the foods have to meet are not. To the best of our knowledge, all bio-engineered foods on the market have gone through FDA's process before they have been marketed.

Here's how it works. Companies send us documents summarizing the information and data they have generated to demonstrate that a bio-engineered food is as safe as the conventional food. The documents describe the genes they use: whether they are from a commonly allergenic plant, the characteristics of the proteins made by the genes, their biological function, and how much of them will be found in the food. They tell us whether the new food contains the expected levels of nutrients or toxins and any other information about the safety and use of the product.

FDA scientists review the information and generally raise questions. It takes several months to complete the consultation, which is why companies usually start a dialog with the agency scientists nearly a year or more before they submit the data. At the conclusion of the consultation, if we are satisfied with what we have learned about the food, we provide the company with a letter stating that they have completed the consultation process and we have no further questions at that time.

FDA Consumer: *Since genes are being added to the plant, why doesn't FDA review biotech products under the same food additive regulations that it reviews food colors and preservatives?*

Dr. Henney: The food additive provision of the law ensures that a substance with an unknown safety profile is not added to food without the manufacturer proving to the government that the additive is safe. Under the law, this intense review is not required when substances are rendered safe by qualified experts. A substance's safety can be established by long history of use in food or when the nature of the substance and the information generally available to scientists about it is such that it doesn't raise significant safety issues.

In the case of bio-engineered foods, we are talking about adding some DNA to the plant that directs the production of a specific protein. DNA already is present in all foods and is presumed to be GRAS. As I described before, adding an extra bit of DNA does not raise any food safety issues.

As for the resulting proteins, they too are generally digested and metabolized and don't raise the kinds of food safety questions as are raised by novel chemicals in the diet. The proteins introduced into plants so far either have been pesticides or enzymes. Pesticide-proteins are regulated by the EPA. The EPA would have to approve it before going on the market. The enzymes have been considered to be GRAS, so they have not gone through the food additive petition process. FDA's consultation process aids companies in determining whether the protein they want to add to a food is generally recognized as safe. If FDA has concerns about the safety of the food, the product would have to go through the full food additive pre-market approval process.

FDA Consumer: *Why doesn't FDA require companies to tell consumers on the label that a food is bio-engineered?*

Dr. Henney: Traditional and bio-engineered foods are all subject to the same labeling requirements. All labeling for a food product must be truthful and not misleading. If a bio-engineered food is significantly different from its conventional counterpart--if the nutritional value changes or it causes allergies--it must be labeled to indicate that difference. For example, genetic modifications in varieties of soybeans and canola changed the fatty acid composition in the oils of those plants. Foods using those oils must be labeled, including using a new standard name that indicates the bio-engineered oil's difference from conventional soy and canola oils. If a food had a new allergy-causing protein introduced into it, the label would have to state that it contained the allergen.

We are not aware of any information that foods developed through genetic engineering differ as a class in quality, safety, or any other attribute from foods developed through conventional means. That's why there has been no requirement to add a special label saying that they are bio-engineered. Companies are free to include in the labeling of a bio-engineered product any statement as long as the labeling is truthful and not misleading. Obviously, a label that implies that a food is better than another because it was, or was not, bio-engineered, would be misleading.

FDA Consumer: *Overall, are you satisfied that FDA's current system for regulating bi-oengineered foods is protecting the public health?*

Dr. Henney: Yes, I am convinced that the health of the American public is well protected by the current laws and procedures. I also recognize that this is a rapidly changing field, so FDA must stay on top of the science as biotechnology evolves and is used to make new kinds of modifications to foods. In addition, the agency is seeking public input about our policies and will continue to reach out to the public to help consumers understand the scientific issues and the agency's policies.

Not only must the food that Americans eat be safe, but consumers must have confidence in its safety, and confidence in the government's role in ensuring that safety. Policies that are grounded in science, that are developed through open and transparent processes, and that are implemented rigorously and communicated effectively are what have assured the consumers' confidence in an agency that has served this nation for nearly 100 years.

Larry Thompson is a member of FDA's public affairs staff.

This article originally appeared in the April 1995 *FDA Consumer* and contains revisions made in February 1998. The article is no longer being updated. For the most recent information on this topic, go to the Center for Food Safety and Applied Nutrition's Biotechnology Web page.

Part One: There are 12 scrambled, misspelled, or misused words in this article. After finding them please write the correct spelling in the following spaces.

1. _____ 7._____
2._____ 8._____
3._____ 9._____
4._____ 10._____
5._____ 11._____
6._____ 12._____

Name:_____

Part Two:

Answer the following questions after reading the article.

1. With the tools developed from biotechnology, a gene can be inserted into a plant to give it a specific new characteristic.
    a. True
    b. False
2. Breeders are required by our colleagues at the _____, to conduct field testing for several seasons to make sure only desirable changes have been made.
3. BT is an acronym for _____?
    a. Biological turtle
    b. Blueberry tart
    c. Bacillus thurigiensis
    d. Bad trait
4. Researchers are working diligently to develop crops with enhanced nutritional properties.
    a. True
    b. False
5. Do the new genes, or the proteins they make, have any effect on the people eating them?
    a. Yes
    b. No
    c. No, it doesn't appear so
    d. Not in this lifetime.
6. The chemical that encodes genetic information is called _____.
7. About 90 percent of all food allergies in the United States are caused by _____.
8. Bio-engineered foods actually are regulated by three federal agencies:

    1. _____, 2._____, and 3. _____.

9. GRAS is an acronym for
    a. Generally recognized as safe.
    b. Gene Resistant Allergy Source.
    c. Germ Related Antigen Safe.
    d. None of these.
10. Does the FDA require companies to label food that is or has been bio-engineered?
    a. Yes
    b. No

Name: _____

Endangered and Threatened Species

Directions: The student will read over the chart and become familiar with the contents and then complete the crossword puzzle. Please complete the crossword puzzle by using the chart.

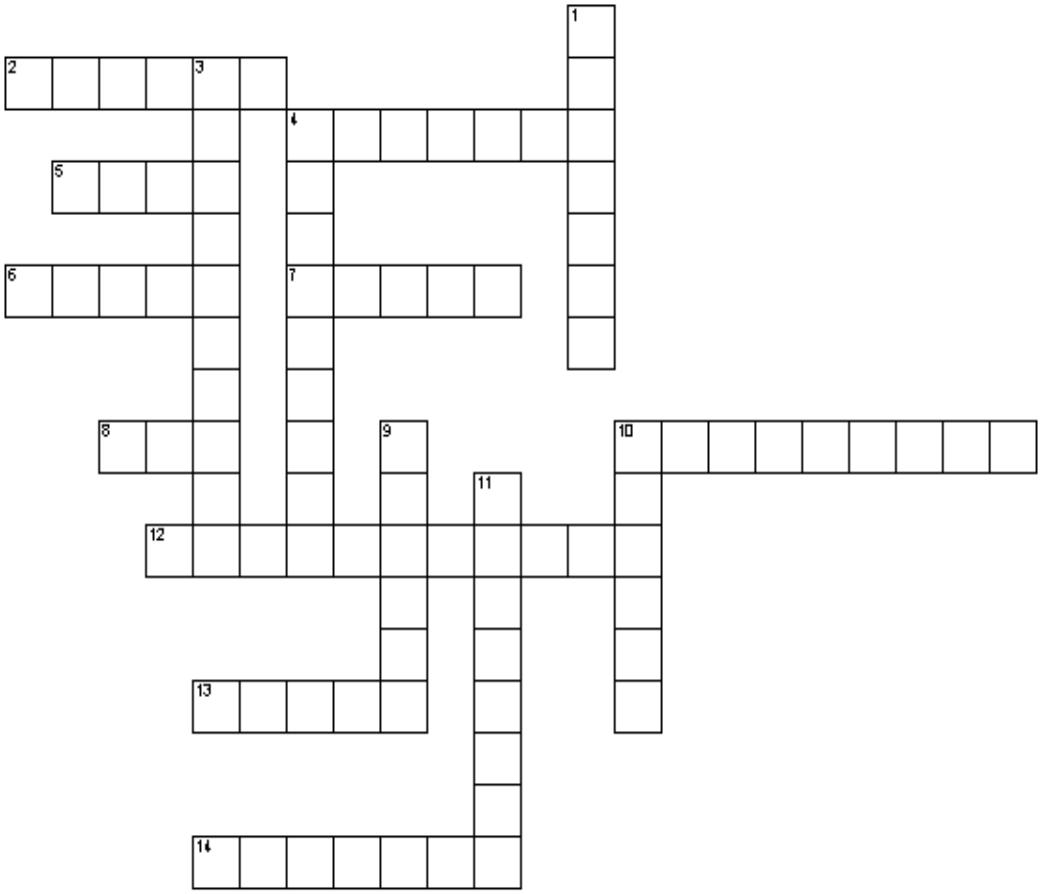
Threatened and Endangered Species Chart

	Endangered[1]		Threatened[2]		Total species	Species with recovery plans
Group	**U.S.**	**Foreign**	**U.S.**	**Foreign**		
Mammals	63	251	9	17	340	48
Birds	78	175	14	6	273	75
Reptiles	14	64	22	15	115	30
Amphibians	10	8	8	1	27	12
Fishes	70	11	44	0	125	94
Clams	61	2	8	0	71	56
Snails	20	1	11	0	32	27
Insects	33	4	9	0	46	28
Arachnids	12	0	0	0	12	5
Crustaceans	18	0	3	0	21	12
Animal subtotal	**379**	**516**	**128**	**39**	**1,062**	**387**
Flowering plants	564	1	141	0	706	555
Conifers and cycads	2	0	1	2	5	2
Ferns and allies	24	0	2	0	26	26
Lichens	2	0	0	0	2	2
Plant subtotal	**592**	**1**	**144**	**2**	**739**	**585**
Total	**971**	**517**	**272[3]**	**41**	**1,801[3]**	**972**

NOTE: As of April 30, 2001.

Biotechnological Systems **Connecting Reading to Technology Education**

Name:_____



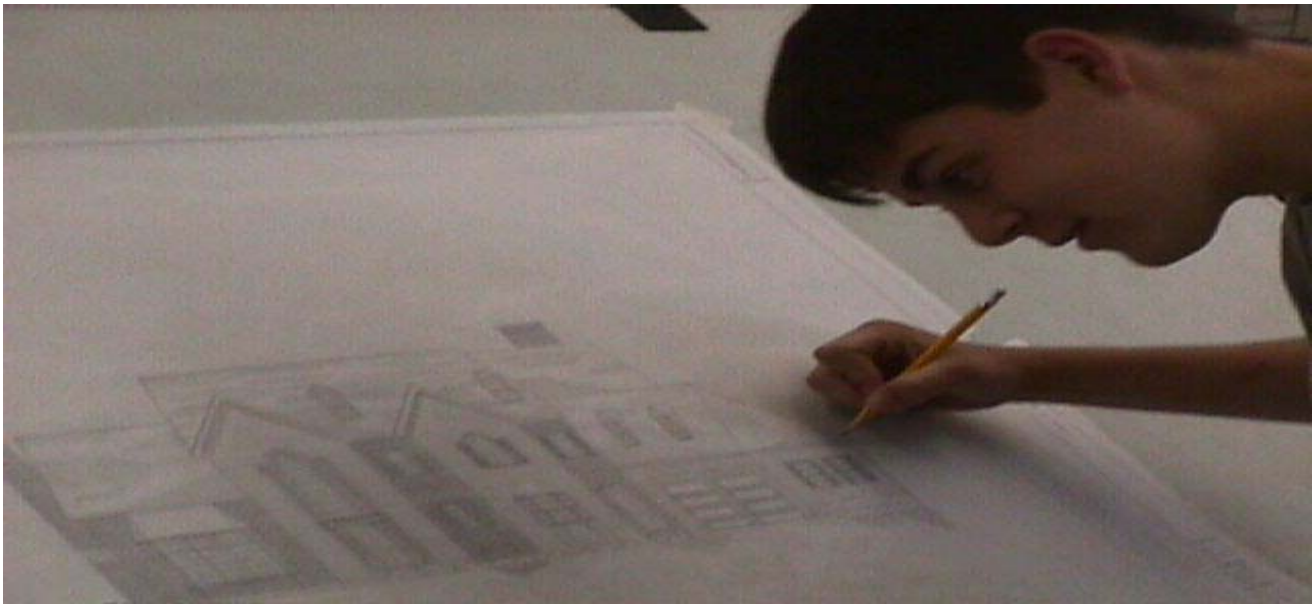
Across

2. There are 739 of these species endangered and threatened.
4. There are 1062 of these species threatened and endangered.
5. The number of conifers and cycads endangered and threatened.
6. This is the number of amphibians in the U.S., which are threatened.
7. 61 of these species are endangered in the U.S.
8. This is the number of Lichens with recovery plans.
10. 555 of these plant species have recovery plans.
12. There are 18 of these species in the U.S., which are endangered.
13. There are 175 of these species endangered in foreign lands.
14. 340 of these are threatened and endangered.

Down

1. 28 of these species have recovery plans
3. The number of ferns and allies, which are endangered in the U.S.
4. 12 of these species are endangered in the U.S.
9. There are 11 of these species threatened in the U.S.
10. There are 70 species of these that are endangered in the U.S.?
11. 115 of these species are endangered and threatened.

Connecting Reading to Technology Education



Informational Systems

Name:_____

Using Your Resources

Directions: Use the Internet to locate the answers to the following questions. You may have to try different search engines to help you with your work like Lycos, Infoseek, Google, etc. (Note to teachers: To make this activity more difficult, reproduce without giving the hints.)

1. What is another word for icon?

Hint: Thesaurus

2. How do you say "glad to meet you" in German?

Hint: Foreign languages for travelers

3. What is the toll-free number for the Hewlett Packard computer parts division?

Hint: Toll free Internet Directory

4. How many US dollars make twenty German Deutsche Marks?

Hint: Currency Conversion

5. What is the current trading price for the makers of the Intel Processor?

Hint: Stock Quotes (Intel Corporation symbol INTC)

6. Dr. Jack G. Copeland implanted the first artificial heart in Michael Drummond on August 29, 1995. Which day of the week was this?

Hint: Locate a calendar maker on-line

7. What happened on February 5th in the history of technology?

Hint: The History Channel On-line

8. An otolaryngologist is a specialist in what area of study?

Hint: Webster on-line dictionary

9. Where would you find a topographical map of Stone Mountain (Georgia)?

Hint: topographical maps

10. Where could you find a map of your city?

Hint: Map Quest

11. Who is the current ruler of the Ukraine?

Hint: Rulers

12. What is the current United States Census?

Hint: US Census Bureau

13. What are two current senators from your state currently serving in congress?

Hint: Your state legislators

14. Where is the Thomas Edison Birthplace Museum located?

Hint: Google search

15. List three uses of aspirin.

Hint: Healthtouch.com

16. When was President George W. Bush born and in what state?

Hint: Biography

17. Where can you find the latest headlines about technology?

Hint: Technology headlines

18. What is the Technology Bug of the Day?

Hint: MSNBC.com Technology

Name_____

Locating Specific Information

Directions: Have the students turn to the Business or Technology section of a newspaper and select three articles. On a sheet of paper have them list the following information:

- Title of article
- Name or product or company
- Main issue being discussed
- Something interesting or unusual about the game or event

Name_____

Pictures are worth a thousand words!

Directions: Give each student a newspaper. Have them select and article to read. Give each student a piece of unlined white paper. Have them fold the paper into six or eight blocks, numbering each. Tell them they are to retell the article in pictures, not words allowed. When they are finished, have them share their visual articles with the class. See if the other students can retell the article from the pictures.

Name_____

Sequencing and Story Structure

Directions: Give each of your students a newspaper. Have them select a Technology related article to read which clearly demonstrates an introduction, a body containing several paragraphs, and a conclusion. Tell them to cut out the article and then to cut it into paragraphs. Give them an envelope and have them write the article's title on the front. After placing the paragraphs in the envelope, have them exchange envelopes with another student. This student is to arrange the paragraphs in proper order. Once the article is in order, have the original student check the article for proper order. These articles can be used several times for further practice.

Name_____

Who, What, When, Where, and Why

Directions: Give each student a newspaper. Have them select a Technology related article to read. On a piece of paper have them list the five W's. Next to each have them write the information from the article that pertains to each. Encourage the students to write their answers in sentence form.

Name_____

Trends in Technology

Directions: Go to the website **www.msnbc.com** and click on the Technology Link on the left hand side of the web page. Choose Front Page. Choose one of the top stories to read. Using the five W's (who, what, when, where, and why), write a short summary of the article. Use a word processing application like *Microsoft Word* or *Microsoft Works* to type your summary.

Name_____

It's a VIRUS!

Directions: Go to the website **www.msnbc.com** and click on the Technology Link on the left hand side of the web page. Viruses & Vulnerabilities. Read about the most recent viruses and the damage that they cause. List the viruses below and rate them from 1-5 on how damaging they could be to your home computer.

1- It will never infect my computer
2- It may infect my computer
3- It will probably infect my computer
4- It will cost me money to repair the damage caused by the virus
5- I hope that I don't get it. It would certainly be the death of my computer

Virus Name	Rating

Name:_____

Designing a Bathroom

Directions: Design a bathroom that meets the specifications below.

- It is approximately 225 square feet
- Gives ample room for storage and dressing
- Includes all of the following: bathtub, sink, cabinets and/or vanity, shower stall, closet, and toilet.
- Drawn to a scale of ¼" = 1'

Name:_____

Dining Room Design

Directions: Design a dining room that meets the specifications below.

- Square footage of 190-210 square feet.
- Must provide seating for 6.
- Provide areas for storage of dishes, linens, silverware, and dining accessories. Label each storage unit.

Name:_____

Communication Timeline

Directions: Research the following excerpts and determine the year of the invention. Then order the excerpts into a timeline that includes the year.

- George Eastman develops the Kodak camera.
- Johannes Gutenberg develops the first system of moveable type known to the western world.
- Blaise Pascal develops a calculator prototype.
- Alexander Graham Bell patents the telephone.
- Charles Babbage develops the "Difference Engine" calculator.
- IBM unveils the Harvard Mark I computer.
- Compact Disks are introduced.
- Steve Jobs and Steve Wozniak invent the original Apple microcomputer.
- Telstar, the first commercial satellite, is launched from the U.S.
- Macintosh computers go on the market.
- Xerox Corporation markets the first practical office copier (copy machine.)
- Samuel F.B. Morse patents the telegraph.
- Theodore Maiman develops the first laser at Hughes Research Laboratory.
- Thomas A. Edison patents the phonograph.

Name:_____

Logical Problem Solving

Directions: Read the following passage and solve the problem logically

Five robots were being packed away after completing an obstacle course. Robot "C" placed third in the course, and Robot "E" placed second. Using the following the information determine how Robots "A", "B", and "D" placed in course.

Robot "A" was not last.

Robot "A" came in after Robot "E".

Robot "D" was not first.

Name: _____

Logical Problem Solving

Directions: Read the following passage and solve the problem logically

Three boats — one orange, one yellow, and one blue — were out on the river this morning. By reading the following clues, can you tell the color and type of each boat, who is on each boat, and which country the people come from? Write your answers on a chart like this one:

	Kind of Boat	Country	Colors
Man			
Woman			
Kids			

1. The woman is not in a yellow boat and is not from France.
2. The orange boat is not from Italy.
3. The kids are in a yellow boat, but they are not from Italy or Sweden.
4. The man and his dog are on a yacht with an Italian flag.
5. The sailboat is from France, while the canoe is orange.

Name:_____

Logical Problem Solving

Directions: Read the following passage and solve the problem logically.

A man took his two sons to a baseball game. Each of the three wore a different kind of shoes and clothing. They were hungry, so each one either had ice cream, peanuts, or a hot dog, but no one had the same thing to eat. By reading the four clues below, you can tell what each one ate at the game and what kind of shoes (loafers, sandals, or sneakers) and clothing (sweater, sweatshirt, or jacket) each was wearing.

1. The father was not wearing loafers.
2. The younger brother was wearing sandals, but did not have ice cream or peanuts.
3. The older brother was wearing a jacket and had ice cream.
4. The person wearing a sweater had a hot dog.

Name: _____

Logical Problem Solving

Directions: Read the following information and logically solve the problem by answering the two questions below.

Questions:

1. Who owns the computer?
2. Who drinks the water?

Here are the facts:

1. The teacher lives in the red house.
2. The engineer owns the microscope.
3. Coffee is drunk in the green house.
4. The architect drinks tea.
5. The green house is immediately to the right of the ivory house.
6. The baseball player owns a video camera.
7. The golfer lives in the yellow house.
8. Milk is drunk in the middle house.
9. The mechanic lives in the first house on the left.
10. The man who plays football lives in the house next to the man with the laser.
11. The man living in the house next to the house where the robot is kept plays golf.
12. The tennis player drinks orange juice.
13. The technician plays soccer.
14. The mechanic lives next to the blue house

Name: _____

Invention Search

Directions: Read the following questions then using the Internet find the answer.

1) What did Alessandro Volta invent in 1800?
2) Where and when was the telescope invented?
3) Which invention was first used to fasten boots and shoes?
4) When were stereo records first released?
5) What did Lasalo Biro invent in 1938?
6) Which invention did Mark Twain become the first famous author to use?
7) Who invented pneumatic (inflatable) tires?
8) Where and when did the first color television service begin?
9) What invention did Joseph Swan and Thomas Edison invent?
10) What was invented solely for the use of King Louis XV of France?

Name: _____

DVD Troubleshooting

Directions: Read the following troubleshooting chart and answer the questions that follow.

Common Problem	Solution
No Power	Insert the power cord's plug securely into the outlet
Power turns itself off	The power is automatically turned off after approx 30 minutes have elapsed in the stop mode (auto power-off feature). Turn power back on.
Player fails to start, even when PLAY is pressed.	* Ensure that the disc is installed with the label side facing up. * This player plays only DVD discs, Audio CD's and Video CD's.
No Picture	* Ensure that the equipment is connected properly. * Turn on the TV's power. * Ensure that the input setting for the TV is correct.
No sound or distorted sound	* Ensure that the equipment is connected properly. * Ensure that the input settings and the volume adjustment for the TV and/or receiver are correct. * No sound is heard during still, frame advance, or slow-motion play.
Disc won't play	* Both the player and the DVD is coded by region. If the regional codes don't match, the disc cannot be played. * This player is Region No. 1. Check the disc code. * Verify that the disc is a type that this player can read. (See page 22.) * Clean the disc. * Try another disc to see if the disc that won't play is bad.

1) If cleaning the disc doesn't work what should be done next?

2) What is the first step of troubleshooting when no picture is being seen?

3) How should the disc be installed into the player?

4) How would someone determine what types of discs this player can read?

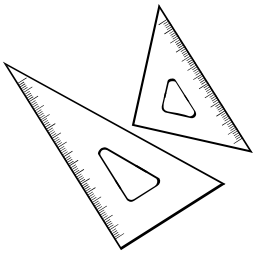
5) What is the name of the feature that turns the power off after the disc has been stopped for more than 30 minutes?

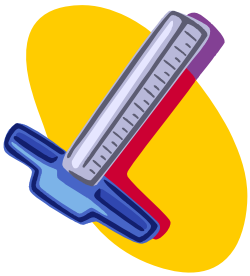
6) Why would someone try to play another disc in the DVD?

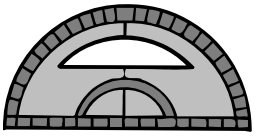
Name:_____

Manual Drafting Tools

Directions: Briefly research each of the following drafting tools then in your own describe each of the tools.







Name: _____

Designing Fasteners

Directions: Re-write the following paragraph using the proper words selected from the list below.

The mechanical engineer, mechanical designer, and _____ technician constantly make or use drawings to show how items are designed and manufactured. Any item that is to be _____ must first be _____. Machinery, cars, equipment used in industry, and even _____ products such as toasters or doorbell buttons must all be drawn before they can be produced.

One important task of the _____ engineer/designer is to carefully select the best _____ for a particular use. The wise engineer has a collection of catalogs showing _____ screws, nuts washers, etc. These fasteners are available in a wide variety of sizes and _____. The engineer is usually able to choose existing fasteners rather than spend time _____ new ones. Fasteners must be shown correctly on _____ so that the production team will know what is needed.

Designing	**Manufactured**	**Drawn**
Fastener	**Standard**	**Materials**
Drawings	**Mechanical**	**Design**

Name: _____

VCR Troubleshooting

Directions: Read the following troubleshooting chart and answer the questions that follow.

PROBLEM	Correction
Programs cannot be viewed on TV…	Set VCR/TV selector to TV. Make sure proper signal source is selected.
Videocassette cannot be inserted…	Insert the cassette with window side up, record tab facing out. Insure no other tape is inside unit.
ACTION and PROG buttons cannot be used.	Press VCR button for VCR mode. Check batteries.
No Power…	Completely insert Power Plug into AC outlet. Set POWER button to ON. Make sure power source is active.
VCR cannot be controlled…	Make sure VCR LOCK is set to off. Make sure remote is in proper mode. Make sure unit is not in a Timer Record operation.

1) For what problem should one check the batteries in the remote control?

2) If you are the VCR LOCK is off, and no Timer Record is in operation what else could be wrong?

3) What is the first troubleshooting to check if the VCR has no power?

4) What does the VCR/TV button allow one to see?

5) Write the three items that would inhibit the VCR from being controlled.

Name _____

Computer Stuff

Directions: Go to the website www.howstuffworks.com. Ask for a search on one of the following topics. The website will give you information in an outline form. Click on and read each section of the outline. Record the heading of each section and write a paragraph to summarize each section of the outline. You will then be required to explain the operation of the device to your classmates.

Optional: The instructor can go to the website, download and print the required material for students to use as a reference.

1. RAM
2. Laptop
3. CPU
4. Video card
5. Networks
6. Software
7. CD Writer
8. Monitor
9. Modem
10. Web Cam
11. Internet
12. Sound card
13. Floppy disk
14. Hard drive
15. Power supply

Name _____

Electricity/Electronics Safety

Directions: Re-write the paragraph below by using the proper words selected from the list provided below.

In the high tech, _____ age, most of us have _____ the mild tingle of a minor electric _____. Although a mild shock is harmless, _____ can be very _____ if not treated with respect. There are many _____ involved in the cause and effect of an electric shock. Three factors, which affect the _____ of a shock are the _____ of current, the path which the electricity takes through the body and the duration of contact. As little as one milliamp, (.001 amps), can stop a human _____ if it finds a path to travel there. Electricity can cause involuntary muscle _____, which may make it impossible to _____ a wire that is shocking you through your hand. Always treat electricity with great _____. Turn off all power to any item you are working on. A good rule for electronics _____ is to keep one hand in their _____ when using the other one to make electrical measurements. In this manner, you will not create a _____ for electricity from one hand to the other.

contraction	**shock**	**release**
heart	**dangerous**	**technicians**
electronics	**respect**	**experienced**
amount	**electricity**	**severity**
path	**factors**	**pocket**

Name _____

How CD's Work

Directions: While reading the passage below, fill in the blanks from the word list below.

CD's store music and other files in _____ form. Information in digital form is represented by a _____ of ones and zeros. In conventional CD's, these ones and zeros are _____ by millions of tiny _____ and flat areas on the disc's _____ surface. The bumps and flats are arranged in a _____ track that measures about 0.5 _____ (millionths of a meter) across and 3.5 miles (5 km) long. To read this information, the CD player passes a _____ beam over the track. When the laser passes over a _____ area in the track, the beam is reflected directly to an _____ sensor on the laser assembly. The CD player _____ this as a one. When the _____ passes over a bump, the light is bounced away from the optical _____ The CD player _____ this as a _____.

Vocabulary

recognizes	beam	sensor
flat	digital	represented
bumps	reflective	continuous
optical	microns	interprets
laser	series	zero

Name _____

Divide and Conquer

Instructions: Sometimes, in order to remember or organize information, it is important to divide your reading into segments and take notes on each section. Boot up and log on to www.howstuffworks.com and search for one of the topics below. Each topic will have several sub-topics explaining its theory or operation. Read a section at a time, record the heading for each section and write a paragraph summarizing each section before reading the next. When completed, you may be asked to report your findings to the class.

Alternative plan: the instructor can pull the topics from the Internet.

cell phone	**airborne internet**
radio	**digital television**
modems	**networks**

Name _____

Inventing the Technology of Reading

Directions: Use a search engine on the web to read and record information on your assigned person. You may be required to turn in a report, discuss the contributions of the person with your class or create a power point presentation.

T' sai Lun – invented paper circa 105 A.D. (Put the "stone tablet" guys out of business)

Murasaki Shikibu and Miguel de Cervantes – authored the first novels circa 1050.

Johannes Gutenberg – invented movable type circa 1450. (Mass production of books)

Jan Amos Comenius - authored the first children's book circa 1658.

Peter Harrison – architect of America's first library circa 1748.

Samuel Johnson – authored the "Dictionary of the English Language" circa 1755.

Nicholas Jacques Conte' – inventor of the graphite pencil circa 1794.

Noah Webster – authored the first comprehensive, American dictionary circa 1806.

Ralph Wedgwood – created carbon paper circa 1806.

Joseph Priestly – combined rubber technology with pencils creating erasers circa 1839.

Charles Dickens – innovator of the first "literary tour" circa 1842.

Harriet Beecher Stowe – authored the first book to sell 1 million copies circa 1852.

Chistopher Latham Sholes – invented the first typewriter circa 1868. (sold to Remington)

Lewis Waterman – patented the first reliable fountain pen circa 1884.

Lothar Meggendorfer – created the first pop-up books circa 1888.

Rene' Francois Armand Prudhomme – won the first Nobel prize for literature circa 1901.

Mary Lemist Titcomb – created the first "bookmobile" circa 1905.

Sir Allen Lane – mass produced successful paperbacks circa 1930.

Lazlo and Georg Biro – inventors of the ballpoint pen circa 1938.

Chester Carlson – inventor of dry copying circa 1938, founded Xerox circa 1947.

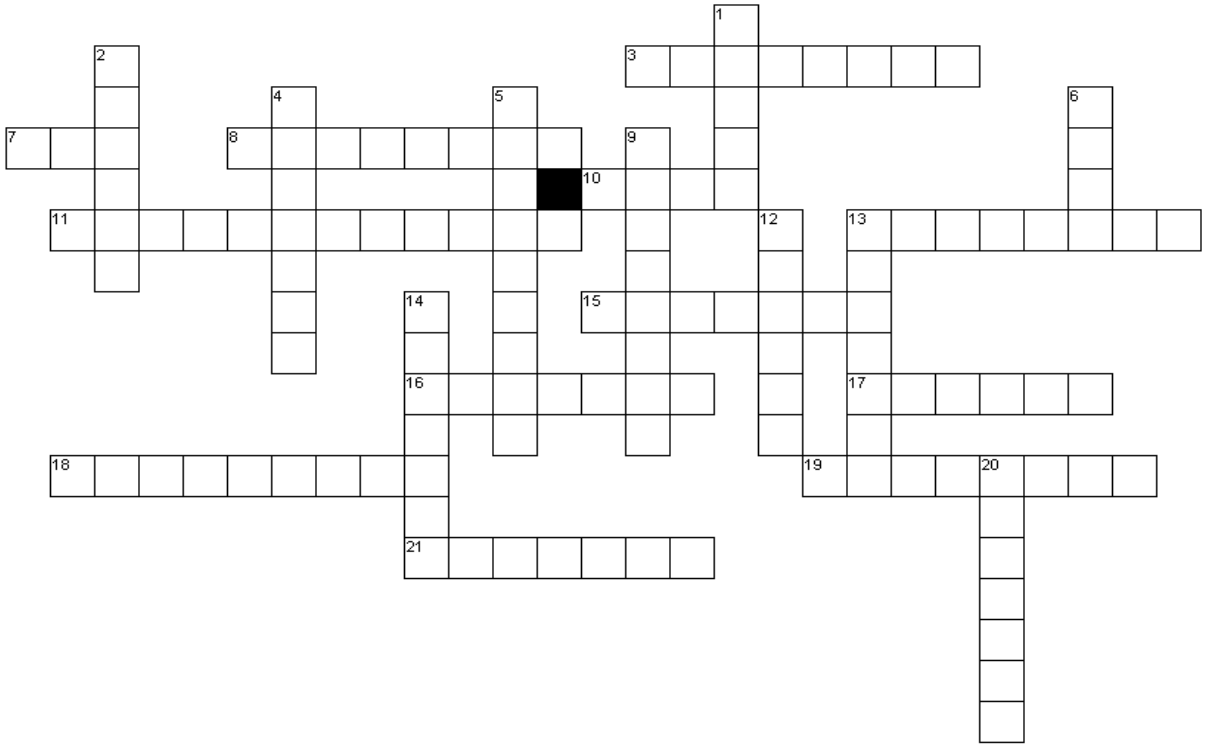
Dylan Thomas – became the voice of the first "audio book" circa 1952.

Michael Shrayer – originator of the word processing program circa 1976.

Name _____

Inventing the Technology of Reading

Directions: Complete the puzzle below using information from the previous page.



Across

3. FIRST FOUNTAIN PEN
7. INVENTED PAPER
8. FIRST CHILDRENS BOOK
10. MASS PRODUCED PAPERBACKS
11. POP-UP BOOKS
13. CREATED CARBON PAPE
15. FIRST BOOKMOBILE
16. FOUNDED XEROX CORPORATION
17. VOICE OF THE FIRST AUDIO BOOK
18. FIRST NOBEL PRIZE FOR LITERATURE
19. CREATED ERASERS
21. CO-AUTHORED THE NOVEL

Down

1. SOLD I MILLION COPIES
2. INVENTED THE GRAPHITE PENCIL
4. DICTIONARY OF THE ENGLISH LANGUAGE
5. INVENTED MOVABLE TYPE
6. INVENTED BALLPOINT PENS
9. AMERICAS FIRST LIBRARY
12. INVENTED FIRST TYPEWRITER
13. FIRST AMERICAN DICTIONARY
14. FIRST LITERARY TOUR
20. ORIGINATOR OF WORD PROCESSING

Name _____

Occupational Outlook Handbook

Directions: Using your WEB browser, type in the address for the Occupational Outlook Handbook (http://stats.bls.gov/ocohome.htm) If this address does not work, use a search engine to locate the current address. Use the handbook to research information on Informational Systems careers. If you are unsure about different careers in this area, ask your instructor to provide a list. Select one career to read about. After reading each section as listed below, write a short paragraph explaining what you have read.

Alternate plan: The instructor can find and print information on careers.

1. Nature of the work
2. Working conditions
3. Employment
4. Training and qualifications
5. Job outlook
6. Earnings
7. Related occupations

Name _____

Historical Research

Instructions: Using an internet search engine, such as www.google.com or www.go.com , type in the name of your assigned person. After reading from at least three sources, prepare a short essay using the attached form.
Plan B: The instructor can provide printed materials on selected persons for the students to use as their reference material.

1. Computer Applications – Charles Babbage, Vannevar Bush, John Napier, Alan Turing, Wilhelm Schickards, Blaise Pascal, Howard Aiken, Herman Hollerith

2. Desktop Publishing – Johann Gutenburg, C.L. Sholes

3. Drafting/CAD - Andrea Marucci, Frank Lloyd Wright, Frederick Olmsted (architects)

4. Electronics - Ambrose Fleming, John Baird, George Simon Ohm, Andre Ampere, Count Alessandro Volta

5. Global Positioning System – Charles Townes, Norman Ramsey, I.I. Rabi

6. Internet – Leonard Kleinrock, Paul Baran, Lawrence G. Roberts, Ray Tomlinson

7. Laser – Theodore Maimam, Albert Einstein, Authur L. Schawlow, Charles Townes

8. Photography – Joseph Niepce, Louis Jacques Daguerre, George Eastman, Edwin Land

9. Telecommunications – Guglielmo Marconi, Samuel Morse, Alexander Graham Bell

10. Video Broadcasting – Joseph May, D S Lowe, George Carey, Paul Nipkow, Karl Braun, Campbell Swinton, Vladimir Zworykin

Name _____

Recording Historical Information

Historical Person _____
Area of Contribution _____

References: www._____
(At least www._____
three) www._____
www. _____

Use the remainder of the page to summarize the person's contribution to technology.

Name: _____

Organizing your Data

Directions: Some problems require you to organize the data before you can reach a conclusion. Read the problem and try to solve it without the chart. Then, using the chart below and the process of elimination, solve the problem.

Three students in technology class, Brad, Kinte and Renee, were given a problem solving assignment on which they needed to collaborate. They each had computers at home and were comparing specifications and software in order to distribute tasks and responsibilities for homework. Each of the computers is different. After reading the four clues below, see if you can figure out the speed (100Mhz, 200Mhz or 300Mhz), hard drive (6 Gig, 10Gig or 20 Gig), and RAM (64 Meg, 128 Meg or 256 Meg) for each student's computer.

3. Brad's machine was not 300 megahertz.
4. Renee's computer was 200 megahertz, but she had less than 128 megabytes of RAM.
5. Kinte had the 6 gigabyte hard drive and less than 256 megabytes of RAM.
6. The student with 10-gigabyte hard drive had 64 megabytes of RAM.

Specifications		**Brad**	**Kinte**	**Renee**
SPEED	100 Megahertz			
	200 Megahertz			
	300 Megahertz			
HARD DRIVE	6 Gigabyte			
	10 Gigabyte			
	20 Gigabyte			
RAM	64 Megabyte			
	128 Megabyte			
	256 Megabyte			

Brad had the _____ speed, the _____ hard drive and _____ of RAM.

Kinte had the _____ speed, the _____ hard drive and _____ of RAM.

Renee had the _____ speed, the _____ hard drive and _____of Ram.

Name:_____

Parts Department

Directions: Use the information provided below to fill in the blanks.

While assembling amplification circuits in the lab, Sally, George, and Frank all had a component missing. When picking up their missing parts — a resistor, a transistor, and a diode, the teacher asked, "Who needed what?" George said, "I didn't need the diode." The boy who asked for the transistor said, "Oh, I thought you did". That was all the teacher needed to know. Who got each component?

Sally needed the _____.

George needed the _____.

Frank needed the _____.

Name _____

Connecting the switch to work stations

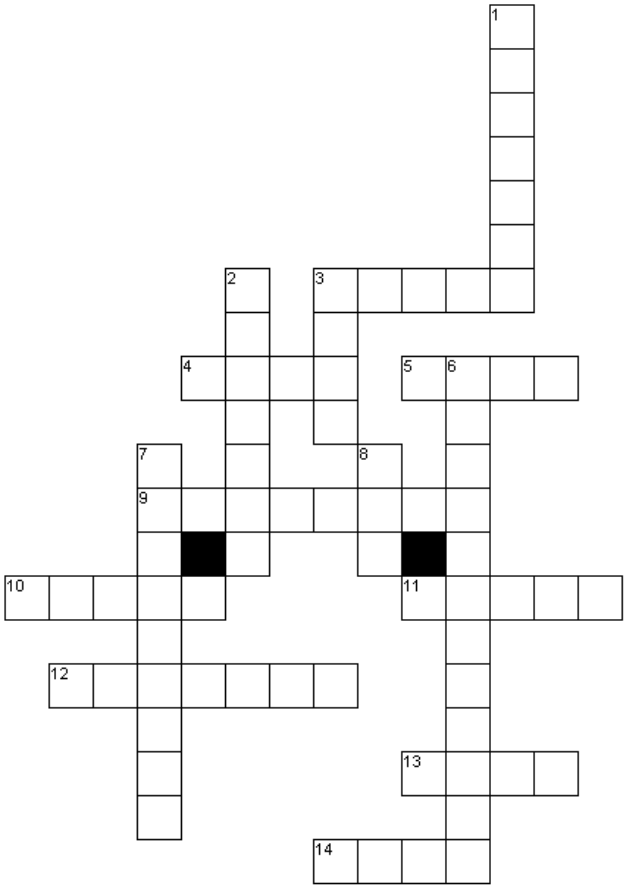
As a network technician, part of your job is to connect assigned workstations to the network. In order to make the right connections, you need to identify who is working at each station. You do not have a chart or list, but you have been able to discern the following information while standing around the water cooler. See if you can figure out
the person working at each station. The business has two floors, with three stations on each floor. Grace works at the top, middle workstation. Bob works directly above Betty. If George works on the top floor, then he works next door to Bob. Wilma works to the left of George, either on the top or bottom floor. Barbara works on the top floor. Which person works where?

Directions: Make a chart with three columns and two rows, representing the two floors and the three workstations on each.

- Start by filling in the middle workstation on the top floor, where you know Grace works.
- Now fill in all the possible places where the other persons could work.
- To begin with, you know that George can't work on the top floor, because he has to work next to Bob, which is impossible since Grace works in the middle. But he could work at any of the bottom-floor stations. When you've filled in all the possibilities, your chart should look like this: Top floor, left to right: Barbara, Bob or Wilma; Grace; Barbara or Bob. Bottom floor, left to right: George, Betty, or Wilma; George; George or Betty.
- You can see, right away, that the George has to work at the middle station on the bottom floor, because his name is the only one in that box, so cross out "George" in the left and right bottom boxes on your chart.
- You don't know if Wilma works on the top or bottom floor, but you know she works to the left of Grace, so try it out with Wilma on the top floor.
- You'll find it can't work, because if she works on the top floor on the left, then Bob must work on the top floor on the right. (You know that Bob works on the top, because he works over the Betty.) Since Grace works in the middle, that leaves no room for the Barbara, whom you know works on the top floor. So Wilma must work on the bottom floor in the left apartment. Cross out her name in the top left box on your chart.
- Start crossing out the eliminated possibilities from here on in, and you'll get the correct answers.

Name _____

What can you read?



Across

3. MEASURING INSTRUMENT
4. LARGE DATA DISPLAY
5. INSIDE THE SKULL
9. CREATED BY A LAWYER
10. FOUND ON A JAR OR CAN
11. NOTES AND KEYS
12. LINES CREATING A PICTURE
13. CONTAINS PAGES OF WORDS
14. MIGHT ONLY BE A WHISPER

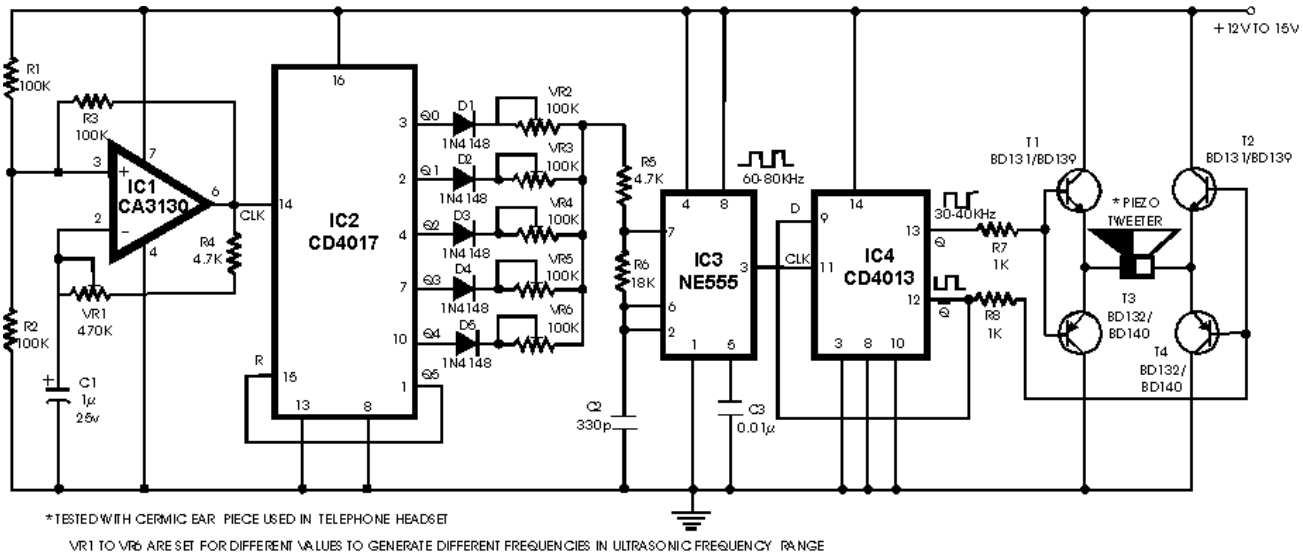
Down

1.SUNSHINE OR CLOUDS AND RAIN
2. COULD BE CURSIVE OR LETTERED
3. A LIST OF WHAT'S AVAILABLE
6. USED TO UNDERSTAND
7. WIRING DIAGRAM
8. GEOGRAPHICAL DATA

Name _____

Schematics

Directions: Many technicians must be able to "read" schematic diagrams. Do a little research and then see if you can answer the questions about the schematic below.



1. How many resistors are in the circuit? _____

2. What is the value of the largest resistor? _____

3. There are little dots where some of the lines cross. What do they mean? _____

4. What do the large, rectangular shaped objects represent? _____

5. There is one large, triangular shape. What is it? _____

6. The four circles on the right end of the schematic are _____

7. D3 is connected to which pin of IC2? _____

8. C1 is connected to 15 other components. List them below.

_____

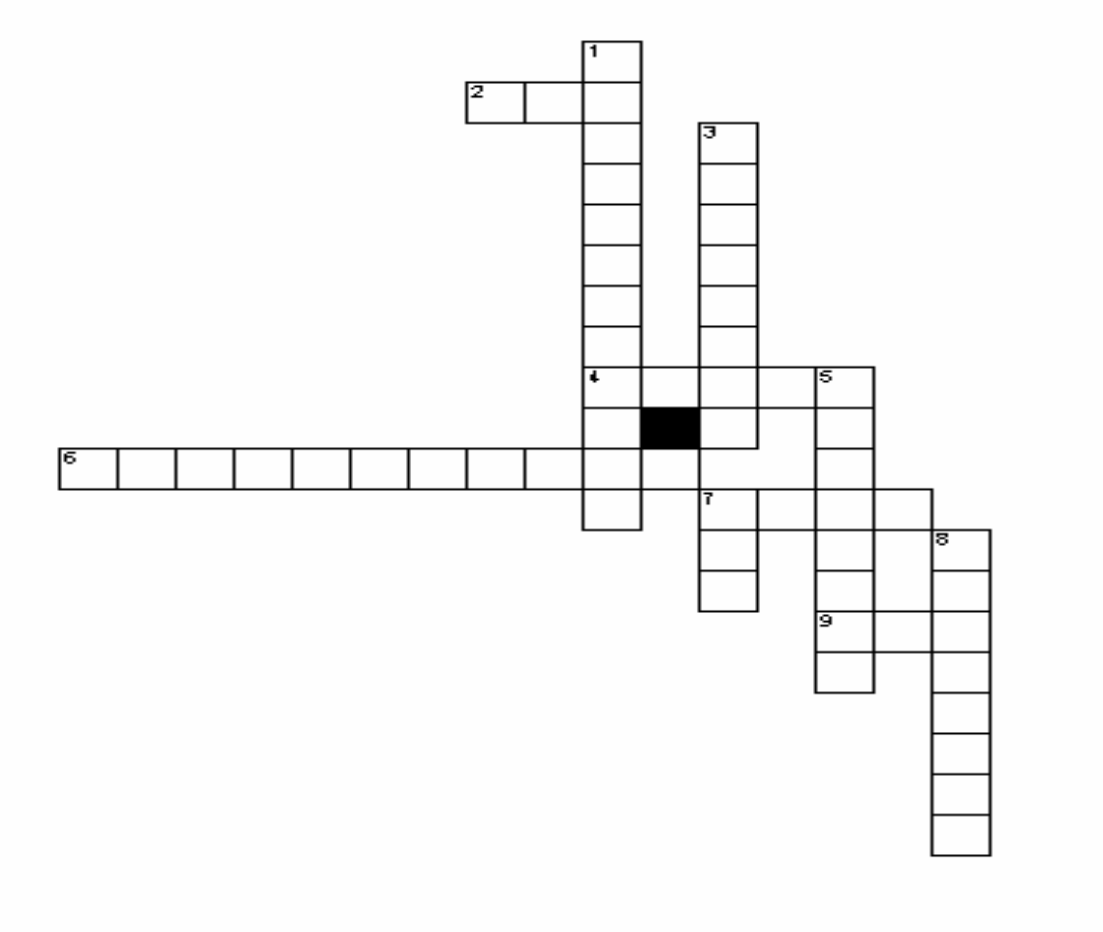
_____

_____

Name**:** _____

Computer Crossword Puzzle

Directions: Solve the following crossword puzzle.



Across

2. The brain of the computer
4. A destructive computer program.
6. Any control device that is used to get data into the computer's CPU
7. Equals eight bits
9. This type of memory is lost when the computer is switched off.

Down

1. Equipment such as a printer that receives information from the CPU.
3. This term refers to the physical parts of the computer.
5. This term refers to what computer programs are stored on.
7. The smallest piece of information a computer can receive.
8. An electronic device that calculates, stores and processes data.

Name**:** _____

Resources of Technology

Directions: Define the terms listed below, which are referred to as the resources of technology. Then write a brief statement about each one's benefit to technology.

People-

Knowledge-

Creativity-

Skill-

Tools and Machines-

Capital-

Time-

Materials-

Energy-

Name**:** _____

Technology and Change

Directions: Read the passage below and answer the following questions.

65 to 80% of all U.S. productivity growth since the Great Depression can be attributed to scientific and technological innovation. Technology-intensive sectors generate a high percentage of the nation's jobs and almost half of our GNP -- twice the level of just one generation ago.

Public debate and attention has broadened beyond how many television channels we will be able to choose from. Computing technologies are becoming affordable, and personal computers are penetrating the home market much faster than any technology before, including the telephone. Almost 40% of U.S. homes have PCs.

If the twentieth century has taught us anything, surely it is that technological change is a two-edged sword and, therefore, socially problematic. The path ahead will be painful for some. Technological advances in information technologies will bring about sometimes difficult generational changes similar in magnitude to those experienced by blacksmiths as the world moved into the age of the horseless carriage.

1) If technology has done so much good for our nation since the Great Depression, how can it be thought of in a negative tone?

2) What is meant by the phrase "a two-edged sword"?

3) What point was the author trying to make when he compared the blacksmiths to the generations living today?

4) Why is it important to know that almost 40% of the U.S. homes have PCs?

5) Write down one technological item, then list three ways it has improved society and three ways that it has had a negative impact on society.

Name**:** _____

Informational Technology Careers

Directions: Pick a career from the list below. Research this career via the Internet then answer the following questions.

Careers

Audio Engineer
Commercial Photographer
Drafter
Architect
Video Editor
Journalist
Technical Writer
Web-Programmer
Printing Technician
Web-Designer

1) What type of education is needed for this career?
   _____
   _____

2) What is average salary for this career? _____

3) Describe what a person in this career does on a day-to-day basis?
   _____
   _____
   _____
   _____

4) Explain why you would choose this career (other than salary)?
   _____
   _____
   _____
   _____

5) Describe what you would do to help society if you had training for this career?
   _____
   _____
   _____
   _____

Name**:** _____

Information Age

Directions: Read the following paragraph and using the word bank fill in the missing phrases.

A computer is a machine that makes _____ and processes _____ very quickly. It can be used for various jobs such as _____ math, _____ new products, producing written text, and _____ with people all over the world. No longer do we have to use one single item for a single job such as the days when a typewriter was used to print text. Computers do three simple tasks input, _____, and output. Typing something into the computer is the input the computer works with this information then produces output by displaying it onto the monitor or printing a hard copy. We live in a new age referred to as the _____ _____ because of the impact of computers on our society.

Word Bank

Bronze Age	Feedback
Process	Manufacturing
Calculating	Information Age
Communicating	Computer Age
Designing	

Name_____

Fascinating Technology

Directions: The student will make a list of all the positive and negative effects they believe that technology will have or has had on man, man's environment, and society. After which, the student will have a group discussion about their responses.

Additional Resources: Videos, TV shows, audio (radio) topics, parent involvement, etc.

Name:_____

Internet Timeline

Directions: The following are a list of dates. Your job is to match the date with the event as it occurred in history. Use the library, the Internet, or whatever source you deem necessary.

1969, 1972, 1973, 1989, 1991, 1993, 1994, 1996, 1997, 1999, 2000, 2001.

_____ ARPA (Advanced Research Projects Agency) goes online in December, connecting four major U.S. universities. Designed for research, education, and government organizations, it provides a communications network linking the country in the event that a military attack destroys conventional communications systems.

_____ Electronic mail is introduced. Queen Elizabeth sends her first email in 1976.

_____ Transmission Control Protocol/Internet Protocol (TCP/IP) is designed and in 1983 it becomes the standard for communicating between computers over the Internet. One of these protocols, FTP (File Transfer Protocol), allows users to log onto a remote computer, list the files on that computer, and download files from that computer.

_____ The first effort to index the Internet is created by Peter Deutsch at McGill University in Montreal, who devises Archie, an archive of FTP sites. Another indexing system, WAIS (Wide Area Information Server), is developed by Brewster Kahle of Thinking Machines Corp. Tim Berners-Lee of CERN (European Laboratory for Particle Physics) develops a new technique for distributing information on the Internet, which eventually is called the World Wide Web. The Web is based on hypertext, which permits the user to connect from one document to another at different sites on the Internet via hyperlinks (specially programmed words, phrases, buttons, or graphics). Unlike other Internet protocols, such as FTP and email, the Web is accessible through a graphical user interface

_____ Gopher, the first user-friendly interface, is created at the University of Minnesota and named after the school mascot. Gopher becomes the most popular interface for several years.

_____ Mosaic is developed by Marc Andreeson at the National Center for Supercomputing Applications (NCSA). It becomes the dominant navigating system for the World Wide Web, which at this time accounts for merely 1% of all Internet traffic.

_____

The White House launches its website, www.whitehouse.gov. Initial commerce sites are established and mass marketing campaigns are launched via email, introducing the term "spamming" to the Internet vocabulary.

Approximately 45 million people are using the Internet, with roughly 30 million of those in North America (United States and Canada), 9 million in Europe, and 6 million in Asia/Pacific (Australia, Japan, etc.). 43.2 million (44%) of U.S. households own a personal computer, and 14 million of them are online.

On July 8, 1997, Internet traffic records are broken as the NASA website broadcasts images taken by *Pathfinder* on Mars. The broadcast generates 46 million hits in one day.

The number of Internet users worldwide reaches 150 million by the beginning of 1999. More than 50% are from the United States. "E-commerce" becomes the new buzzword as Internet shopping rapidly spreads.

To the chagrin of the Internet population, deviant computer programmers begin designing and circulating viruses with greater frequency. "Love Bug" and "Stages" are two examples of self-replicating viruses that send themselves to people listed in a computer user's email address book. The heavy volume of email messages being sent and received forces many infected companies to temporarily shut down their clogged networks.
The Internet bubble bursts, as the fountain of investment capital dries up and the NASDAQ stock index plunges, causing the initial public offering (IPO) window to slam shut and many dot coms to shutter their doors.

Napster is dealt a potentially fatal blow when the 9th U.S. Circuit Court of Appeals in San Francisco rules that the company is violating copyright laws and orders it to stop distributing copyrighted music. The company, which runs a computer application that allows users who are logged on to one of its servers to download an MP3 recording directly from another user logged onto the same server, is developing a subscription-based service. Many labels—both independent and major—have said they will make their songs available for download once the new system is in place.

Name_____

Library Hunt

Directions: By using the resources at the library please find the answers to the questions located on this form. Additionally, please record the name of the book, Internet site, periodical or other source where you found your answer in the space provided. Thank you and have fun!

1. Who discovered electricity? Answer:_____.
   Source:_____
   _____.
2. When was the transistor discovered?
   Answer:_____.
   Source:_____
   _____.
3. On August 6, 1945 a nuclear weapon was dropped on Hiroshima, Japan by the United States. What kind of airplane was it that delivered this weapon?
   Answer:_____.
   Source:_____
   _____.
4. What is Quantum Physics and who discovered it?
   Answer:_____
   _____
   _____.
   Source:_____
   _____.
5. Name at least three uses of the bicycle.
   Answer:_____
   _____
   _____.
   Source:_____
   _____.

Name: _____

Historical Time Line of Electricity and Technology

Directions: Located on a game board there is a stack of cards which students can choose from. Each card has a small narrative, which describes an invention or inventor and a discussion about the technology, which was invented. The idea is for the student to read the narrative and then place the event or invention on the correct location time and time slot. The student will strive to line series of events and inventions in the order for which they took place.

Name: _____

Seven Areas of Technology

Directions: The following is a list of the seven areas of technology. Each one is numbered. After reading each excerpt, please find the number associated with the type of technology the information relates with and place the number in the space provided.

Seven Areas of Technology:

1. Medical Technologies
2. Agricultural and Related Biotechnologies
3. Energy and Power technologies
4. Information and Communication Technologies
5. Transportation Technologies
6. Manufacturing Technologies
7. Construction Technologies

In construction, heavy wood timbers have a relatively high fire resistance, because fire tends to burn very slowly inward from the surface, leaving enough sound timber in the center to prevent collapse. Wood framing can also be impregnated with ammonium phosphate solution or covered with special mastics. Stucco or other incombustible facing which also gives a wood frame some protection from fire.

Answer: _____.

Magnetic levitation is the support and propulsion of objects or vehicles by the use of magnets. The magnets provide support without contact or friction, allowing for fast, quiet operation. In a typical system, the vehicle, which resembles a railroad car, travels above a guide way. Arrays of magnets of like polarity in both the vehicle and guide way repel each other, producing the lifting force. By continuously changing the polarity in alternate magnets, a series of magnetic attractions and repulsions is created that moves the vehicle along the track. The electrical energy required for such a system is great and the use of super conducting materials offers the only realistic potential for this means of transportation. Research into such systems has been conducted since the 1960s in the United States, Great Britain, Japan, and Germany. By 1991 magnetic technology had been successfully applied in England in the construction of a fully automated, low-speed shuttle between Birmingham and a nearby intercity railroad station. In 1996 funding was approved in Germany for a magnetic train linking Berlin and Hamburg. The train, which is expected to traverse the 185-mile route in less than an hour, is to be in service by 2005.

Answer: _____.

The gene is defined as a unit of inheritance. A gene is actually a sequence of DNA (see nucleic acid) contained by and arranged linearly along a chromosome. Each gene transmits chemical information that is expressed as a trait, e.g., tall or dwarf size. Each species has a genome**,** or characteristic set of genes that contain the total genetic information for an individual organism. In many familiar organisms two genes for each trait are present in each individual, and these paired genes, both governing the same trait, are called alleles.

Answer_____

Construction of a lock canal was decided on in 1906. The first three years were spent in the development of construction facilities, surveys, and disease control. The canal was informally opened Aug. 15, 1914; formal dedication took place on July 12, 1920. The total cost was $336,650,000, and c.240 million cu yd (184 million cu m) of earth were evacuated. Madden Dam, which stores additional water for the locks, was completed in 1935.

Answer: _____.

The communications industry is broadly defined as the business of conveying information. Although communication by means of symbols and gestures dates to the beginning of human history, the term generally refers to mass communications. As such, it covers television and radio broadcasting, telegraphs, publishing, advertising, telecommunications, motion pictures, home videos, public relations, computer databases, and other information industries.

The origins of mass communications can be traced to the development of the printing press in 15th-century Europe; it allowed inexpensively produced newspapers and books to spread information to large numbers of people. Between the 16th and 19th cent., improved roads and faster ships allowed news to spread farther and faster, linking Europe with Latin America and Asia. The instantaneous transmission of information became possible with the building of the first telegraph system (1844) and the invention of the telephone (1876). Radio, which got its start when Guglielmo Marconi sent his first wireless message (1895), allowed rapid communication during World War I. The establishment of the first commercial radio station in 1920 and the creation of national radio networks allowed listeners all over a country to hear the same news, music, and entertainment shows simultaneously.

Following the invention of recorded sound in 1877, the popularity of phonographs in the early 20th century enabled listeners to enjoy musical performances at home, and the spread of popular music on radio allowed regional musical styles, such as ragtime, to reach mass audiences. Photographs in the 1830s and motion pictures in the 1890s transmitted images around the world, a development that played a key role in popularizing U.S. cultural values globally. Television, which was first demonstrated in the 1920s and developed commercially after World War II, combined all of these technologies into a new medium that could shape mass culture by delivering news, entertainment, and advertising to nearly all U.S. homes by the end of the 20th cent. The Internet, which originated in the late 1960s and grew commercially in the 1990s, provided another vehicle for such an interweaving of technologies.

Answer_____.

In the United States and other free market economies, the rise of mass communications also provided a medium for selling and marketing products. The growth of U.S. advertising, which increased from $50 million in 1867 to $3 billion in 1925, to $19.6 billion in 1970, and to $308 billion in 1999, played a key role in financing the growth of new communications technologies, such as cable television and the Internet, and greatly contributed to the spread of existing media. Satellites have been used for long-distance telephone communications since the 1950s, and after the Olympics were broadcast live from Tokyo in 1964 via satellite, media scholars began talking of a global electronic village. However, national cultural tastes have proved to be remarkably resilient, and future advances in communications technology may tend to fragment rather than unite audiences.

Newer technologies have also motivated governments to loosen controls over the communications industries. In the 1980s, many commercial and satellite television stations were established in Europe, breaking the monopoly of government broadcasters, and in the 1990s the flow of information over the Internet made it easier to bypass government restrictions and censorship. Nonetheless, the enormous power of the communications industry remains controversial. The mass media has been widely criticized for its superficial news coverage, its power to affect public opinion, and the economic power it gives to advertisers and governments.

Answer: _____.

Sources of energy are required for transportation, for heat and light in dwelling and working areas, and for the manufacture of goods of all kinds, among other applications. The development of science and civilization is closely linked to the availability of energy in useful forms. Modern society consumes vast amounts of energy in all forms: light, heat, electrical, mechanical, chemical, and nuclear. The rate at which energy is produced or consumed is called power, although this term is sometimes used in common speech synonymously with energy.

Answer: _____.

Early people depended for their survival on hunting, fishing, and food gathering. To this day, some groups still pursue this simple way of life, and others have continued as roving herders (see nomad). However, as various groups of people undertook deliberate cultivation of wild plants and domestication of wild animals, agriculture came into being. Cultivation of crops—notably grains such as wheat, rice, corn, rye, barley, and millet—encouraged settlement of stable farm communities, some of which grew to be towns and city-states in various parts of the world. Early agricultural implements—the digging stick, the hoe, the scythe, and the plow—developed slowly over the centuries, each innovation (e.g., the introduction of iron) causing profound changes in human life. From early times, too, people created ingenious systems of irrigation to control water supply, especially in semiarid areas and regions of periodic rainfall, e.g., the Middle East, the American Southwest and Mexico, the Nile Valley, and S Asia.

Farming was intimately associated with landholding (see tenure) and therefore with political organization. Growth of large estates involved the use of slaves (see slavery) and bound or semi-free labor. In the Western Middle Ages the manorial system was the typical organization of more or less isolated units and determined the nature of the agricultural village. In Asia large holdings

by the nobles, partly arising from feudalism (especially in China and Japan), produced a similar pattern.

Answer: _____.

As the Middle Ages waned, increasing communications, the commercial revolution, and the steady rise of cities in Western Europe tended to turn agriculture away from subsistence farming toward the growing of crops for sale outside the community (commercial agriculture). In Britain the practice of enclosure allowed landlords to set aside plots of land, formerly subject to common rights, for intensive cropping or fenced pasturage, leading to efficient production of single crops.

In the 16th and 17th century horticulture was greatly developed and contributed to the so-called agricultural revolution. Exploration and intercontinental trade, as well as scientific investigation, led to the development of horticultural knowledge of various crops and the exchange of farming methods and products, such as the potato, which was introduced from America along with beans and corn (maize) and became almost as common in N Europe as rice is in SE Asia.

The appearance of mechanical devices such as the sugar mill and Eli Whitney's cotton gin helped to support the system of large plantations based on a single crop. The Industrial Revolution after the late 18th century swelled the population of towns and cities and increasingly forced agriculture into greater integration with general economic and financial patterns. In the American colonies the independent, more or less self-sufficient family farm became the norm in the North, while the plantation, using slave labor, was dominant (although not universal) in the South. The free farm pushed westward with the frontier.

Answer: _____.

In the N and W United States the era of mechanized agriculture began with the invention of such farm machines as the reaper, the cultivator, the thresher, and the combine. Other revolutionary innovations, e.g., the tractor, continued to appear over the years, leading to a new type of large-scale agriculture. Modern science has also revolutionized food processing; refrigeration, for example, has made possible the large meatpacking plants and shipment and packaging of perishable foods. Urbanization has fostered the specialties of market gardening and truck farming. Harvesting operations (see harvester) have been mechanized for almost every plant product grown. Breeding programs have developed highly specialized animal, plant, and poultry varieties, thus increasing production efficiency. In the United States and other leading food-producing nations agricultural colleges and government agencies attempt to increase output by disseminating knowledge of improved agricultural practices, by the release of new plant and animal types, and by continuous intensive research into basic and applied scientific principles relating to agricultural production and economics.

These changes have, of course, given new aspects to agricultural policies. In the United States and other developed nations, the family farm is disappearing, as industrialized farms, which are organized according to industrial management techniques, can more efficiently and economically adapt to new and ever-improving technology, specialization of crops, and the volatility of farm prices in a global economy. In Third World countries, however, where small farms, using

rudimentary techniques, still predominate, the international market has less effect on the internal economy and the supply of food.

Most of the governments of the world face their own type of farm problem, and the attempted solutions vary as much as does agriculture itself. The modern world includes areas where specialization and conservation have been highly refined, such as Denmark, as well as areas such as N Brazil and parts of Africa, where forest peoples still employ “slash-and-burn” agriculture cutting down and burning trees, exhausting the ash-enriched soil, and then moving to a new area. In other regions, notably SE Asia, dense population and very small-holdings necessitate intensive cultivation, using people and animals but few machines; here the yield is low in relation to energy expenditure. In many countries extensive government programs control the planning, financing, and regulation of agriculture. Agriculture is still the occupation of almost 50% of the world's population, but the numbers vary from less than 3% in industrialized countries to over 60% in Third World countries.

Answer: _____.

Name_____

Seven Areas of Technology Used in the Job Market?

Directions: This activity is divided into two parts. First, if there is no connection between the job and any of the areas of technology, indicate this by writing N/A. Otherwise, indicate that a connection exists by placing the number of the job title next to the area of technology it relates to. In the second part, select three job titles from the list. Go to the library and ask the librarian to show you the "Occupational Hand Book". In this book you will be able to read a description of the jobs you selected. Also, tell the librarian that you are doing research and you must learn how the jobs you have selected will relate with the *Seven Areas of Technology*. You may also benefit by using the Internet as a resource; http://careers.msn.com is a good place to start.

1.Chef, 2.Accountant, 3.Electrical Engineer, 4.CADD Operator, 5. Pilot, 6.Truck Driver, 7. Electrician, 8. Plumber, 9. Roofer, 10. Sheetrock Installer, 11. Bank Teller, 12.Gardener, 13.Teacher, 14.Movie Producer, 15.Actor, 16.Photographer, 17.News Reporter, 8.Helmsman, 19.Nurse, 20.Secretary, 21. Scuba Diver, 22.Stock Broker, 23.The President of the United States, 24.Surgeon, 5.Airline Traffic Controller.:

Part 1:

Seven Areas of Technology:

1. Medical Technologies:
2. Agricultural and Related Biotechnologies:
3. Energy and Power Technologies:
4. Information and Communication Technologies:
5. Transportation Technologies:
6. Manufacturing Technologies:
7. Construction Technologies:

Part 2:

Write a brief explanation about each job area you selected. In your paper please indicate how each job relates with technology by using specific examples.

Name: _____

Useful Products or Not?

Directions: Find a gadget or product, which is ridiculous and seems to have no practical use. Additionally, find a gadget or product, which is useful and serves to help solve a problem or meet the wants and needs of the consumer or end user.

Answer the following questions:

1. List the products or gadgets you have chosen.
2. Explain why you think the products or gadgets were developed.
    a. Does it solve a problem?
    b. Does it make life a little more pleasant?
3. Can you think of a product or gadget, which should be developed? Explain why.

Name_____

Technology Fact Finder

Directions: The student will do research. The student will find a complete set of encyclopedias. Read or skim through each volume and find information related to an inventor, an invention, or an event related to technology. You must find information related to one of these areas (an inventor, an invention, or an event related to technology) from each volume in the encyclopedia set. Write the name of the inventor, the invention, or the event on a sheet of paper. Also, write the name of the encyclopedia and page number where you found the information on the same sheet of paper. After which, the students will meet together to share with each other and talk about the information you gathered. You will be graded on your participation in class and the completion of your work listing an inventor, an invention or an event relating with Technology. Note: If you are having difficulty finding the information in a particular volume you may use another resource as long as you list your sources. There are 26 letters in a complete set of encyclopedias. This means that at the completion of the exercise you will have a total of 26 items listed.

Suggested Resources: Any set of encyclopedias will do or other sources as required.

Name_____

Technology Fact Finder 2

Directions: After completing the Technology Fact Finder exercise the student will be ready to do Technology Fact Finder 2. The student will choose three articles from those found in the Technology Fact Finder exercise and develop three questions relating to each article. Upon completion, the student will have a total of nine questions. You must develop your questions so that there are three questions relating to an in an inventor, three questions relating to an invention, and three questions relating to an event which relates to technology.
Suggested Resources: Any set of encyclopedias or other resources as required.

Name _____

Tell –A- Tale

Directions: The following is a short story with missing words. The student must fill in the blank spaces with the type of word the space requires. Foe example, if the space requires a noun, the student will write a noun word in the space. Each space requires a different type of word choice. It could be asking for a noun, verb, action verb, adjective, or even an exclamation. Fill in the blanks with the correct word choice. When completed read the story to a friend. Use only your own words.

Determined to finally finish the _____(noun). _____(person), and _____(person) walked to the _____(appliance or game) on a mission. It was time to save the beautiful _____(noun) from the fire breathing _____(noun). With a _____(noun) on their faces, they sat down on some _____(plural noun) in front of the computer. They only needed _____(number) points to win! _____(action verb-ing) like never before, they finally captured the _____(adjective) princess! They were so happy to win, they shouted _____(exclamation)!

Source: Pizza Hut

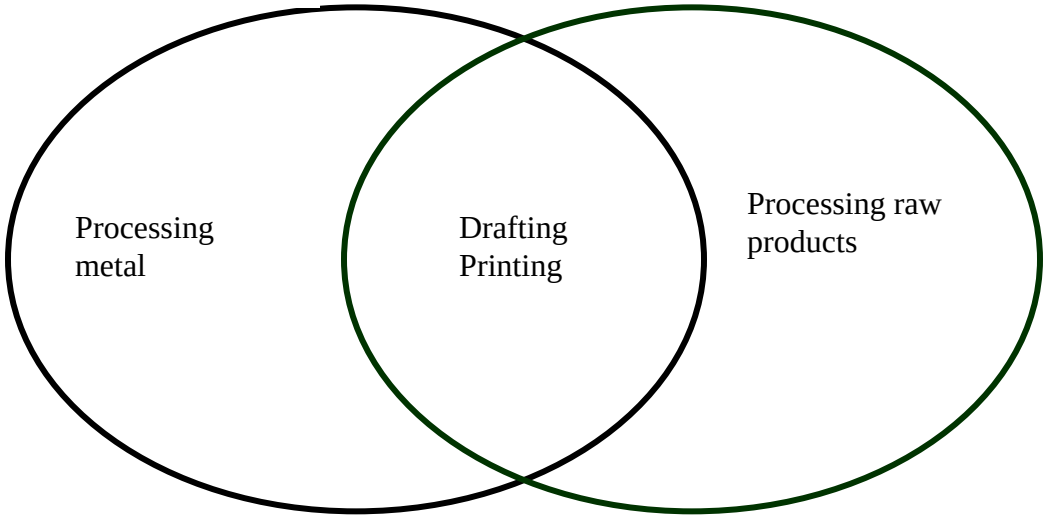
Name_____

Information-related Venn Diagram Reading Activity

Directions: Students will research two separate industries (e.g. food processing versus automobile manufacturing). Students will list various processes involved in the making of products in each industry (e.g. car mfg. involves assembling of parts, processing metal, etc. and food processing involves assembling packaged products, processing raw materials, etc.) in the major circles and list the common communication activities in the overlapping section of the diagram (e.g. drafting, graphics, machine-to-people communication, people-to- people communication, printing, principles of design)

AUTO MANUFACTURING

FOOD PROCESSING



Name_____

Communication Time Line

Directions**:** Students will develop a time line showing the evolution of communication devices/media starting with devices that originated during near pre-historic times to the twenty-first century.

Name_____

Communication at Sea

Directions**:** Students will develop a PowerPoint presentation depicting the development of maritime communication systems to include but not be limited to semaphores (communication with flags), radio communication, radar/sonar, communication using lasers, on board communication, communication with aircraft and submarines, GPS, etc.

Name_____

Develop Your Own Hieroglyphics

Directions**:** Pairs of students will develop simple ways of encoding information, by developing their own hieroglyphics. Students can develop unique symbols or make use of fonts such as web dings, wingdings, etc. Examples are as follows:

Example #1: A=ı, B=□, C=□, etc.

Example #2: A=□, B= , C=□, etc.

Name_____

Developing Simple Codes

Directions**:** Pairs of students will develop simple ways of encoding information, develop a key, and challenge classmates to break the code. Examples are as follows:

Example #1: A=1, B=2, C=3, etc.

Example #2: A=Z, B=Y, C=X, etc.

Fax, Fax Machine & Facsimile Invention

By Mary Bellis

Facsimile transmission over wires or faxing was invented by Alexander Bain, a Scottish mechanic who in 1843 received a British patent for “improvements in producing and regulating electric currents and improvements in timepieces and in electric printing and signal telegraphs.” Bain had created a fax transmitter that was designed to scan a flat surface (made of metal) using a stylus mounted on a pendulum. The stylus picked up the images on the surface. Seven years earlier Samuel Morse invented the telegraph and the fax machine evolved from the telegraph technology.

In 1902, the photoelectric system was invented by Dr Arthur Korn, and improved the practical fax. In 1914, Edouard Belin established the concept for a remote fax photo/news reporting. The American Telephone & Telegraph Company (AT&T) worked to improve telephone facsimile technology, and in 1924 the telephotography machine was used to send political convention photos long distance for newspaper publication.

Abbreviation of *facsimile machine,* a fax machine is a device that can send or receive pictures and text over a telephone line. Fax machines work by digitizing an image -- dividing it into a grid of dots. Each dot is either on or off, depending on whether it is black or white. Electronically, each dot is represented by a bit that has a value of either 0 (off) or 1 (on). In this way, the fax machine translates a picture into a series of zeros and ones (called a bit map) that can be transmitted like normal computer data. On the receiving side, a fax machine reads the incoming data, translates the zeros and ones back into dots, and reprints the picture.

The idea of fax machines has been around since 1842, when Alexander Bain invented a machine capable of receiving signals from a telegraph wire and translating them into images on paper. In 1850, a London inventor named F. C. Blakewell received a patent for a similar machine, which he called a *copying telegraph.*

But while the idea of fax machines has existed since the 1800s, fax machines did not become popular until the mid 1980s. The spark igniting the fax revolution was the adoption in 1983 of a standard protocol for sending faxes at rates of 9,600 bps. The standard was created by the CCITT standards organization and is known as the *Group 3* standard. Now, faxes are commonplace in offices of all sizes. They provide an inexpensive, fast, and reliable method for transmitting correspondence, contracts, résumés, handwritten notes, and illustrations.

A fax machine consists of an optical scanner for digitizing images on paper, a printer for printing incoming fax messages, and a telephone for making the connection. The optical scanner generally does not offer the same quality of resolution as stand-alone scanners.

Some printers on fax machines are *thermal,* which means they require a special kind of paper.

All fax machines conform to the CCITT Group 3 protocol. (There is a new protocol called *Group 4*, but it requires ISDN lines.) The Group 3 protocol supports two classes of resolution: 203 by 98 dpi and 203 by 196 dpi. The protocol also specifies a data-compression technique and a maximum transmission speed of 9,600 bps.

Some of the features that differentiate one fax machine from another include the following:

speed: fax machines transmit data at different rates, from 4,800 bps to 28,800 bps. A 9,600-bps fax machine typically requires 10 to 20 seconds to transmit one page.

printer type: Most fax machines use a thermal printer that requires special paper that tends to turn yellow or brown after a period. More expensive fax machines have printers that can print on regular bond paper.

paper size: The thermal paper used in most fax machines comes in two basic sizes: 8.5-inches wide and 10.1-inches wide. Some machines accept only the narrow-sized paper.

paper cutter: Most fax machines include a paper cutter because the thermal paper that most fax machines use comes in rolls. The least expensive models and portable faxes, however, may not include a paper cutter.

paper feed : Most fax machines have paper feeds so that you can send multiple-page documents without manually feeding each page into the machine.

autodialing: fax machines come with a variety of dialing features. Some enable you to program the fax to send a document at a future time so that you can take advantage of the lowest telephone rates.

As an alternative to stand-alone fax machines, you can also put together a fax system by purchasing separately a fax modem and an optical scanner. You may not even need the optical scanner if the documents you want to send are already in electronic form.

Name_____

Fax (Facsimile) Machine

Instructions: (If the web site listed below no longer exists, inform your instructor.)
Get on the Internet and to: www.inventors.about.com
Scroll and select: Historical Inventions A to Z.
Select the letter "F."
Scroll and select: Fax/Fax Machine/Facsimile
Read the top of the page…answer the questions below that relate to that section.
Scroll and select: Fax Machine.
Scroll and read the article…answer the questions below.

1. A. Who invented Facsimile transmission?
   B. When did he invent it?
   C. What is his occupation described as?

2. The fax machine evolved form what technology that had been invented seven years earlier?

3. What was developed in 1914 by Edouard Belin.

4. A. What does AT&T stand for?
   B. Describe what the fax machine was used to do in 1924.

5. What is it that the FAX (Facsimile) machine is used for?

6. How do they work…what is it they do to an image they scan…describe the process using proper terms from the article?

7. A. When did fax machines finally become popular?
   B. Describe what caused the fax machine "revolution."

8. Today, Fax machine technology provides what for offices of all sizes?

9. A. What are the 3 main parts to a fax machine?
   B. What devise provides better quality resolution for images?

10. Describe your opinions about how you think the fax machine has affected the work place…news and picture transmission.

Name_____

New Speaker Technology

Instructions: (If the website listed below no longer exists, inform your instructor.)
Get on the Internet and go to: web.media.mit.edu/~pompei/spotlight/
The little ~ is to the left of the number 1 on the keyboard.
Read the questions below, scan through the article and answers the questions.

1. What is the Audio Spotlight, what does it do, as described in the first main paragraph?
2. What is special about the beam of sound…describe it as discussed in the first main paragraph?
3. What is it that it can do with sound that is impossible with traditional loudspeakers?
4. In the second paragraph, how wide is the sound beam it creates...how far away can it be heard, and how does its distortion of sound compare to regular speakers?
5. Under "Usage", describe "directed audio" and "projected audio."
6. The Transducer is what projects the sound like a speaker, in the second paragraph under "Usage," the transducer is described. Discuss the transducer as it is described?
7. In the section "Background"…what was Mr. Pompei's background.
8. In the section About the Inventor, describe Mr. Pompei's background.
9. How do you think this technology will affect the world? Discuss it.

Name_____

Computer Animation History

Instructions: (If the Website listed below no longer exists, inform your instructor.)
Get on the Internet and go to www.bergen.org/AAST/ComputerAnimation/
Scroll and select: "Evolution of Computer Animation."
Select: "Traditional Methods."
Read the questions below, read the information provided and answer the questions.

1. A. How was all animation done before the invention of computer animation?
   B. How many frames of film are needed for each second of animation?

The following questions deal with Key Frames.

2. What is the role of the Senior Artist concerning Key Frames?
3. What are the frames called where a lot of change is to take place?
4. What is the role of the Junior Artists?
5. What is it that the artists do that dramatically cuts down on the time needed to complete a project?

The following questions deal with Cell Animation.

6. How is each character in this method drawn?
7. Where, or how, is the background drawn?
8. How is the animation shot concerning the characters and the background?
9. This saves time, because the artists only need to draw what?

The following questions deal with Rotascoping.

10. What is Rotascoping?
11. This helps to animate scenes that would otherwise be very hard to _____ by the artist?

12. How are the techniques listed above most useful?
13. What is your opinion of the background history of animation that lead to computer animation?

Traditional Methods of Animation

Before the advent of the computer animation, all animation was done by hand. All the frames in an animation had to be drawn by hand. Considering that each second of animation contains 24 frames (film), one can only imagine the tremendous amount of work that has to go into creating even the shortest of animated films. A couple of different techniques were developed for creating animation by hand.

Key Frames

Considering the immense amount of work that goes into the creation of an animation sequence, more than one person is involved in the drawing or painting process. After a storyboard has been laid out, the senior artists go and draw the major frames of the animation. These major frames are frames in which a lot of change takes place. They are the key points of the animation. Later, bunches of junior artists draw in the frames in between. This way, the workload is distributed and controlled by the key frames. By doing work this way, the time in which an animation can be produced is cut dramatically, depending on the number of people working on the project. Many people, thus cutting down on the time needed to get a final product out, can do work simultaneously.

Cel Animation

Another advance, which helps tremendously in the process of creating animations, is called cel animation. When creating an animation using this method, each character is drawn on a separate piece of transparent paper. A background is also drawn on a separate piece of opaque paper. Then, when it comes to shooting the animation, the different characters are overlaid on top of the background in each frame. This method also saves time in that the artists do not have to draw in entire frames, but rather just the parts that need to change such as individual characters. Sometimes, even separate parts of a character's body are placed on separate pieces of transparency paper.

Rotascoping

Rotascoping is the process of copying images from moving video into an animation. For example, let us say that you want to animate a frog jumping. It is a lot easier to draw the motion and shape of the frog in the different parts of the animation when you have some reference, such as video, as opposed to imagining it in your head. With the help of rotascoping, one can animate some complex scenes that would be very hard to visualize. One disadvantage of rotascoping is that you have to get the exact video you want to animate. For example, if you want a dog running across the screen, video of a dog running away from you will not do.

All these animation techniques are great, but when they are most useful is when they are all used together. Cel animation by itself would not help out much if it were not for key frames and being able to distribute the workload across many people.

Name_____

Special Effects (Movie / Television)

Instructions: (If the Web site listed below no longer exists, inform your instructor.)
Get on the Internet and go to:
www.riverdeep.net/current/2002/03/031802_movies.jhtml
Read the questions below; scan the information on the web page, answer the questions below.

1. Today's moviegoers have come to expect what?
2. What was King Kong actually himself, which was used to make the 1933 movie?
3. What technique was used to make King Kong come to life on the screen?
4. Describe the labor intensive process used to make King Kong life like on the screen?
5. Describe the process of Optical Printing used to combine Fay Wray and King Kong together on film?
6. The blending of shots, combining the separate elements; animation, scenery, and human characters is known as what?
7. In the Modern Movies section, describe the "Blue Screen" process concerning the actors, background, and the use of computers.
8. Describe the process of how "time-slicing" is created.
9. What does CGI stand for?
10. Describe what CGI is, or does for movie making…what is your understanding of it from the reading?
11. What is your opinion of the development, and or the use of special effects in movies?

Special Effects

The Early Days

Moviegoers marveled the first time Superman soared across the sky in his quest to defeat evil. But what was state-of-the-art in 1978 is no longer as convincing. Today's moviegoers have come to expect amazing effects that put them right in the middle of the action: a fishing boat battling ninety-foot waves in The Perfect Storm; giant, life-like dinosaurs devouring their prey in Jurassic Park; a terrifying plane crash in Cast Away. Special effects have come a long way since they first appeared. Have you ever seen the 1933 movie King Kong? It is one of the most memorable examples of early experiments with special effects. King Kong himself was an animated model, brought to life on screen using stop-motion filming. It is a very labor-intensive method: models have to be moved a fraction of an inch, their facial expressions changed, and then shot, with 24 different shots being taken for just one second of film.

King Kong's costar in the movie was the actress Fay Wray. If Kong was an animated model, how did the early filmmakers make it look as though he was interacting with an actress? The answer lies in a technique known as "optical printing." The producers filmed Kong and Fay Wray separately. They then projected the two films together and used another camera to record the information on a third reel of film. The result: on film, it looks as though Fay Wray is right there with Kong. The separate elements; animation, scenery, and human characters; were merged to appear as though they all existed together during filming. The scene appears real. This blending of shots is now known as composition. It's still done today, but using different methods.

Modern Movies

These days, instead of a jerky King Kong, you'll see humans walking with authentic-looking dinosaurs in a lush forest. The old technique of optical printing has been replaced with digital composition. One important tool in digital composition is the "blue screen." Movie stars perform a scene in a studio, in front of a blue screen. Later, computer programs are used to replace the blue background with a real background, such as an ocean scene. So, even though the actor was filmed in a studio, it will look like he was filmed out at sea.

The Blue Screen was used several times in the movie Forrest Gump. In one of the most memorable scenes, actor Tom Hanks appears to shake hands with President John F. Kennedy who in reality passed away over 35 years before the movie was made. The movie producers filmed Hanks in front of a blue screen, pretending he was interacting with the President. They then used computer technology to isolate Hanks and insert him into an old film clip featuring President Kennedy.

Time-Slicing

The Nickelodeon movie Clockstoppers, uses the technique known as "time-slicing." It was important for the Clockstoppers plot that objects appear to be frozen in time. In the movie, the camera seems to rotate around objects, giving you a three-dimensional view of them as they stand still. In fact, a ring of cameras is positioned around the object, and the cameras all take a still image at the same time. When the images are played together, it looks as though there is one camera moving around the object, caught in one moment of time.

Stop Motion

Stop-motion filming is still used today. Recent examples include the movie Chicken Run (which used Claymation puppets), MTV's Celebrity Death match, The Nightmare Before Christmas, and parts of Monkeybone. According to the Movie School Encyclopedia, Steven Spielberg originally wanted to use stop-motion to film Jurassic Park, but in the end he decided to use digital models instead.

(CGI) Computer Generated Imaging

Computer power has opened up new doors for filmmakers. The dramatic realism of James Cameron's Titanic (1999) would not have been possible without "CGI," or computer-Generated Imaging. Computer graphics were used to fill in details and build scenes that could not be filmed, such as the ship sinking in the distance. In Gladiator (2001), a skeletal version of the Coliseum was used as the set; the vivid details you see in the movie were filled in using computer graphics.

Computer animation has taken on a life of its own, too. Sometimes, animated characters interact with real scenes and humans on screen. Today's powerful computers make it possible to make animated characters seem very real.

Name_____

Cutting Edge Technology

Directions: The student will surf the net, read periodicals, talk with other teachers and explore the library for information related to cutting edge technology. A list of subject areas where cutting edge technology is being used to benefit mankind has been created for your use. Choose an item from the list and find an article about that subject area. Try to find an article, which researches the most recent advancements in this area. Make a copy of the article and turn this in with your work.

Subject Areas

Magnetic levitation, Air travel, Water travel, Land travel, Space travel, Genetics, Farming, Hydroponics, Aerodynamics, Sports, Arts, Jet pack, Food Preparation or consumption, Manufacturing, Printing, Audio, Video, Communications, Exercise, Medical, Telephone, Computers, Music development, Bicycle, Home improvement, Security, Safety, etc…

Suggested Resources: www.factmonster.com, www.howstuffworks.com, www.yahoo.com, www.goggle.com

Name_____

Integrated Circuit (IC) History of the Modern Computer

Instructions: (If the Website listed below no longer exists, inform your instructor.)
Get on the Internet and go to: www.inventors.about.com
Scroll and select: "Historical Inventions A to Z."
Select the letter "I."
Scroll and select: "Integrated Circuit."
Read "Inventors of the modern Computer" and answer the questions below.

1. A. What does "IC" stand for?
   B. Who was the engineer that worked for Texas Instruments in 1958?

2. Who was the engineer that co-founded the Fairchild Semiconductor Corporation?

3. Form 1958 to 1959 both engineers were working independently on the same problem…what was it?

4. A. What semiconductor material was it that Kilby used for his integrated circuit?
   B. What semiconductor material was it that Noyce used for his integrated circuit?

5. They invented the monolithic integrated circuit, which placed the previously separated transistors, resistors, capacitors, and all the connecting wiring onto what?

6. After both Kilby and Noyce received patents for their inventions, and several years of legal battles between them, what was it that they decided to do together?

7. The global market of integrated circuit technology is worth about how much (in dollars per year) today?

8. In what year and form what company were integrated circuits first commercially available?

9. A. When did all computers begin to be made with chips instead of individual transistors and other accompanying parts?
   B. The original IC, which was the size of an adult's pinkie finger, contained which parts, and how many parts of each?

10. A. Today, how many transistors can an IC smaller than a penny hold?
    B. The portable calculator was invented when, and by whom?

11. Robert Noyce is the founder of what company that also invented the microprocessor?

Inventors of the Modern Computer

The History of the Integrated Circuit (IC) - Jack Kilby & Robert Noyce Inventors

By Mary Bellis

"What we didn't realize then was that the integrated circuit would reduce the cost of electronic functions by a factor of a million to one, nothing had ever done that for anything before" - Jack Kilby

Illustration from Jack Kilby's inventor's journal

It seems that the integrated circuit was destined to be invented. Two separate inventors, unaware of each other's activities, invented almost identical integrated circuits or ICs at nearly the same time.

Jack Kilby, an engineer with a background in ceramic-based silkscreen circuit boards and transistor-based hearing aids, started working for Texas Instruments in 1958. A year earlier, research engineer Robert Noyce had co-founded the Fairchild Semiconductor Corporation. From 1958 to 1959, both electrical engineers were working on an answer to the same dilemma: how to make more of less.

In designing a complex electronic machine like a computer it was always necessary to increase the number of components involved in order to make technical advances. The monolithic (formed from a single crystal) integrated circuit placed the previously separated transistors, resistors, capacitors and all the connecting wiring onto a single crystal (or 'chip') made of semiconductor material. Kilby used germanium and Noyce used silicon for the semiconductor material.

In 1959 both parties applied for patents. Jack Kilby and Texas Instruments received U.S. patent #3,138,743 for miniaturized electronic circuits. Robert Noyce and the Fairchild Semiconductor Corporation received U.S. patent #2,981,877 for silicon based integrated circuits. The two companies wisely decided to cross license their technologies after several years of legal battles, creating a global market now worth about $1 trillion a year.

In 1961 the first commercially available integrated circuits came from the Fairchild Semiconductor Corporation. All computers then started to be made using chips instead of the individual transistors and their accompanying parts. Texas Instruments first used the chips in Air Force computers and the Minuteman Missile in 1962. They later used the chips to produce the first electronic portable calculators. The original IC had only one transistor, three resistors and one capacitor and was the size of an adult's pinkie finger. Today an IC smaller than a penny can hold 125 million transistors.

Jack Kilby now holds patents on over sixty inventions and is also well known as the inventor of the portable calculator (1967). In 1970 he was awarded the National Medal of Science. Robert Noyce, with sixteen patents to his name, founded Intel, the company responsible for the invention of the microprocessor, in 1968. But for both men the invention of the integrated circuit stands historically as one of the most important innovations of mankind. Almost all modern products use chip technology.

Name: _____

Following Instruction

Directions: The following is a set of instructions obtained from the Aqua Art Floor Lamp. Carefully read the instructions set forth herein. Try to remember the exact order of each step as it occurs. Without referring back to the instructions answer as many of the questions which follow.

Aqua Art Floor Lamp- Instructions For Use…

1. Carefully remove contents: Aqua floor lamp, lid, AC adapter, air pump, 20 colored marbles, and replacement bulb. Place lamp on a flat waterproof surface.
2. Fill Aqua lamp with distilled water until it reaches MAX water line. Drop colored balls into the water. Do not get base or electrical cord wet (see back panel).
3. Connect rubber tubing to air pump. Make sure that there are no kinks or water leakage on rubber tube.
4. Connect electrical cord from unit to AC wall adapter. Also connect electrical cord from air pump to same AC wall adapter.
5. Plug AC adapter into a standard wall socket (output 12v). Adjust jet stream to Hi or Lo as desired.
6. Once AC adapter is plugged in wall, you may turn air pump OFF or ON with toggle switch. Or you may turn 4- color revolving light OFF or ON with toggle switch.

1. What is the first instruction?

2. Connect rubber tubing to air pump after or before you connect in the electrical cord from the unit.

3. You may adjust the jet stream to Hi or Lo after or before you fill the lamp with distilled water.

4. You may turn the air pump On or Off with what?

5. True or False. The air pump is rated at 12v.

Name_____

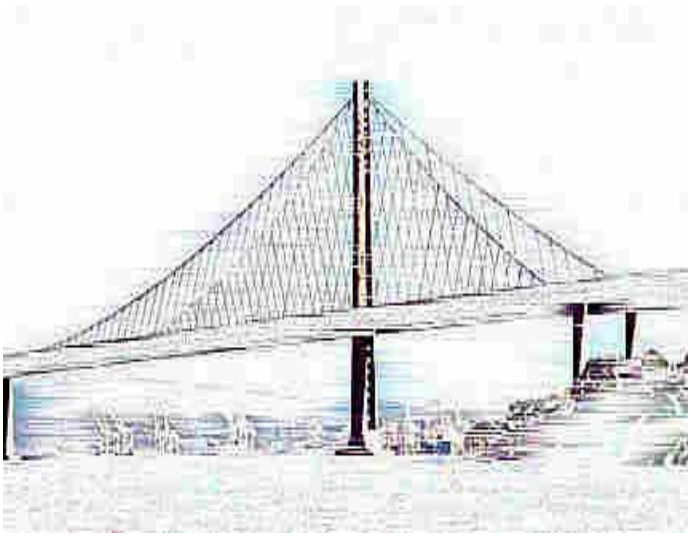
Cutting Edge Technology

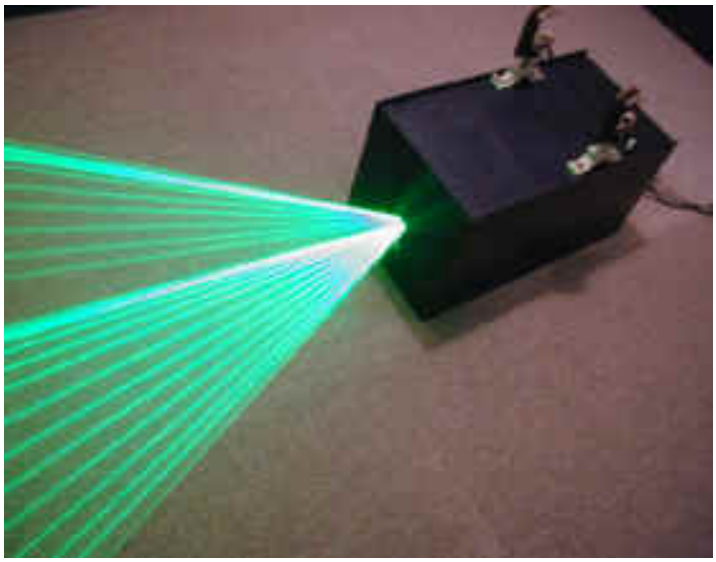
Directions: The student will surf the net, read periodicals, talk with other teachers and explore the library for information related to cutting edge technology. A list of subject areas where cutting edge technology is being used to benefit mankind has been created for your use. Choose an item from the list and find an article about that subject area. Try to find an article, which researches the most recent advancements in this area. Make a copy of the article and turn this in with your work.

Magnetic levitation, Air travel, Water travel, Land travel, Space travel, Genetics, Farming, Hydroponics, Aerodynamics, Sports, Arts, Jet pack, Food preparation or consumption, Manufacturing, Printing, Audio, Video, Communications, Exercise, Medical, Telephone, Computers, Music development, Bicycle, Home improvement, Security, Safety, etc…

Suggested Resources: www.factmonster.com, www.howstuffworks.com, www.yahoo.com, www.goggle.com

Connecting Reading to Technology Education





Physical Systems

Name_____

Batteries (Development)

Directions: Read the following excerpt taken from the website ***www.inventors.about.com***. Use the information to answer the questions that follow and to complete the crossword puzzle.


Allessandro Volta

Battery development dates as far back as the late 18th century. The cause was championed by the work carried out by Luigi Galvani from 1780 to 1786. Through his experiments Galvani observed that, when connected pieces of iron and brass were applied to frog's legs, they caused them to twitch. However, Galvani thought that the effect originated in the leg tissue. Nevertheless, Galvani had laid the cornerstone for further developments in "voltaic" electricity.

From 1796 - 1799, Alessandro Volta experimented with zinc and silver plates to produce electric currents at the Pavia University. Volta stacked the two to form a "pile", the first "dry" battery. By 1800 Volta had created the "crown of cups", a modified arrangement of zinc and silver discs dipped in a salt solution.

In the years that ensued, other means of producing electricity were invented, all of which involved the use of liquid electrodes. Those developed by Bunsen (1842) and Grove (1839) were amongst the most successful systems, and, were used for many years.

By 1866, Georges Leclanche, a French engineer, patented a new system, which was immediately successful. In the space of two years, twenty thousand of his cells were being used in the telegraph system. Leclanche's original cell was assembled in a porous pot. The positive electrode consisted of crushed manganese dioxide with a little carbon mixed in. The negative pole was a zinc rod. The cathode was packed into the pot, and a carbon rod was inserted to act as a currency collector. The anode or zinc rod and the pot were then immersed in an ammonium chloride solution. The liquid acted as the electrolyte, readily seeping through the porous cup and making contact with the cathode material. Leclanche's "wet" cell (as it was popularly referred to) became the forerunner to the world's first widely used battery, the zinc carbon cell.

Leclanche's invention, which was quite heavy and prone to breakage, was steadily improved over the years. The idea of encapsulating both the negative electrode and porous pot into a zinc cup was first patented by J.A. Thiebaut in 1881. But, it was Carl Gassner of Mainz who is credited as constructing the first commercially successful "dry" cell. Variations followed. By 1889 there were at least six well-known dry batteries in circulation. Later battery manufacturing produced smaller, lighter batteries, and the application of the tungsten filament in 1909 created the impetus to develop batteries for use in torches.

The production of batteries was greatly increased during the First World War as a means of powering torches, field radios. Other milestones in battery production include the widespread radio broadcasting, which brought battery-operated wireless into the heart of many homes. But, it

was during the inter-war years that battery performance was greatly enhanced. This was achieved through better selection of materials and methods of manufacture.

Batteries have now become an essential part of everyday life. They are the power source for millions of consumer, business, medical, military and industrial appliances worldwide. This demand is growing.

.

1. Approximately when is it thought that the very first batteries were made, where were they found, and what were they probably used for ?

2. Discuss Luigi Galvani concerning Battery technology evolution…what did he do?

3. In the late 1790s, whose experiments was a re-discovery of battery technology that produced electric currents, and what were the metal plates made of that he used in the first dry battery?

4. Define: Electrolyte

5. Define: Cathode

6. Define: Anode

7. Define: Ions

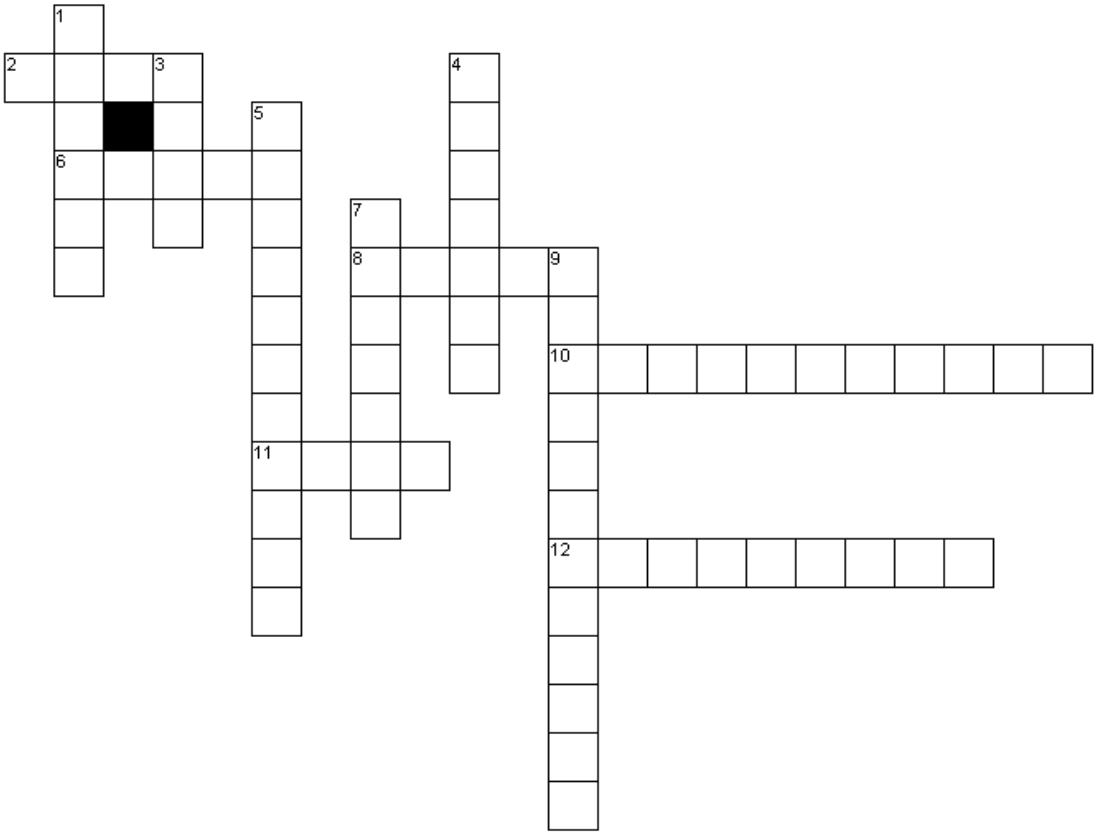
8. Define: Cell

9. Define: Oxidation

10. In your opinion, how has the invention of the battery affected the world?

Name_____

Batteries (Development)



Across

2. Metal used some of the first dry batteries.
6. Re-discovered how to produce electric currents using dissimilar metal plates in the late 1790s.
8. Releases electrons that travel through the electrolyte to the cathode.
10. Conducts the electric current (allows the flow of ions) between the Anode and the Cathode inside a battery.
11. Individual atoms that have either lost electrons (positively charged), or gained electrons (negatively charged).
12. Occurs when an atom looses an electron.

Down

1. Metal used in some of the first dry batteries.
3. A cathode and an anode immersed in an electrolyte.
4. Accepts the negatively charged electrons produced by the anode.
5. Where the first evidence of batteries were found.
7. Used iron and brass connected plates to make frogs legs twitch.
9. The probable first use of batteries to do this with gold and silver.

Name_____

The Digital Compact Disk

Directions: Read the following excerpt taken from the website *www.inventors.about.com.* Use the information to answer the questions that follow.

James T. Russell invented the digital compact disc that is commonly found in most stereos and computers, in the late 1960s.

Russell was born in Bremerton, Washington in 1931.Russell earned a BA in Physics from Reed College in Portland in 1953. Afterward, he went to work as a Physicist for General Electric.

At GE, Russell initiated many experimental instrumentation projects. He was among the first to use a color TV screen and keyboard as the sole interface between computer and operator. In 1965, when Columbus, Ohio - based Battelle Memorial Institute opened its Pacific Northwest Laboratory in Richland, Washington, Russell joined the effort as Senior Scientist. He already knew what avenue of research he wanted to pursue.

Russell was an avid music listener. Like many audiophiles of the time, he was continually frustrated by the wear and tear suffered by his vinyl phonograph records. He was also unsatisfied with their sound quality: his experimental improvements included using a cactus needle as a stylus. Alone at home on a Saturday afternoon, Russell began to sketch out a better music recording system --- and was inspired with a truly revolutionary idea.

Russell envisioned a system that would record and replay sounds without physical contact between its parts; and he saw that the best way to achieve such a system was to use light. Russell was familiar with digital data recording, in punch card or magnetic tape form. He saw that if he could represent the binary 0 and 1 with dark and light, a device could read sounds or indeed any information at all without ever wearing out. If he could make the binary code compact enough, Russell saw that he could store not only symphonies, but also entire encyclopedias on a small piece of film.

After years of work, Russell succeeded in inventing the first digital-to-optical recording and playback system (patented in 1970). He had found a way to record onto a photosensitive platter in tiny "bits" of light and dark, each one micron in diameter; a laser read the binary patterns, and a computer converted the data into an electronic signal --- which it was then comparatively simple to convert into an audible or visible transmission. This was the first compact disc.

Although Russell envisioned 3x5-inch stereo records and video records about the size of a punch card, the final product was the size of the phonographic disc. Through the 1970s, Russell continued to refine the CD-ROM, adapting it to any form of data. The CD-ROM found few interested investors at first; but eventually, Sony and other audio companies realized the implications and purchased licenses.

By 1985, Russell had earned 26 patents for CD-ROM technology. He then founded his own consulting firm, where he has continued to create and patent improvements in optical storage systems, along with bar code scanners, liquid crystal shutters, and other industrial optical

instruments. His most revolutionary recent invention is a high-speed optical data recorder / player that has no moving parts.

James T. Russell has many interests beyond optical data devices. In fact, he has claimed, "I've got hundreds of ideas stacked up --- many of them worth more than the compact disc. But I haven't been able to work on them." Digital engineers and consumers alike will be lucky if he does find the time.

Name_____

Compact Disc (Digital)

1. Who invented the compact disc and around when did he invent it?

2. What was his degree in which he earned from Reed College in 1953?

3. As a music listener, what were the 2 things he disliked about vinyl phonograph records?

4. Describe the system that would record and play sounds that he envisioned, to include the physical contact of parts and what the system would use to achieve his physical contact requirements.

5. He would try and represent the binary units of 0 and 1 with what?

6. What did Russell Patent in 1970…describe it?

7. A. He found a way to record his "bits" of light and dark on what?
   B. A laser was used to do what?
   C. What was a computer to be used for?

8. The first compact disc was as big as what which was common to the 1970s?

9. ROM stands for: Read…Only…Memory. What companies eventually purchased licenses using the CD-ROM technology?

10. Describe how you think history was changed as a result of the invention of the Compact disc?

Name_____

The Digital Compact Disk

J W E F R R I P D C U Y T E H Y O P O C
Z A B W C A H O I A J T G O P R O O Z K
K B M S V Y E N O S X A D A A O D E Z B
Q G E E S G O T A I R U K Y R M U R A N
C A Q I S R Y D D O F L D N G E M B D B
J C C B T R G G T N I J Z N O M L C E Z
D S A C O Y U S T G A P S M N V J Q D E
Z T E D R S L S H O X R B I O I J R X N
R L X A X A C T S N M O A T H N E Q E G
E Z N O C L A A S E T Y K E P Y E Y G I
F I E I T N P K U S L K R C W L C G T N
B R T S D E A G H A Q L A T I G I D T E
V P E D N U N B H N S T E R E O D J T E
O P A A D E C S I D T C A P M O C E B R
B R A I D O C F R Z T E C H N O L O G Y
K P O T R O G I X E N B Y H C H K T N C
D H Y V E Z N A L R S M L U U U X Y O F
K R R U B N Q L I O M A I C J G N N E I
O E D I V D T W Y S I P L L V E C O D U
R U O P H O T O S E N S I T I V E S X I

AUDIO
BINARY
ELECTRONIC
ENGINEER
LASER
LICENSE
MEMORY
ONESANDZEROS
PHONOGRAPH
PHOTOSENSITIVE
PHYSICS
READONLY
SONY
STEREO
TECHNOLOGY
VIDEO
VINYL
WEARANDTEAR
COMPACTDISC
DIGITAL
JAMESRUSSELL
LIGHTANDDARK
OPTICALSTORAGE
PATENT

Name_____

Deming

Directions: Read the following excerpt taken from the website *www.inventors.com.* Use the information to answer the questions that follow.

W. Edwards Deming conducted a thriving worldwide consulting practice for more than forty years. His clients included manufacturing companies, telephone companies, railways, carriers of motor freight, consumer researchers, census methodologists, hospitals, legal firms, government agencies, and research organizations in universities and in industry.

The impact of Dr. Deming's teachings on American manufacturing and service organizations has been profound. He led a sweeping quality revolution that is improving the competitive position of the United States.

President Reagan awarded the National Medal of Technology to Dr. Deming in 1987. He received in 1988 the Distinguished Career in Science award from the National Academy of Sciences.

Dr. Deming received many other awards, including the Shewhart Medal from the American Society for Quality Control in 1956 and the Samuel S. Wilks Award from the American Statistical Association in 1983.

The Metropolitan section of the American Statistical Association established in 1980 the annual Deming Prize for improvement of quality and productivity. Dr. Deming was a member of the International Statistical Institute. He was elected in 1983 to the National Academy of Engineering, and in 1986 to the Science and Technology Hall of Fame in Dayton. He was inducted into the Automotive Hall of Fame in 1991.

Dr. Deming is perhaps best known for his work in Japan, where from 1950 and onward he taught top management and engineers methods for management of quality. This teaching dramatically altered the economy of Japan. In recognition of his contributions, the Union of Japanese Science and Engineering (JUSE) instituted the annual Deming Prizes for achievements in quality and dependability of product. The Emperor of Japan awarded to Dr. Deming in 1960 the Second Order Medal of the Sacred Treasure.

Dr. Deming received his doctorate in mathematical physics from Yale University in 1928. A number of universities have awarded to him the degrees LL.D. and Sc.D. *honoris causa*: the University of Wyoming, Rivier College, the University of Maryland, Ohio State University, Clarkson College of Technology, Miami University, George Washington University, the University of Colorado, Fordham University, the University of Alabama, Oregon State University, the American University, the University of South Carolina, Yale University, Harvard University, Cleary College, and Shenandoah University. Yale University awarded to him also the Wilbur Lucius Cross Medal. Rivier College awarded to him the Madeleine of Jesus Award.

Dr. Deming is the author of several books and 171 papers. His books, *Out of the Crisis* (MIT/CAES, 1986) and *The New Economics* (MIT/CAES, 1994) have been translated into several foreign languages. Myriad books, films, and videotapes profile his life, his philosophy, and the successful application of his teachings worldwide. Dr. Deming's four-day seminars reached 10,000 people per year for over ten years.

1. What was his practice (job title) for more than 40 years…what did he do?

2. Who were some of his clients?

3. The impact of his teachings had a profound impact on whom?

4. Who awarded him in 1987, and what was it he received?

5. What was the revolution that he led?

6. A. What did he do from 1950 onward in Japan?
    a. How did his work affect Japan's economy?

7. In recognition of his accomplishments, the Union of Japanese Science and Engineering instituted the Deming Prize for what concerning industry?

8. From where did he receive his doctorate (PhD), and what was it in?

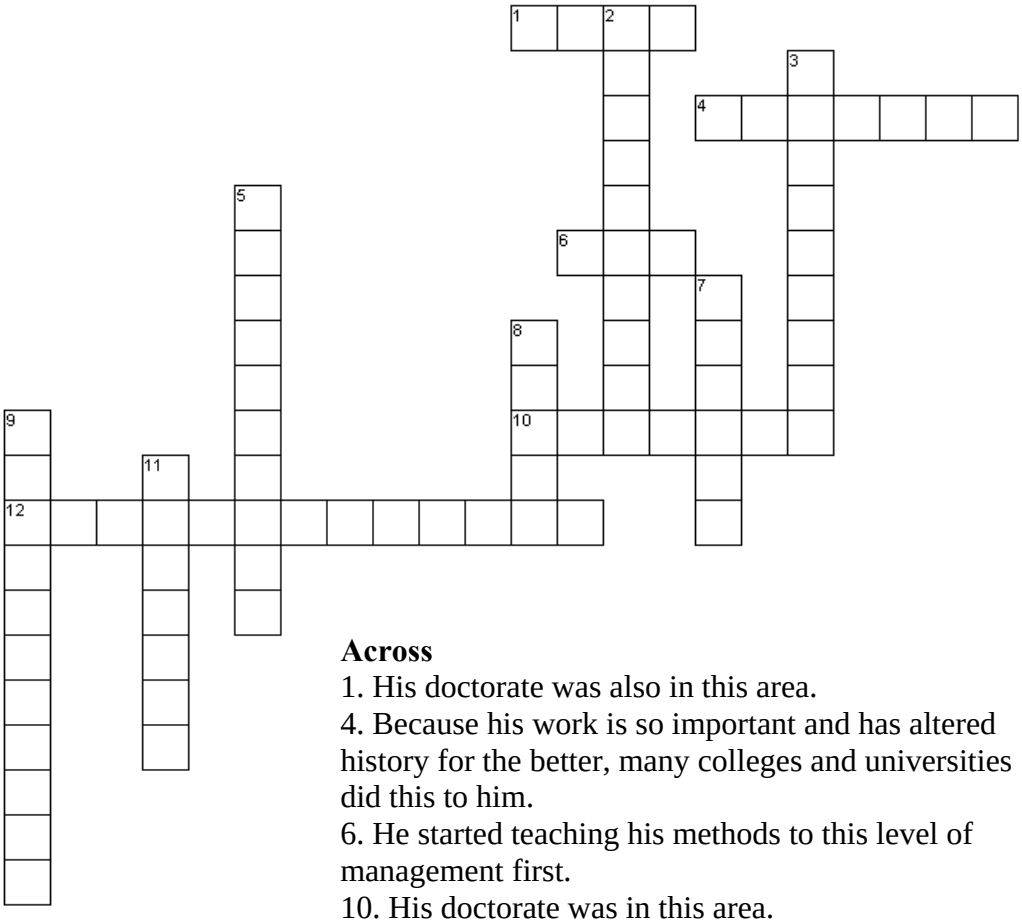
9. How many different colleges and universities have awarded him degrees and honors? (This is to let you know how important others think his work is.)

10. After teaching industries in Japan, which were still recovering from World War Two in 1950, how to implement a process of continuous product improvement, Japanese products began to improve in quality, dependability, and price. As a result, over time, many products that were made in the United States are now only made in Japan. Once, Japanese products were thought of as cheap, and junk-like. Because of continuous quality improvement and innovation, many Japanese products are now thought of as "state of the art," top quality, and "best buys."

    a. In your own opinion, how do you think Dr. Deming has affected the world of manufacturing, the products we buy today, and the world as a whole…life as we know it?
    b. The 1950s are now a thing of the past. What do you think the impact of his teaching was on the future, which we are living in day?

Name_____

Dr. Deming



Across

1. His doctorate was also in this area.
4. Because his work is so important and has altered history for the better, many colleges and universities did this to him.
6. He started teaching his methods to this level of management first.
10. His doctorate was in this area.
12. What major industry sector did he help improve the most?

Down

2. Received the National Medal of what from President Ragan in 1987?
3. He taught these people (job title) as well his methods of quality management.
5. What was his job title?
7. Who taught Japanese industry how to improve their products beginning around 1950?
8. He is famous for helping what country's industry recover from World War Two?
9. For achievements in quality and dependability this award is the highest honor in Japanese industry.
11. He led this type of sweeping revolution that is helping the competitive position of U.S. industries.

Name_____

Eli Whitney / Henry Ford

Directions: (**Note:** If the web site(s) no longer exists, use a search engine and find the answers to the questions below.)

Get on the Internet and go to: www.inventors.about.com
Select "Famous Inventors" on the left side of the page.
Select "Famous Inventors: A to Z"
Select the letter "W"
Scroll down and select Eli Whitney.
Scroll down past the write-up and Select: Eli Whitney (1765 to 1825)
Read the information, and then answer the questions below.

1. What was his next project after the cotton gin? Describe it. What did he eventually introduce?
2. Up to that point, how were items made?
3. The changes he introduced in what eventually allowed him to produce 10,000 muskets in 2 years?
4. What were the 2 major innovations in his process?
5. Patterns were used to produce what, and who worked with them?

For questions 6-9, use the instructions above except go to the letter "F"
Scroll down and select "Henry Ford."
Scroll down past General Histories to the names and Select "Henry Ford."
Scroll past the write-up and select "Henry Ford" form MIT's Invention Dimension.

6. He didn't invent the automobile, but he did invent what that revolutionized its production?

7. In 1908 what was it that Ford's company began to do?

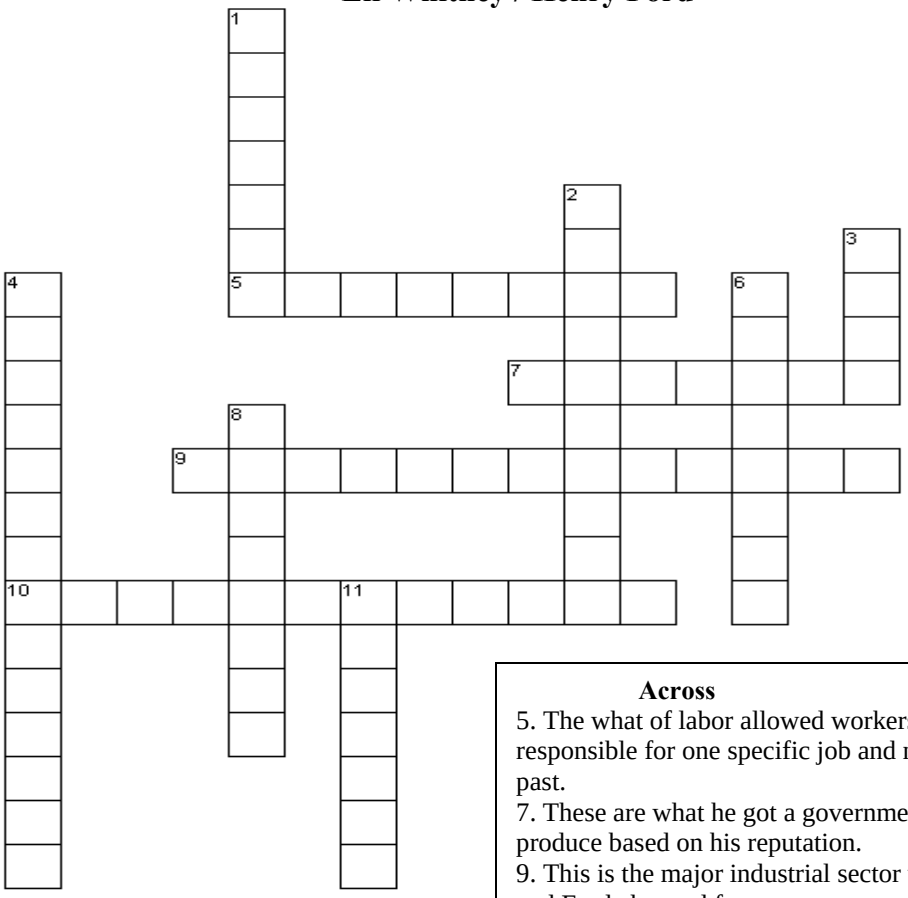
8. What was Ford's solution to meet the growing demand for his cars…describe it?

9. A. Describe the principle of "division of labor" to include how it affected working on the cars as they moved on the assembly line.
   B. How did his innovations affect the price of the cars he produced…the cost went form what in 1908 to what in 1915?

10. In your opinion, how has manufacturing, and our daily lives been affected:
    A. Because of the introduction of mass production of identical parts (The concept of interchangeable parts) from Eli Whitney.
    B. Because of the innovation in production using the assembly line method?

Name_____

Eli Whitney / Henry Ford



Across

5. The what of labor allowed workers to focus on being responsible for one specific job and not several as in the past.
7. These are what he got a government contract to produce based on his reputation.
9. This is the major industrial sector which both Whitney and Ford changed forever.
10. He introduced this innovation to production where by cars moved down a belt from one worker to another.

Down

1. Because parts were made by machines set up using standard patterns and molds in stead of a craftsman one piece at a time, by hand, workers no longer had to be this in order to work in manufacturing.
2. This was the system that he would completely reinvent in America before Ford.
3. This is what production was called, because parts were made in large numbers from molds and patterns.
4. This is the term used to describe parts manufactured in identical fashion because of standard sizes from molds and patterns.
6.Cars were assembled at a moving assembly line instead of being assembled by a small team of workers.
8. Until Whitney everything was made by this method, all pieces one at a time usually by a single craftsman.
11. Because cars could be made faster and more efficiently, this happened to the price of Ford's cars...the price what?

Name_____

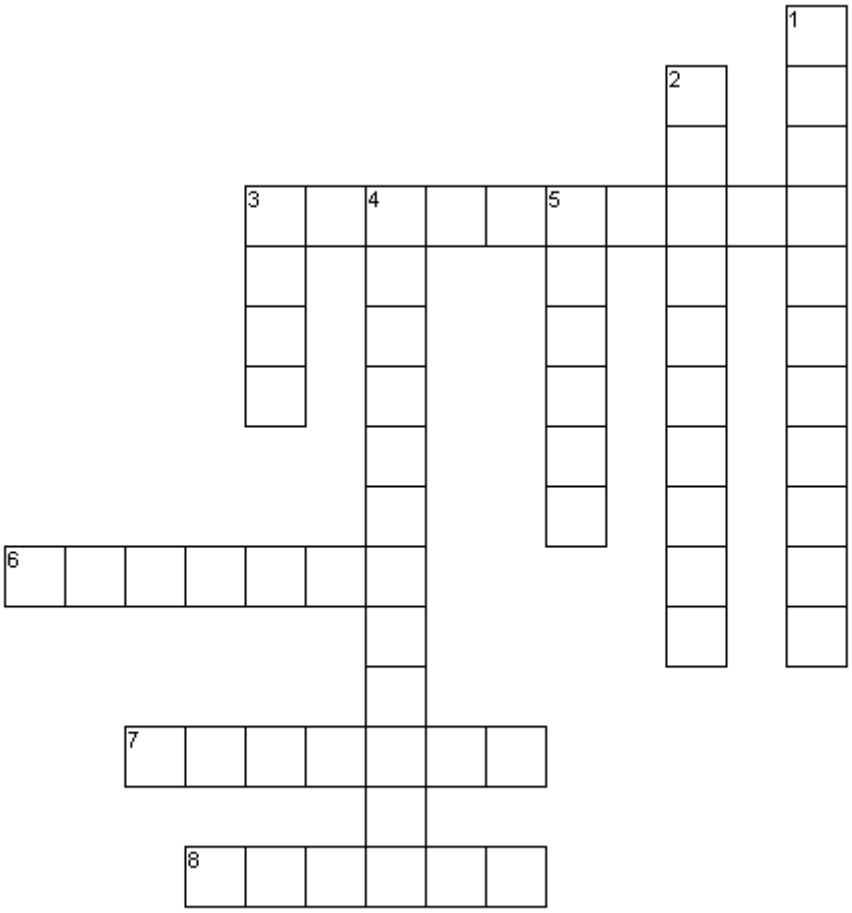
GPS / Global Positioning System

Directions: (**Note:** If the web site listed below no longer exists, use a search engine like www.google.com and search for GPS, or Global Positioning System and then look for information in order to answer the questions below.)
Get on the Internet and go to: www.inventors.about.com .
Select "Historical Inventions A to Z" in the middle of the page.
Select the letter "G" at the top of the page.
Scroll down the page and select GPS / Global Positioning System.
Read the information presented then answer the questions below.

1. Who invented it?
2. How much did it originally cost?
3. What is GPS…what does it help to do, what is its function?
4. How many satellites were originally used?
5. GPS uses satellites to do what?
6. How accurate is it…to within what amount of measurement?
7. How accurate are advanced forms of GPS?
8. What does it do for ships and submarines out at sea?
9. What are some other things that are now beginning to use GPS?
10. In your own opinion, describe how GPS has affected daily life, or has it?

Name_____

GPS / Global Positioning System



Across

3. Advanced systems are accurate to within this measurement.
6. Mountain that GPS was used to measure.
7. Government area, agency, or branch that invented the global positioning system.
8. Number of billions of dollars it cost originally.

Down

1. Satellites are use to calculate these types of positions.
2. Eighteen were put in place originally.
3. GPS is finding its way into these today.
4. What type of system is GPS…what is it used for?
5. It is accurate to within this measurement.

Name_____

History of Robots

Directions: Read the following excerpt taken from the website *www.inventors.about.com*. Use the information to answer the questions that follow.

A Short History of Robots
1920
The idea of a robot is not new. For thousands of years man has been imagining intelligent mechanized devices that perform human-like tasks. He has built automatic toys and mechanisms and imagined robots in drawings, books, plays and science fiction movies.
In fact, the term "robot" was first used in 1920 in a play called "R.U.R." or "Rossum's Universal Robots" by the Czech writer Karel Capek. The plot was simple: man makes robot then robot kills man! Many movies that followed continued to show robots as harmful, menacing machines. More recent movies, however, like the 1977 "Star Wars", portray robots such as "C3PO" and "R2D2" as man's helpers. "Number Five" in the movie "Short Circuit" and C3PO actually take on a human appearance. These robots, which are made to look humans, are called "androids".
1941
In 1941, science fiction writer Isaac Asimov first used the word "robotics" to describe the technology of robots and predicted the rise of a powerful robot industry. His prediction has come true. Recently there has been explosive growth in the development and use of industrial robots to the extent that terms like "robot revolution", "robot age", and "robot era" are used. "Robotics" is now an accepted word, which describes all technologies associated with robots.
1956
In 1956, George Devil and Joseph Engelberger formed the world's first robot company. Devol predicted that the industrial robot would "help the factory operator in a way that can be compared to business machines as an aid to the office worker". A few years later, in 1961, the very first industrial robot was "employed" in a General Motors automobile factory in New Jersey. Since 1980, there has been an expansion of industrial robots into non-automotive industries. The main factor responsible for this growth has been the technical improvements in robots due to advancement in microelectronics ("ME") and computers.
Today
Fully functioning androids are many years away due to the many problems that must be solved. However, real, working, sophisticated robots are in use today and they are revolutionizing the workplace. These robots do not resemble the romantic android concept of robots. They are industrial manipulators and are really computer controlled "arms and hands". Industrial robots are so different to the popular image that it would be easy for the average person not to recognize one.

Benefits of Robots

Robots offer specific benefits to workers, industries and countries. If introduced correctly, industrial robots can improve the quality of life by freeing workers from dirty, boring, and dangerous, and heavy labor. It is true that robots can cause unemployment by replacing human workers but robots also create jobs: robot technicians, salesmen, engineers, programmers and

supervisors. The benefits of robots to industry include improved management control and productivity and consistently high quality products. Industrial robots can work tirelessly night and day on an assembly line without a loss in performance. Consequently, they can greatly reduce the costs of manufactured goods. As a result of these industrial benefits, countries that effectively use robots in their industries will have an economic advantage on world market.

Name_____

Robotics

1. Describe Who, When, and Where concerning the first time the term "robot" was used?

2. Describe what Androids are concerning robots?

3. What did Isaac Asimov predict? When did he make his prediction?

4. Robotics is now the accepted word for what?

5. A. What did George Devol and Joseph Engelberger do?
   B. When did they do it?
   C. Devol predicted that the industrial Robot would do what?

6. Where (what business) and When was the first industrial robot "employed?"

7. Describe what enabled the expansion of industrial robots into non-automobile industries since 1980.

8. Robots in industry today are industrial manipulators and are really just what?

9. A. How do robots benefit workers and improve the quality of life?
   B. What are some robot related jobs?
   C. Because Robots can work day and night endlessly, how do they affect the end costs of the goods they produce?

10. Describe how you think the world has been changed, if at all, for better, or worse, because of the introduction of robots in manufacturing.

Name_____

Satellites

Directions:

Go to the Internet and go to: www.inventors.about.com
Select Historical Inventions A to Z.
Select the letter "S."
Scroll down to Satellites and Select it.
Read the information under "The History of Satellites."

1. What was Sputnik, what country did it belong to, and when did it make history?

2. A. Its launch ushered in 4 new developments…what were they?
   B. The launch also marked the start of the space age and what?

3. In 1952 Scientists came up with IGY…
   A. What does it stand for?
   B. When are the dates it was established for?
   C. Describe what scientists knew about solar cycles for that period of time?

4. A. When did the White House announce that the United States was developing plans to launch a satellite during the IGY ?
   B. In September 1955 what was the name of the proposal that was to represent the U.S. during the upcoming IGY ?

5. As a technical achievement, Sputnik caught what 2 things?

6. Other than Sputniks impressive size compared to Vanguard, what was it the public feared?

7. Describe what happened on November 3rd, 1957, just about one month after Sputnik?

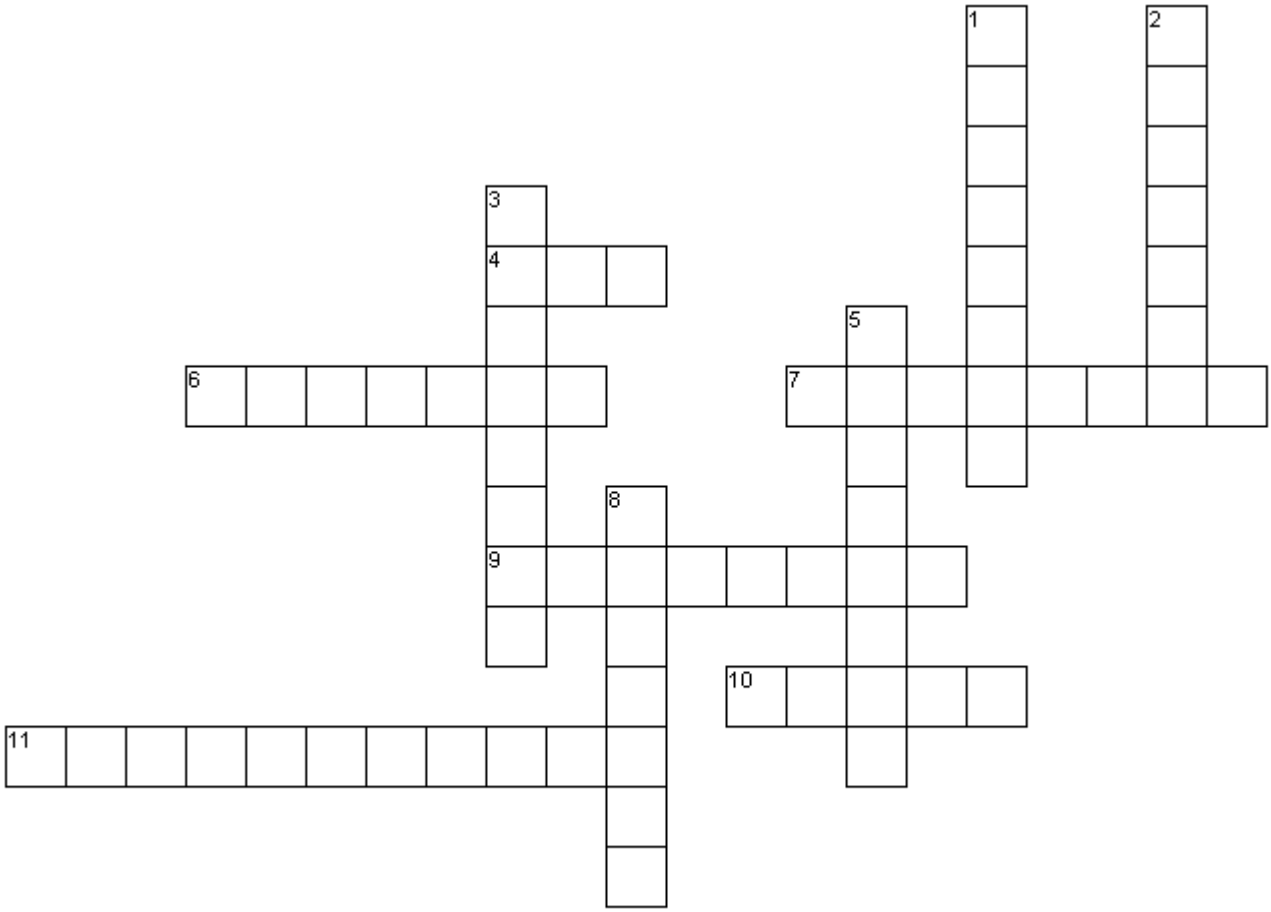
8. Describe what the United States did as a response to the Sputnik launch in October …what government department responded, who was in charge of it, and what was it called?

9. A. When did the United States successfully launch its first satellite?
   B. What was it called?
   C. What did it eventually discover?

10. In your own opinion, describe how you think satellite technology has affected the world…to include: missile technology, the space race with the former Soviet Union, and the many things satellites are used for today…weather...GPS etc.

Name_____

Satellites



Across

4. The initials of a period of time when solar activity was calculated to be at a height in the late 1950s.
6. The United States second satellite project in addition to Vanguard in response to Sputnik was stared by this Department.
7. The name of the White House's proposal to represent the U.S. during the upcoming IGY.
9. Successfully launch by the U.S. January 31, 1958.
10. The dog's name carried by Sputnik II on November 3, 1957 about a month after Sputnik I.
11. The country that launched the first satellite.

Down

1. The world entered into a new age on October 4, 1957.
2. The name of the month when on the 4th of it in 1957 the first satellite was launched.
3. The public feared that the satellite technology the Soviets had also enabled them to launch these against us.
5. United States first satellite discovered these belts around the earth.
8. The world's first man made satellite.

Name:_____

Nikola Tesla (Inventor)

Instructions: Read the passage below about Nikola Tesla that was taken from the website www.inventors.com Use the passage to complete the activities that follow.

Nikola Tesla invented the AC motor and transformer, 3-phase electricity and the Tesla Coil. Tesla is now credited with inventing modern radio as well; the Supreme Court overturned Marconi's patent in 1943 in favor of Tesla. Ten years after patenting a successful method for producing alternating current, Nikola Tesla claimed the invention of an electrical generator that would not "consume any fuel." This invention has been lost to the public. "*I have harnessed the cosmic rays and caused them to operate a motive device."* - Tesla.

Nikola Tesla was born in 1856 in Croatia and emigrated to the U.S. in 1884 as a physicist. He invented fluorescent lighting, the Tesla induction motor, the Tesla coil, and developed the alternating current (AC) electrical supply system. In 1885, George Westinghouse, head of the Westinghouse Electric Company, bought the patent rights to Tesla's system of dynamos, transformers and motors. Westinghouse used Tesla's alternating current system to light the World's Columbian Exposition of 1893 in Chicago. The Tesla coil, invented in 1891, is still used in radio and television sets and other electronic equipment. Tesla is considered one of the outstanding scientists who paved the way for many of the technological developments of modern times.

Tesla was Thomas Edison's rival at the end of the 19th century - in fact, he was more famous than Edison throughout the 1890's. His invention of polyphase electric power earned him worldwide fame and fortune. At his zenith he was an intimate of poets and scientists, industrialists and financiers. Yet Tesla died destitute, having lost both his fortune and scientific reputation. During his fall from notoriety to obscurity, Tesla created a legacy of genuine invention and prophecy that still fascinates today.

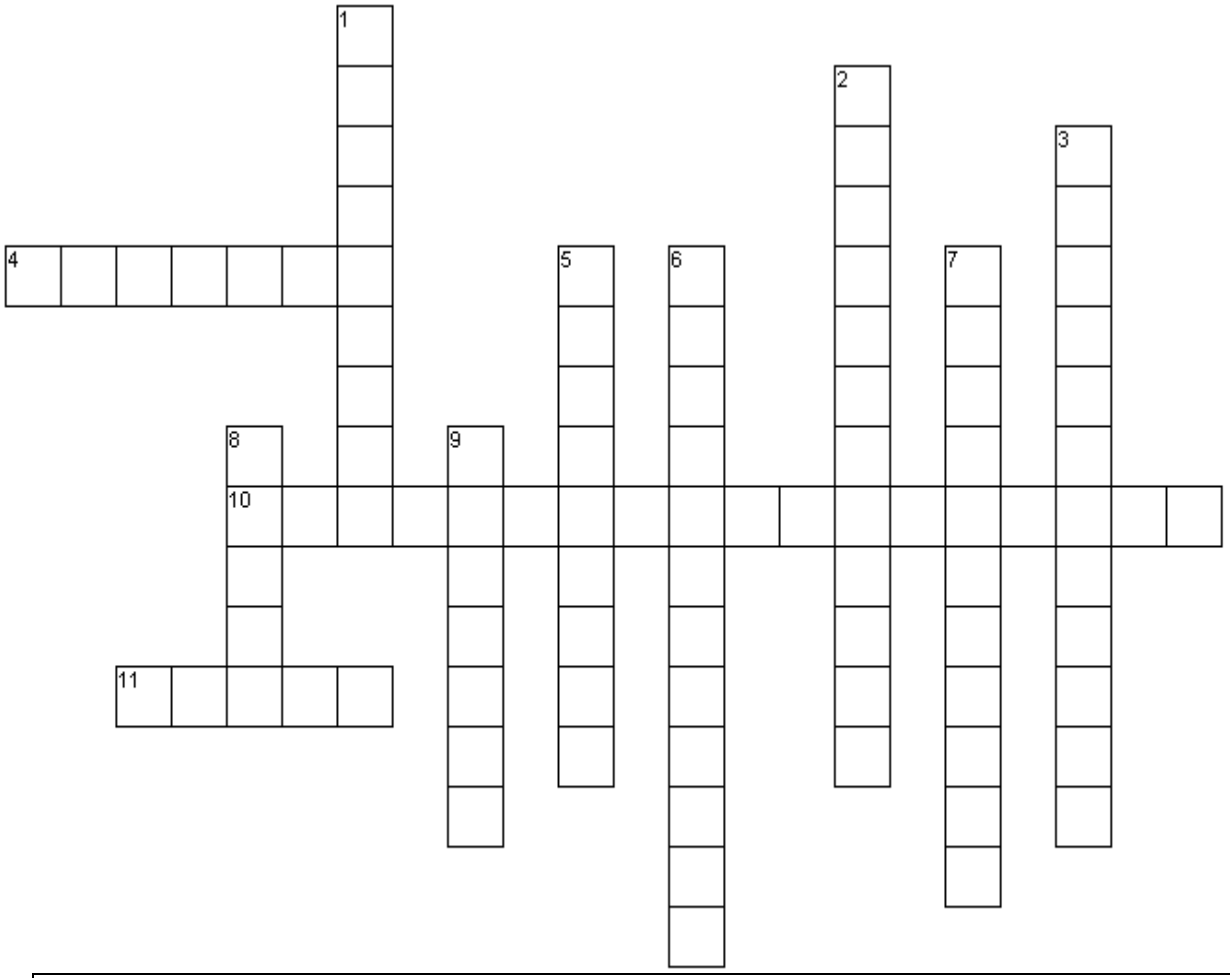
Name:_____

Nikola Tesla (Inventor)

1. Where was he born?
2. When did he come to the United States?
3. What was his job title when he immigrated to the U.S.?
4. Who's patent was overturned in his favor in 1943, and for what invention?
5. In what devises is the Tesla Coil still used today?
6. What form of power distribution is he credited for inventing?
7. What power company bought his power distribution patent?
8. What type of lighting did he invent?
9. How wealthy was he when he died?
10. In your own opinion, how has the world been changed because of his inventions…do you think the world is a better place and how?

Name:_____

Nikola Tesla (Inventor)



Across

4. Inventor who's patent was overturned in 1943 in favor of Tesla.
10. Type of electric power production system he invented.
11. His financial status at his death.

Down

1. Job title he held when he emigrated to the U.S.
2. Overturned a patent in Tesla's favor.
3. Was his rival at the end of the 19th century.
5. Still used in radios and televisions today
6. Electric company that bought his electricity production patents.
7. Type of lighting he invented.
8. Invention that patent was over turned for.
9. Country of birth for Tesla.

Name: _____

Vocabulary/Reading/Team Building Challenge

Directions: Students will read about a technological system found in a future technology article or science fiction story. Students will be divided into small groups. Each group will combine the futuristic technologies found in their readings and combine them to create a new invention or innovation.

Name: _____

Vocabulary/Reading/Future Careers

Directions: Students will read about a technological system found in a future technology article or science fiction story and list or research several careers related to the futuristic technological system.

Name: _____

Impacts of Inventions

Directions: (1**)** Students will read about an invention (or several inventions) and list the positive and negative impacts of that invention. (2) Students will also list ways in which the negative effects can be resolved and the positive effects can be further improved.

Name: _____

Vocabulary/Reading/Internet Research Challenge

Directions: Students will read about a technological system found in a future technology article or science fiction story and find ten or more Internet sites related to that futuristic technological system.

Name:_____

Read It-Design It

Directions: The instructor will develop a "read it and design it" activity pertaining to construction, manufacturing or architecture which utilizes a drawing software (e.g. CAD, CAP, ProDESKTOP, etc.). The instructor will present the problem solving activity to the students in a design brief format.

Name: _____

Vocabulary Challenge

Directions: Students are to locate, read and underline 5-10 key word in an article pertaining to Technology. They should bring a copy of the article to class to exchange with a fellow student. This student will replace these terms with appropriate words.

Name: _____

The BIG FIVE Game

Directions: Students will list a minimum of two technology or science related terms having the same number of syllable as the designated number.

1. _____
2. _____
3. _____
4. _____
5. _____

The BIG FIVE Game - KEY

Directions: Students will list a minimum of two technology or science related terms having the same number of syllable as the designated number. Students can use a glossary if necessary.

1. gear, weight, force, etc.
2. acid, data, airplane, etc.
3. kinetic, artery, conductor, etc.
4. insulator, automation, etc.
5. multimedia, intergalactic, communication, technological, electricity, hereditary, etc.

Name: _____

The First to Fly

Directions: Go to the following website and read about the history of the Wright Brothers, then answer the following questions about their life.

http://www.kyrene.k12.az.us/schools/brisas/sunda/inventor/wright/index.html

1) What type of toy did Orville and Wilbur's father bring to them to make them want to fly one day?

2) What was the first business that the Wright Brothers owned?

3) What was the second business that they owned which helped to fund their early flight experiments?

4) In what year did the Wright Brothers build their first glider?

5) How long did their longest glider ride last?

6) In 1901 the brothers broke a world record of flying 389 feet, but this still did not satisfy them, so they improved their glider and flew how many feet?

7) Who was the first person to fly an engine powered plane?

8) How far did this first flight carry the first person to fly?

9) In 1908 the Wright Brothers perfected their flying machine. How fast could this plane fly?

10) How far did the 1908 flight fly, which was reported by a newspaper?

Name: _____

The Effects of Aerodynamics on an Airplane

Directions: Go to the following website, research the aero dynamical forces, and answer the following questions.
http://www.howstuffworks.com/airplane1.htm

1) What are the four aerodynamic forces that affect an airplane?

2) What happens when the pilot increases the thrust of the plan so that it is greater than the amount of drag present?

3) In your own words define drag

4) In your own words define lift

5) Is air a fluid? (Yes/No)

6) Lift can only exist in the presence of a _____ _____?

7) Explain in your own words why spacecraft have no wings?

Name: _____

Flight Terminology

Directions: Unscramble the following terms associated with flight and define them.

PIHTC ☐☐☐☐☐

WYA ☐☐☐

LORL ☐☐☐☐

TURHTS ☐☐☐☐☐☐

RDAG ☐☐☐☐

HEWTIG ☐☐☐☐☐☐

TIFL ☐☐☐☐

DERRDU ☐☐☐☐☐☐

LAFPS ☐☐☐☐☐

POPELLORR ☐☐☐☐☐☐☐☐☐

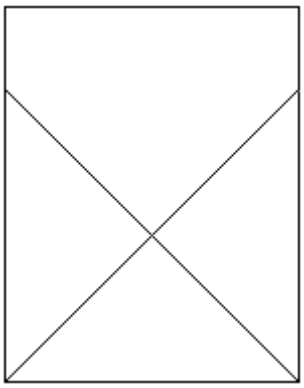
GIWSN ☐☐☐☐☐

Name: _____

Building a Paper Airplane

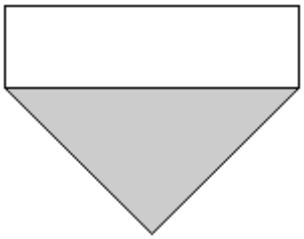
Directions: Read the following directions to create your very own glider.

1. Fold your sheet of A4 paper on diagonal lines as shown on DIG. 1 creasing well.



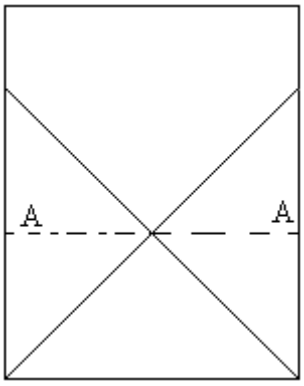
DIG. 1

2. You should get a shape as in DIG. 2.



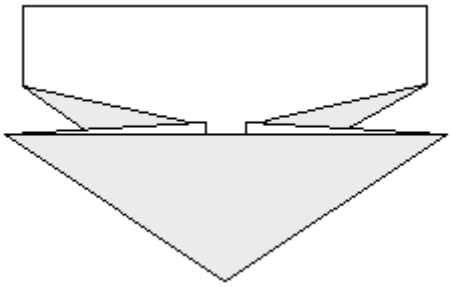
DIG. 2

3. Open it out to give DIG. 3 and then fold along the dotted line shown.



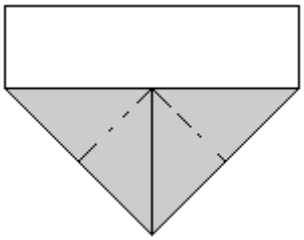
DIG. 3

4. Push in from the two points labeled A on DIG. 3 to give the shape in DIG. 4.



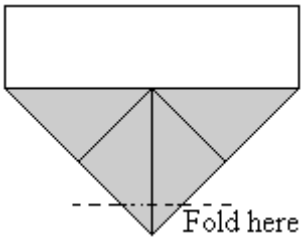
DIG. 4

5. Now flatten out this form and fold along the dotted lines in DIG. 5.



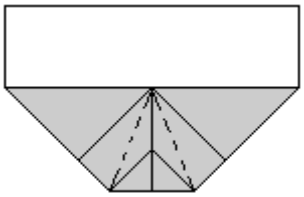
DIG. 5

6. This should give you the form in DIG. 6. Fold along the dotted line on this. Now you have DIG. 7.



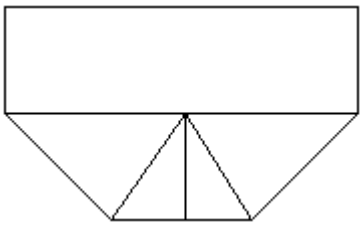
DIG. 6

7. Fold along the two dotted lines on DIG. 7 so that the two flaps meet in the center.



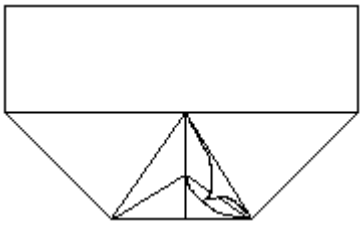
DIG. 7

8. You will be left with the form shown in DIG. 8.



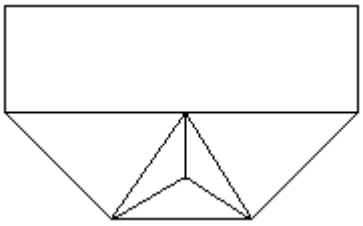
DIG. 8

9. The triangular flap in the center (underneath the two flaps you just produced) should have two pockets. Tuck the flaps produced in step 7 into these pockets as shown in DIG. 9.



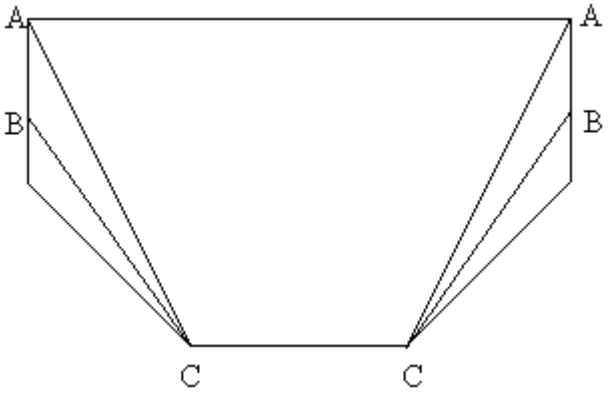
DIG. 9

10. You should be left with a piece of paper looking like DIG. 10.



DIG. 10

11. Now turn the plane over and fold along the lines labeled AC and BC in DIG. 10. These folds are very important if you want to produce a plane that flies absolutely level.

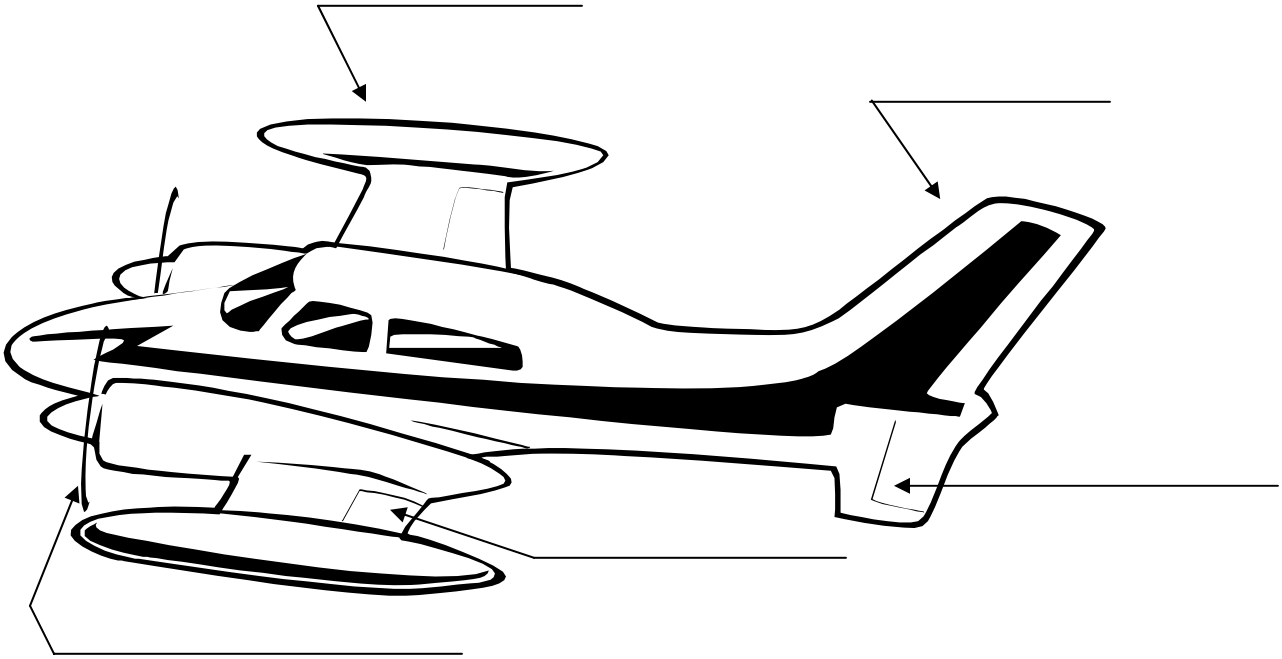


DIG. 11

Name: _____

Parts of the Airplane

Directions: Color the picture of the airplane and label the pats.



Name: _____

Industrial Search

Directions: Read the questions, and then find the answers by performing an Internet search.

1) When was the first practical steam engine invented?
2) Who refined the Thomas Newcomen's steam engine?
3) Where and when was the first nuclear power plant constructed?
4) Where was the first hydroelectric station constructed?
5) Which country produces the most cars?
6) What goods were first manufactured by mass production and who devised this method?
7) What is the world's largest computer company?
8) What was the first material to be manufactured by the Bessemer process?
9) Where and when was the first oil drilled?
10) What family owned company invented Nylon and then Teflon?
11) Who created the first moveable assembly line?
12) Elisha Graves Otis is known as the inventor of what item?
13) Who invented the first outboard motor?
14) Where did the term robot originate?

Name: _____

Reading a Screw Thread Chart

Directions: Using the information supplied in the chart answer the questions that follow**.**

Nominal Diameter	Coarse NC UNC		Fine NF UNF		Extra Fine NEF UNEF	
	Thds.per Inch	Tap Drill	Thds.per Inch	TapDrill	Thds.per Inch	Tap Drill
# 0 (.060)	…	…	80	3/64	…	…
# 1 (.073)	64	No. 53	72	No.53	…	…
# 2 (.086)	56	No. 50	64	No.50	…	…
# 3 (.099)	48	No. 47	56	No.45	…	…
# 4 (.112)	40	No. 43	48	No.42	…	…
# 5 (.125)	40	No. 38	44	No.37	…	…
# 6 (.138)	32	No. 36	40	No.33	…	…
# 8 (.164)	32	No. 29	36	No.29	…	…
# 10 (.190)	24	No. 25	32	No.21	…	…
#12 (.216)	24	No. 16	28	No.14	…	…
1/4	20	No. 7	28	No. 3	32	7/32
5/16	18	F	24	I	32	9/32
3/8	16	5/16	24	Q	32	11/32
7/16	14	U	20	25/64	28	13/32
½	13	27/64	20	29/64	28	15/32

1) Define the following terms:
   Nominal Diameter—
   UNC—
   UNF—
   UNEF—

2) How many threads per inch does a #8 UNF bolt have?

3) What size tap drill would be used for a NEF 5/16 bolt?

4) What similarities are there between a #5 UNC bolt and a #6 NF bolt?

5) With threads per inch in mind, which of the three types do you think is strongest?

Name _____

Occupational Outlook Handbook

Directions: Using your WEB browser, type in the address for the Occupational Outlook Handbook (http://stats.bls.gov/ocohome.htm) If this address does not work, use a search engine to locate the current address. Use the handbook to research information on Physical Systems careers. If you are unsure about careers in this area, ask your instructor to provide a list. Select one career to read about. After reading each section as listed below, write a short paragraph explaining what you have read.

1. Nature of the work
2. Working conditions
3. Employment
4. Training and qualifications
5. Job outlook
6. Earnings
7. Related occupations

Name _____

Divide and Conquer

Directions: Sometimes, in order to remember or organize information, it is important to divide your reading into segments and take notes on each section. Boot up and log on to www.howstuffworks.com and search for one of the topics below. Each topic will have several sub-topics explaining its theory or operation. Read a section at a time, record the heading for each section and write a paragraph summarizing each section before reading the next. When completed, you may be asked to report your findings to the class.

Alternative plan: the instructor can pull the topics from the Internet.

bridges
concrete
smart structures
sky scrapers
building implosion
robotics
snakebots
fuel cells

Name _____

Historical Research

Directions: Using an internet search engine, such as www.google.com or www.go.com, type in the name of your assigned person. After reading from at least three sources, prepare a short essay using the attached form.
Plan B: The instructor can provide printed materials on selected persons for the students to use as their reference material.

1. Construction - Charles Pajeau, Joseph Monier, Wolf Hilbertz, Patricia Billings, A C Gilbert, George A Fuller

2. Energy - William Grove, Buckminister Fuller, Rudolf Gunnerman, Lester Hendershot, Michael Faraday, William Sturgeon

3. Manufacturing - Charles Hall, Henry Ford

4. Robotics - Akhil Madhani, Karel Capek, Isaac Asimov, Joseph Engelberger, George Devol

Name _____

Recording Historical Information

Historical Person _____
Area of Contribution _____

References: www. _____
(At least www. _____
three) www._____
www. _____

Use the remainder of the page to summarize the person's contribution to technology.

Name: _____

Technology Jargon

Directions: Here is a list of words. Refer to the scrambled letters and find each word on the list by placing a circle around them.

D M W A P S O E C W G F C B S
G G A L N E C O N N H O H R C
H N O N D I M I I T N G O O I
Y I E I U P M K T S U F R A N
D T V R U F R A T O D T R D O
R N N T U O A R T J B B W C P
O I E S W T U C L I J O I A O
L R O T P C L K T A O L R S R
I P E M T A X U F U T N A T D
C N D I G W W K C N R H J I Y
S W O K A U D I O I S I E N H
P N E U M A T I C S R J N G M
B I O T E C H N O L O G Y G I
Y T I C I R T C E L E I A P L
G N I T F A R D S C L R I T L

AGRICULTURE
ANIMATION
AUDIO
BIOTECHNOLOGY
BROADCASTING
COMPUTER
CONSTRUCTION
DRAFTING
ELECTRICITY
HYDROLICS
LATHE
MANUFACTURING
MILL
NETWORKING
PNEUMATICS
PRINTING
ROBOTICS
VIDEO
HYDROPONICS

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SUGGESTED WEB SITES

(1) Learning Network Store Educators

This site contains a collection of tools you need to help kids create.

http://store.learningnetwork.com/static/teacher/literacy_t.html

(2) Top 10 Most Popular Sites for "Reading Literacy

This site contains a wide range of publications concerning reading literacy.

http://Search.msn…./results.asp?RS=CHECKED&FORM=MSNH&v=1&q=reading+literac

(3) A Tapestry of Reading

This site provides a list of activities and books pertaining to science, literature, biography, drama, etc.

http://store.learningnetwork.com/k12/teacher/cat?e=b&off_1n_id=100040156

(4) Books on the Menu

This is an activity in which the oldest children in an elementary school are trained to be "book mates" who choose and share books with the youngest children.

http://www.rif.org/programs/booksmenu.html

(5) For Kids

This site contains a list of additional web sites that have educational games, quizzes and language arts activities that can enhance reading skills.

http://www.rif.org/resources/kids.html

(6) A History of Reading by Alberto Manguel

This book celebrates the history of reading from clay tablets to the CD-ROM.

http://store.learningnetwork.com/k12/teacher/cat?e=b&off_1n_id=1000009963

(7) Ready-to-Use Reading Activities for the Elementary Classroom

This publication contains activities that can be photocopied for classroom use.

http://store.learningnetwork.com/k12/teacher/cat?e=b&off_1n_id=10000020223

(8) Motivational Activities

This site contains several read-together activities volunteers, older children and young readers.

http://www.rif.org/programs/bom_activities.html

(9) All About Reading is Fundamental

This site provides a brief history of the Reading is Fundamental program.

http://www.rif.org/about/index.html

(10) Family Fun

This site provides information showing how parental involvement is critical raising lifelong readers.

http://www.rif.org/fun/index.html

(11) Alternative Assessment Techniques for Reading & Writing

This book provides strategies for assessing reading and writing skills.

http://store.learningnetwork.com/k12/parent/cat?e=b&off_1n_id=1000138488

(12) Computing Activities Thru The Year

This book contains more than 50 activities to help students develop skills in word processing, graphic design and using the Internet.

http://store.learningnetwork.com/k12/tteacher/cat?e=b&off_1n_id=1000111911

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