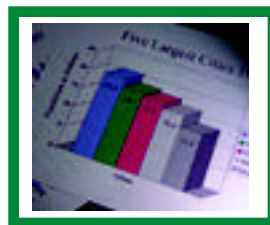


USING TABLES, CHARTS, AND DIAGRAMS

From the
MAPS AND GLOBES
Unit of Study



Teacher's Guide

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Using Tables, Charts, and Diagrams

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MAPS AND GLOBES UNIT OF STUDY

Grades 5 - 9

INTRODUCTION

This Unit of Study is designed for use in grades 5 - 9 as an introduction to the major ideas and concepts associated with the use of maps, globes, graphs, tables, charts, and diagrams.

INSTRUCTIONAL NOTES

Before presenting these lessons to your students, we suggest that you preview the videos and review this guide and the accompanying blackline master activities in order to familiarize yourself with their content.

As you review the materials presented in this guide, you may find it necessary to make some changes, additions, or deletions to meet the specific needs of your class. We encourage you to do so, for only by tailoring this program to your class will they obtain the maximum instructional benefits afforded by the materials.

It is also suggested that the video presentation take place before the entire group under your supervision. The lesson activities grow out of the context of the video; therefore, the presentation should be a common experience for all students.

UNIT GOALS

This Unit of Study is composed of four video presentations covering the topics of maps, globes, graphs, tables, charts, and diagrams. An understanding of map and globe skills is essential to developing an appreciation for the planet on which we live and its land and water resources. Because of the increased sharing of data and information in modern society, it is essential that students in this age group understand various tools for presenting information, such as tables, charts, graphs, and diagrams. Living in "the information age," it is important that students feel comfortable using tools that are so often used to present data and to organize ideas and plans.

After completing this Unit of Study students should be able to:

- Use maps and globes and their various features to identify locations, global relationships, and distances.
- Create bar graphs, line graphs, pie graphs, and pictographs
- Interpret information from tables, timelines, and diagrams
- Produce flow charts and storyboards

UNIT ASSESSMENT

The four-part Unit of Study, when purchased as a package, is accompanied by an assessment tool (**Unit Post-Test**) designed to test student comprehension of the Unit Goals.

USING TABLES, CHARTS, AND DIAGRAMS

LESSON OBJECTIVES

After viewing the video and participating in the accompanying activities, the students should be able to achieve the following objectives:

- Describe the organization and structure of tables, charts and diagrams.
- Interpret information from tables, charts and diagrams.
- Find information from time lines, tables, charts, and diagrams.

SUMMARY OF THE VIDEO

This video describes how tables, charts and diagrams are used to share data and information. Students need to be familiar with the structure of these tools for they are becoming more and more common methods of presenting information.

LESSON ASSESSMENT TOOLS

This lesson is accompanied by several assessment tools designed to help you determine student comprehension of the lesson objectives before the administration of the lesson, immediately following the video presentation, and after the lesson has been completed. A **Pre-Test (Blackline Master #1)** may be used prior to launching the lesson; a **Video Quiz (Blackline Master #2)** reflects the questions which appear on-screen at the end of the video; and a **Post-Test (Blackline Masters #10 and 11)** may be contrasted to the results of the other assessment tools to gauge the efficacy of the lesson.

TEACHER PREPARATION

View the video and review the accompanying activities. Duplicate any blackline masters you wish to distribute. If you plan to use the Video Quiz, which immediately follows the video presentation, you may wish to have copies of the quiz ready to distribute at the completion of the video program. Also, plan to pause the tape between questions if students require more time.

INTRODUCING THE VIDEO

Tell the students that the video they are about to see is about tables, charts and diagrams which are tools for sharing data and information. These are common methods for easily illustrating and organizing information. Many of these tools are found throughout textbooks such as history and math books. Students have probably used many of these tools before such as time lines and data tables.

VIEW THE VIDEO

Viewing Time is 10 minutes for the program and about 5 minutes for the Video Quiz.

FOLLOW-UP ACTIVITIES

BLACKLINE MASTER DESCRIPTIONS

Most of the follow-up activities for this program are designed for intermediate grades. An Answer Key appears on pages 4-7 of this guide.

- ***Blackline Master #1: Pre-Test*** is used to discern what students already know about maps prior to the administration of the lesson.
- ***Video Quiz*** is to be used at the end of the video program. At the completion of the video, there is a short quiz. The narrator will read the questions which are displayed on the screen. Students can use **Blackline Master #2: Video Quiz** to record their answers. Answers to the questions are provided in the Answer Key section of this teacher's guide.
- ***Reading Tables*** is the title of **Blackline Master #3**. This exercise requires students to answer questions based on information provided in a table on U.S. Computer Sales. (The next assignment uses information from the table on this Blackline Master.)
- ***Blackline Master #4: Computer Sales*** is an addition to the previous exercise. On this worksheet students are to make a bar graph based on information provided on Blackline Master #3.
- ***Blackline Master #5: Human Space Flight*** asks students to answer questions concerning the time line displayed at the top of the page.
- ***Blackline Master #6: Web Page Development*** suggests methods for organizing a school web page.
- ***Blackline Master #7: Diagrams: Following Directions*** instructs students to use the diagrams and written instructions to carry out the project.
- ***Blackline Master #8: Flow Chart*** is an illustration of how a flow chart can be designed to carry out a particular task or procedure.
- ***Blackline Master #9: Flow Chart - Make Your Own*** asks students to create their own flow chart using the proper chart symbols.
- ***Blackline Masters #10 & 11: Post-Test*** is the assessment tool to be administered at the completion of the lesson. You may contrast its results with those of the Pre-Test to gauge student comprehension of the lesson objectives.

DISCUSSION QUESTIONS

1. Discuss the importance of planning and how the use of charts such as concept maps, idea maps, and storyboards can assist in this planning and organization. Often people try to jump right into a project without using one of these tools to plan in advance what will happen. Though it may seem like an extra step but actually using one of these planning strategies will help in the long run.
2. Ask if anyone has ever assembled something that came with diagrams as well as written directions. Ask them to imagine what it would have been like to try and assemble the object without the diagrams. Many people rely heavily on the diagrams often choosing to ignore the written directions.

ENRICHMENT ACTIVITIES

1. Have students assemble a booklet of examples that illustrate the use of tables, charts and diagrams. Where did the example come from and how was it being used?
2. Many hard to visualize ideas such as the internal workings of equipment or the structure of the earth are presented in diagram form. Students could select an item such as a toaster, golf ball, or a shoe and create a cross-sectional diagram of the item.
3. Students could bring in cross-sectional diagrams that are often found with household appliances as "How to Install" instructions.

ANSWER KEY

• PRETEST, Blackline Master #1

1. Average Yearly Income
2. 17
3. Chile 770
4. Switzerland, Japan, Denmark, Sweden, U.S.
5. A storyboard is used to plan a multimedia production like a video or PowerPoint project.
6. A concept map is a way to illustrate scientific and historic information and how concepts are related to one another.
7. A flow chart is a method for illustrating a process step by step.
8. A time line is a chart that shows when events took place.
9. A diagram is used to show how something works.
10. They give an internal view of how things work.

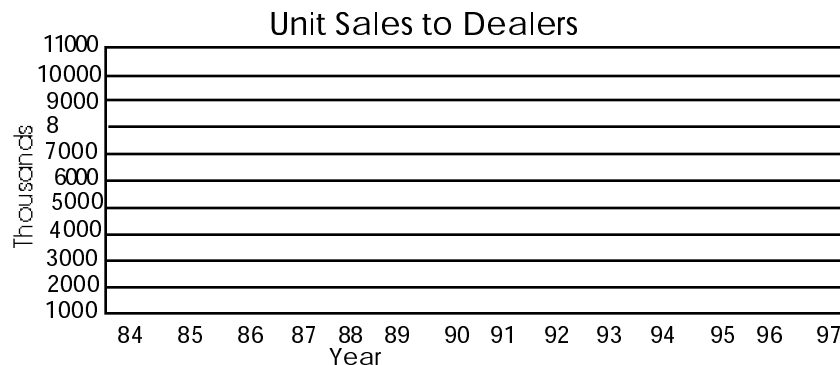
• **VIDEO QUIZ, Blackline Master #2**

1. Projected Population for the Year 2025
2. millions
3. 335,100,000
4. China
5. Australia
United Kingdom
France
Germany
Japan
United States
India
China
6. Time Line
7. Organization chart
8. Flow chart
9. A storyboard is a way to plan a project from start to finish.
10. A concept map is used to illustrate scientific or historical concepts. The main concept is placed at the top of the chart and then specific details are connected by links that use descriptive words to show the relationship between concepts.

• **READING TABLES, Blackline Master #3**

1. U.S. Computer Sales
2. thousands to unit sales millions to dollar sales
3. Electronic Industries Association, Arlington VA
4. 1985-87
5. \$16,585,000,000
6. 6,725,000
7. 1995
8. \$95,574,000,000

• **COMPUTER SALES, 1984-1997, Blackline Master #4**



• **HUMAN SPACE FLIGHT, Blackline Master #5**

1. Human Space Flight 1961- 1970
2. 6/16 1963 Russia
3. Yuri Gagarin Russia
4. John Glenn 2/20/62
5. Alan Shepard 5/5/61
6. 10 months
7. Russia
8. 26 months
9. 3/18/65
10. 37 years

• **WEB PAGE DEVELOPMENT, Blackline Master #6**

Answers will vary

• **DIAGRAMS: FOLLOWING DIRECTIONS, Blackline Master #7**

When completed the result is a three dimensional pyramid

• **FLOW CHART, Blackline Master #8**

The result will be to have added the two numbers together for a total of 93

• **FLOW CHART - MAKE YOUR OWN, Blackline Master #9**

Answers will vary

• **POST-TEST, Blackline Masters #10 & 11**

1. National Parks
2. Number of visitors to National Parks
3. 9,989,000 visitors
4. 1,869,000
5. 7,876,000
6. Great Smokey Mts. 10 million
Grand Canyon 4 million
Yosemite 4 million
Olympic 4 million
Yellowstone 3 million
Rocky Mountains 3 million
Grand Teton 3 million
Acadia 3 million
Zion 2 million
Mammoth Cave 2 million
7. 38 million
8. Rocky Mountains
9. 14,000 feet
10. 5,000 feet
11. American History 1760-1800
12. 1760 to 1800
13. 1770

14. 1765
15. 8 years
16. Students should place the events in the appropriate location on the chart
17. A storyboard is a planning method used for organizing what will happen at the beginning, middle and end of a video project or other multimedia production.
18. A concept map is used to illustrate scientific or historical events or concepts. The main concept is placed at the top and then other related concepts are connected by links which contain words showing how they are related.
19. A flow chart is used to show the steps in a process.
20. A cross-sectional or cutaway diagram is used to show the internal workings of something usually machinery.
21. A diagram is often used to show how things are organized, built or related.

USING TABLES, CHARTS, AND DIAGRAMS

Script of Narration

Here is a satellite view of Chicago, Illinois. Located in the middle of the United States, this city has always been an important link to destinations in all directions. For years the airports in Chicago have been the busiest in the world. Midway airport held the top rank until 1962 when O'Hare airport took over as the world's busiest airport. Here is a table downloaded from the Internet that shows the ranking of airports worldwide. Notice O'Hare is ranked as number one with over 70 million passengers each year. Midway is ranked eighty-sixth with almost 10 million passengers.

On some tables things are organized in general categories. For instance on this table of farms in the United States, one general category would be specific states. Another general category is the number of farms in that state. So to find out the number of farms in Oklahoma we would find the name of the state and then move down to the number that indicates how many farms are in that state.

Many tables represent large numbers which would confuse things on the table. Large numbers with many zeros could easily clutter up a table and make it so difficult to read that the table becomes useless. So the zeros are often dropped and words such as "in thousands" in parentheses or "numbers in thousands". If the table is representing money it may say "millions of dollars" or "billions of dollars". So in this example of a table showing the total personal income of people in the World by country the words "in billions of dollars" are used. This means that 403.5 doesn't mean four hundred three dollars and fifty cents. It means four hundred three billion five hundred million.

Now let's take a look at the four kinds of charts -- illustrated charts, time lines, flow charts, and organization charts. Organized charts are often used to show the organization of a company or how different departments interact with each other. Here is a chart that illustrates how the three parts of the government are organized. Let's look more closely at the Executive Branch of the government. The president is listed at the top of the chart. Then comes the Vice President and various cabinet positions. Generally the higher up the chart the greater the responsibility the position holds.

Flow charts show the steps in a process. They were once used during the process of planning a computer program. Now they are used to show other step by step processes. Squares, rectangles, circles, diamonds, and arrows are used to show the flow. Circles are usually used to show the beginning and ending points of the flow chart. Rectangles and squares give instructions and information. Diamond shaped figures contain questions. If the answer to the question is "yes" then an arrow directs the user in a particular direction along the flow chart. If the answer is "no" then a different arrow directs the flow in a different direction.

An illustrated chart is like a pictograph in that pictures are used to illustrate or symbolize specific information. On this illustrated chart three natural resources oil, coal, and iron are shown for three countries. The color of each symbol has a special meaning. It is shown in the key for the chart. Notice that green means excellent resources, brown means good supplies, and red means poor. If you wanted to see how oil resources in Japan are you would look at the top of the chart for the category oil and then along the left side of the chart for Japan. Then by moving across and down you would find where the two intersect and find the appropriate information in this case a symbol that means poor resources.

Another common type of chart is called a time line. You often find them used in history text books. To locate information on the time line such as the year the United States entered World War II you would first find the words US Enters WWII and then follow the line over to the time line to see that it was in 1941. Often time lines are made more interesting to look at with the addition of graphics illustrating the various activities highlighted on the time line.

A diagram is an illustration that can be very helpful when building or fixing something. You probably have used a diagram when assembling a model. The illustrations clarify the written directions and in many cases can eliminate the need for complicated written directions. Cutaway or cross section diagrams are used to illustrate the internal workings of equipment. They illustrate how parts are organized inside the machinery. Illustrations like these may be very complicated so they need to read carefully. A cross section diagram of the earth illustrates what scientists believe the interior of the earth is like. These kinds of diagrams are very useful for illustrating hard to visualize concepts.

Visual diagrams can be used to assist in the organizing of ideas or concepts. They can help people plan, problem solve, or visualize difficult concepts. A very common diagram is called a concept map. This type of diagram is used to visualize and illustrate scientific or historical concepts. The main concept is placed at the top of the concept map and then specific details are connected by links that use descriptive words to show the relationship between concepts.

An idea map is used during brainstorming situations where the goal is to create a list of many ideas or thoughts on a specific subject or problem. The main idea is placed in the middle and then related ideas are linked outward from that main idea. These new ideas have details connected to them with links.

A storyboard can be used to plan a video production, a multimedia presentation, or a series of web pages. When planning a video production it really helps to make a storyboard. It is simply a plan for how the action will

progress during the video. How will the video begin, progress, and end. It can be organized in a very simple way using a piece of paper divided down the center. On the left side of the paper three or four boxes are drawn. In each of these boxes a different scene of the video is drawn. On the right side of the paper the audio part of the video is written in. The various scenes of the video are planned out and organized so that everyone involved can visualize the action and order of events. When planning a multimedia project or web page project where it is possible for hyperlinking between pages it pays to plan things in advance. Let's look at a web page design project. Start with the main page or what is called the homepage. Let's say the assignment is to design a personal web page. So you may start on the homepage by identifying yourself. Then other pages might be identified and set up to include topics such as family, your birth, favorite hobbies, favorite sports, favorite vacation spots, favorite music, etc. Then on each page written material and pictures would be added. Finally navigation between the pages would be planned. Each page would have a link back to the homepage and the homepage would include links to each individual page. By planning in advance the entire series of pages can be visualized and developed more efficiently.

Another kind of chart is used to explain how things happen. This chart is used to show the steps of how a bill becomes a law. We start at the top of the chart and follow the sequence. Boxes identify various steps and lines connecting the boxes show how one step leads to another. This may be a simplified version of how a bill becomes a law but it provides the basics of how the process works. First the bill is introduced by a legislator. Then it is referred to a committee. The committee holds hearings to determine the bill's worthiness. If the committee likes the bill they send it back to the legislature for a vote. If it is approved by both houses of legislature it goes to the chief executive -- a governor or president -- who may sign it into law.

So tables, graphs, charts, and diagrams are designed to help share data and information in quick and easy to understand ways. They can be used to make assignments for school such as science fair projects interesting and clear.

Maps and Globes Unit of Study

USING TABLES, CHARTS, AND DIAGRAMS BLACKLINE MASTERS

- Blackline Master #1: Pre-Test
- Blackline Master #2: Video Quiz
- Blackline Master #3: Reading Tables
- Blackline Master #4: Computer Sales, 1984-1997
- Blackline Master #5: Time Lines
- Blackline Master #6: Web Page Development
- Blackline Master #7: Diagrams: Following Directions
- Blackline Master #8: Flow Chart
- Blackline Master #9: Flow Chart - Make Your Own
- Blackline Masters #10 & 11: Post-Test



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Using Tables, Charts, and Diagrams

PRE-TEST

DIRECTIONS: Answer the following questions in the space provided. Use the table on the right to answer the first set of questions.

1. What is the title of this table? _____

2. How many countries are being compared? _____

3. Which country represented has the least average income?

4. Put the five countries with the highest average yearly income
in order from highest to lowest.

Average Yearly Income
(given in US dollars)

Argentina	7,290	Brazil	3,202
Chile	770	Canada	20,670
Mexico	3,750	Austria	23,120
Denmark	26,510	France	22,960
Germany	23,560	Italy	19,620
Switzerland	36,410	Sweden	24,830
U. K.	17,970	China	490
Japan	31,450	Australia	17,510
US	24,750		

5. What is the purpose of a storyboard? _____

6. What is a concept map? _____

7. What is a flow chart? _____

8. How is a time line used? _____

9. What is a diagram and how is it used? _____

10. What are cutaway or cross sectional diagrams? _____

Using Tables, Charts, and Diagrams

VIDEO QUIZ

DIRECTIONS: At the end of the video production is a short quiz. You may write the answers to the quiz on this sheet.

Projected Population for the Year 2025 (millions)

Australia	23.1	China	1,492	France	63
Germany	79.3	India	1,384	Japan	125
United Kingdom	62.5	United States	335.1		

1. What is the title of this table? _____
2. The numbers are given in what unit? _____
3. The 335.1 given for the United States stands for _____
4. Which country will have the greatest population in 2025? _____
5. Put the countries from this table in order from smallest population to largest population.

6. If you were preparing a presentation to describe the events over the past five years, which type of chart would you choose as a visual aid - illustrated chart, time line, flow chart, or organization chart (circle one)?
7. If we wanted to show how a companies leadership was structured what type of chart would we use - illustrated chart, time line, flow chart, or organization chart (circle one)?
8. To show the steps in a process we would use - illustrated chart, time line, flow chart, or organization chart (circle one)?
9. What is a storyboard? _____
10. What is a concept map? _____

Using Tables, Charts, and Diagrams
READING TABLES

DIRECTIONS: Use the information provided in the table below to answer the questions that follow.

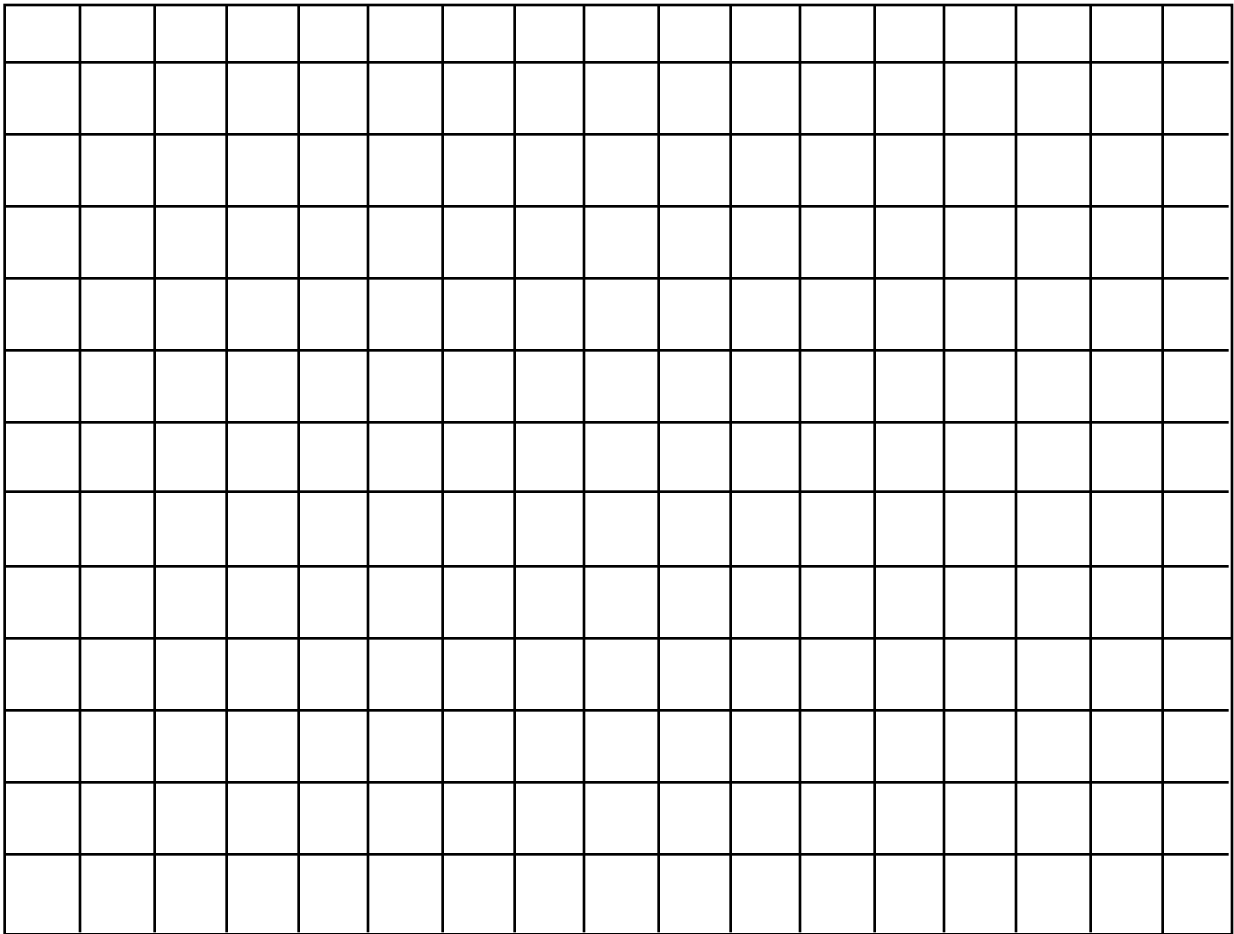
U.S. Computer Sales		
Year	Unit sales to dealers (thousands)	Dollar sales to dealers (millions)
1984	3,975	\$ 2,385
1985	3,200	2,175
1986	2,950	3,060
1987	3,125	3,100
1988	3,500	3,340
1989	3,900	3,711
1990	4,000	4,187
1991	3,900	4,287
1992	4,875	6,825
1993	5,850	8,190
1994	6,725	10,088
1995	8,400	12,600
1996	9,400	15,040
1997	10,700	16,585

Source: Electronic Industries Association, Arlington, VA

1. What is the title of this table? _____
2. Are the unit sales to dealers in hundreds, thousands, or millions? _____
How are the dollar sales to dealers expressed? _____
3. From where did the information for this table come? _____
4. A few years saw a drop in units sold. What years saw those drops? _____
5. What was the dollar amount for sales in 1997? _____
6. How many more units were sold in 1997 than in 1984? _____
7. Which year saw the greatest increase in units sold? _____
8. From 1984 to 1997 how much money was spent in computers sales? _____

Using Tables, Charts, and Diagrams
COMPUTER SALES, 1984-1997

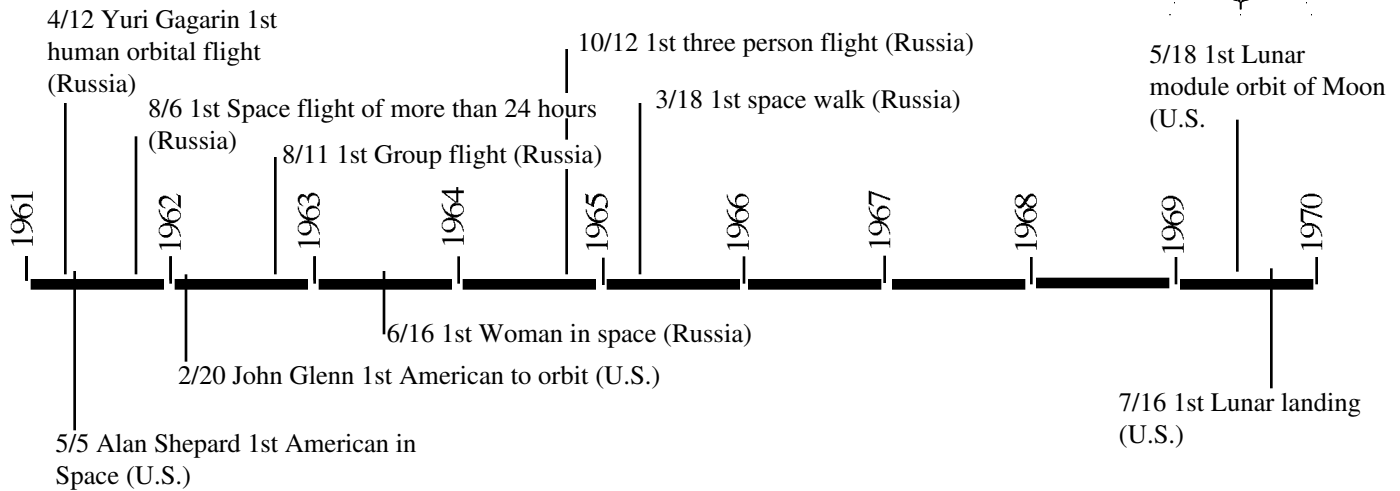
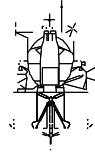
DIRECTIONS: Use the information on worksheet 2 to create a line or bar graph that represents the number of computer units sold to dealers from 1984-1997.



Using Tables, Charts, and Diagrams

TIME LINES

Human Space Flight 1961 - 1970

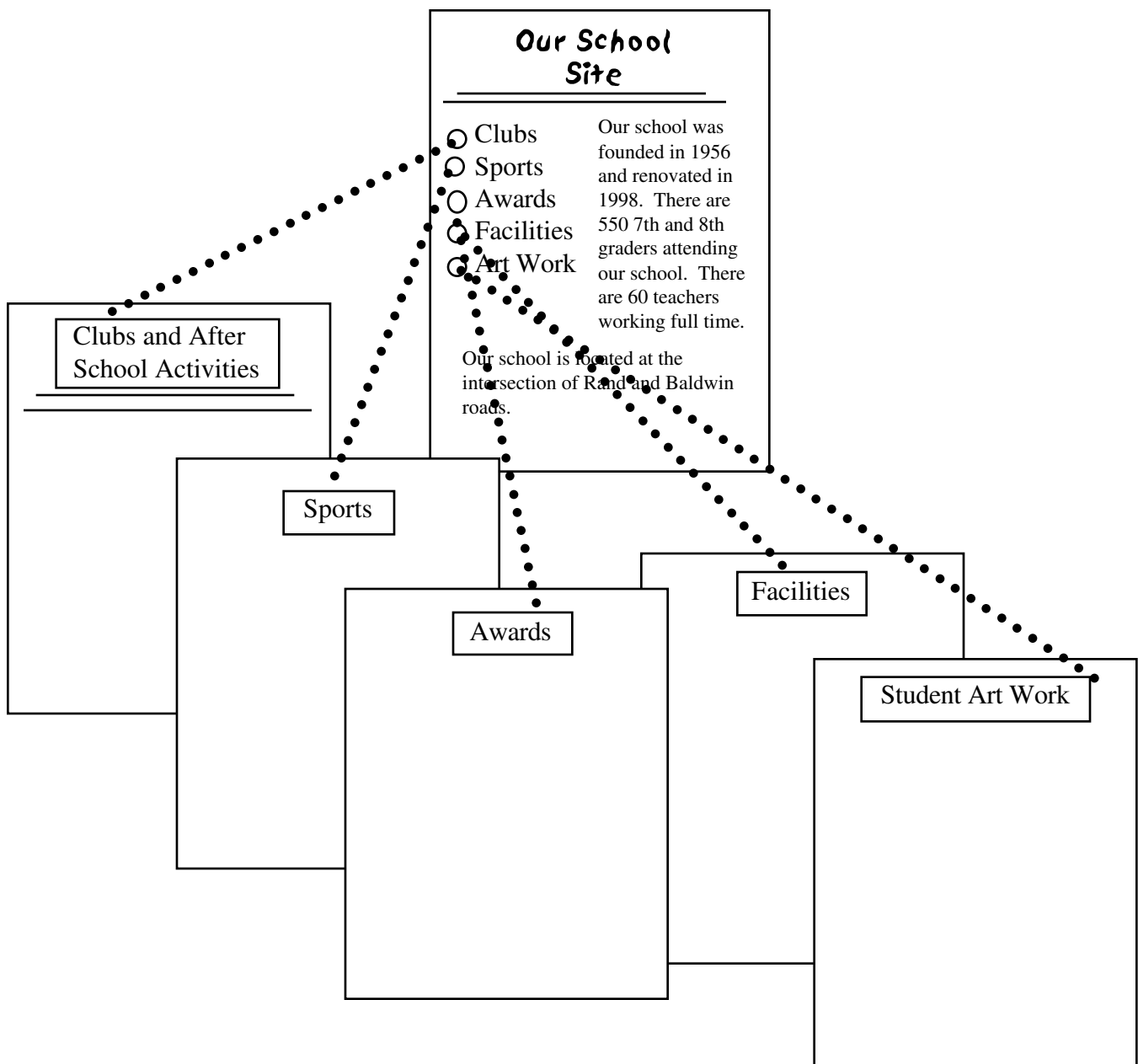


- What is the title of this time line? _____
- When did the first woman fly into space? _____
What country was she from? _____
- Who was the first human to orbit the earth? _____
What country did he represent? _____
- Who was the first American to orbit the earth? _____
When did he take that flight? _____
- Who was the first American to fly into space? _____
- How many months were there between the 1st Russian orbital flight and the first American orbital flight? _____
- Which country seemed to be leading the space race during the period of time between 1961 and 1965? _____
- How many months were there between the first man to orbit the earth and the first woman to orbit the earth? _____
- When was the 1st space walk? _____
- John Glenn flew in space once again in 1999. How many years separated that flight and his historic flight as the first American to orbit the earth? _____

Using Tables, Charts, and Diagrams

WEB PAGE DEVELOPMENT

DIRECTIONS: You have been given the assignment of developing your school's web pages. Use pieces of notebook paper or a word processing program to design each page. Each page should have a unique name for linking purposes. Have a title for each page and include clip art and digital pictures. Write down the content for each page and organize this content in an appealing fashion. You may want to use frames and wrap text around pictures and clip art. Be sure to include hyperlinks to other pages. Use blue colored text to show the links. Mark where they will link in parenthesis. Remember to include a link back to the homepage on each additional page.



Using Tables, Charts, and Diagrams

DIAGRAMS: FOLLOWING DIRECTIONS

DIRECTIONS: Follow the directions and use the diagrams to help make the project described below.

Materials: 5" X 8" index card pencil glue scissors metric ruler compass

Procedure:

1. Open the compass to the largest diameter that will fit the width of your index card without touching or falling off the edges.
2. Draw a circle at the left end of the card as close as possible to the left edge without falling off (see illustration A).
3. When finished with the circle, don't change the radius setting. Make a small pencil mark at the top of the circle as shown in illustration B.
4. Place the compass point on this top mark and in a clockwise direction around the circle, draw a small arc where the compass radius crosses the circle.
5. Repeat this by moving the compass point to the new arc and drawing a new arc. Continue until there are 4 arcs as shown in illustration B.
6. Use your ruler to draw in the straight solid and dashed lines as shown in illustration C. Be careful. You should end with three equilateral triangles.
7. Use the ruler to extend the lines to make a fourth triangle that lies outside of the circle as shown in illustration D.
8. Now make glue flaps as shown in illustration D.
9. Use the scissors to cut out the 4 triangles including the flaps. Then use the ruler to help make straight creases. Then put glue on the flaps and fold the tetrahedron together.

Illustration A

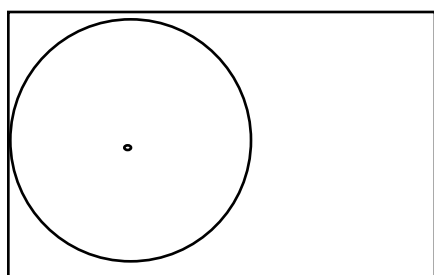


Illustration B

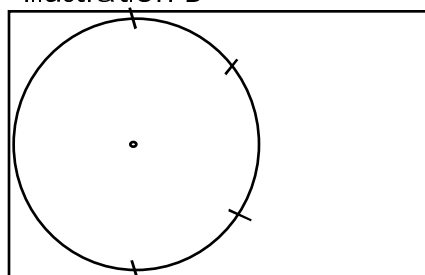


Illustration C

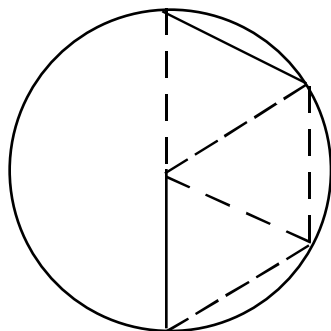
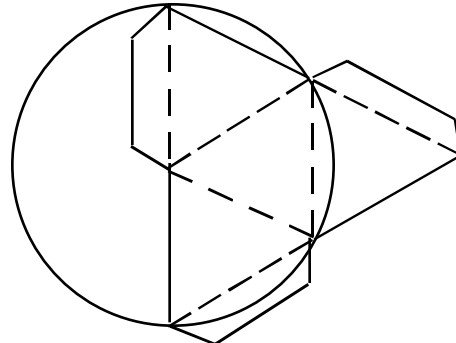


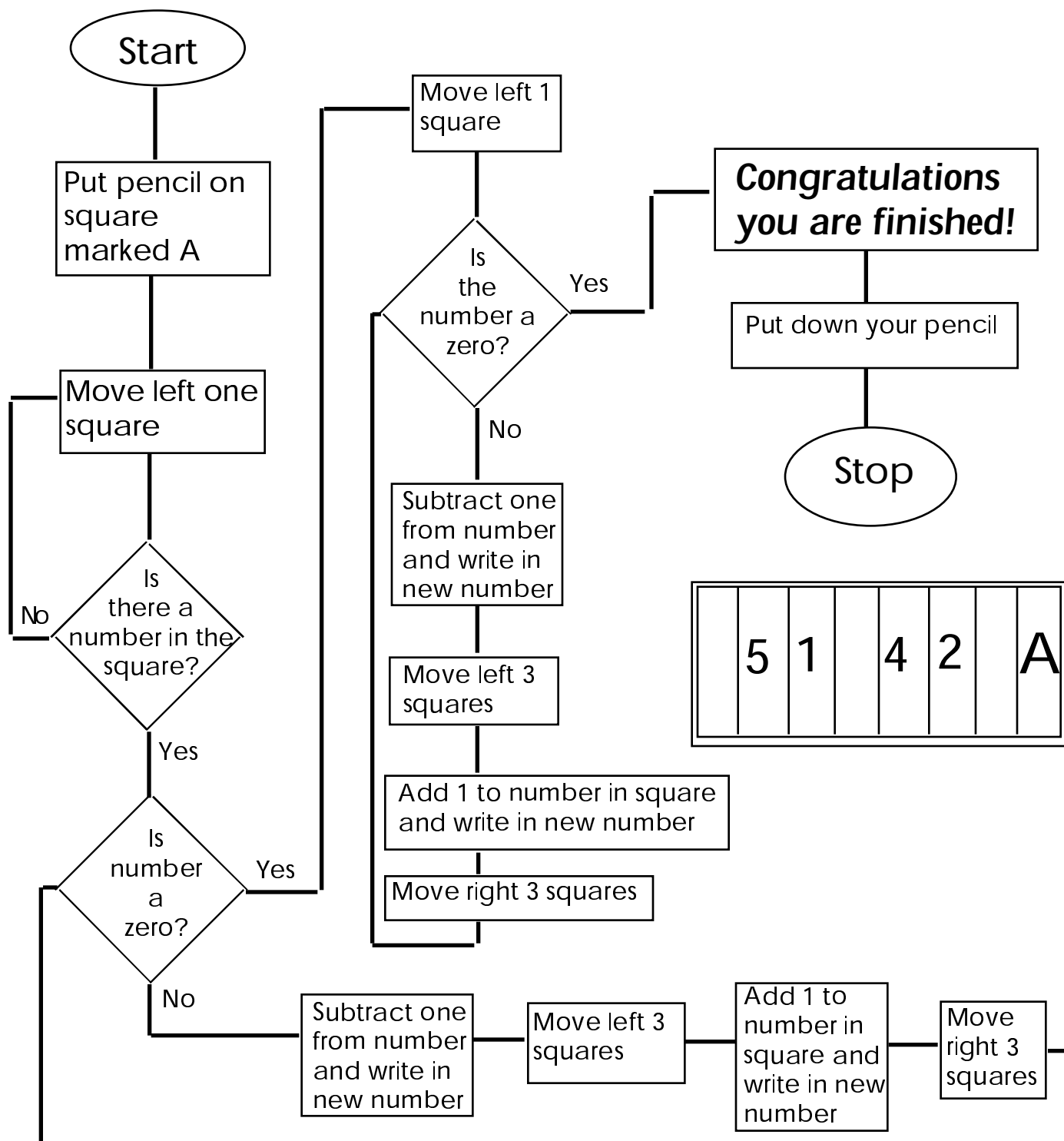
Illustration D



Using Tables, Charts, and Diagrams

FLOW CHART

DIRECTIONS: Follow the instructions in the flow chart below.



Using Tables, Charts, and Diagrams
FLOW CHART - MAKE YOUR OWN

DIRECTIONS: Design a flow chart for making a phone call. Remember to use the flow chart symbols: square or rectangle for information or instruction, circle or ellipse for start and stop, and diamond for questions.

Using Tables, Charts, and Diagrams
POST-TEST (Page One)

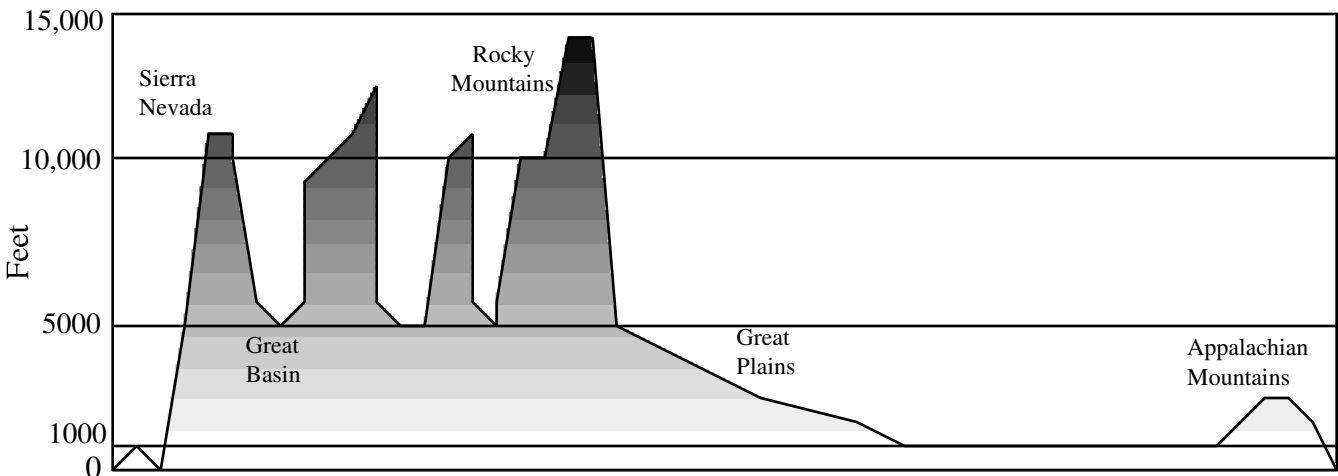
DIRECTIONS: Use the information from the table to answer the following questions.

1. What is the title of this table? _____
2. What information is this table sharing? _____
3. It says Great Smokey Mountains 9.989. What does that mean? _____
4. The Grand Canyon has how many more visitors than Zion National Park? _____
5. How many more visitors attend the Great Smokey Mountains compared to Mammoth Cave? _____
6. Round off each of the parks numbers of visitors to the nearest million.
 Great Smokey mts. _____
 Grand Canyon _____
 Yosemite _____
 Olympic _____
 Yellowstone _____
 Rocky Mountains _____
 Grand Teton _____
 Acadia _____
 Zion _____
 Mammoth Cave _____

National Parks (in millions of visitors)	
Great Smokey Mts.	9.989
Grand Canyon	4.239
Yosemite	3.657
Olympic	3.577
Yellowstone	3.120
Rocky Mountains	3.035
Grand Teton	2.757
Acadia	2.594
Zion	2.370
Mammoth Cave	2.113

7. From this information what is the annual number of visitors to the top ten national parks? (round off numbers to the nearest million) _____

DIRECTIONS: Use the information from this cross -sectional diagram to answer the following questions.



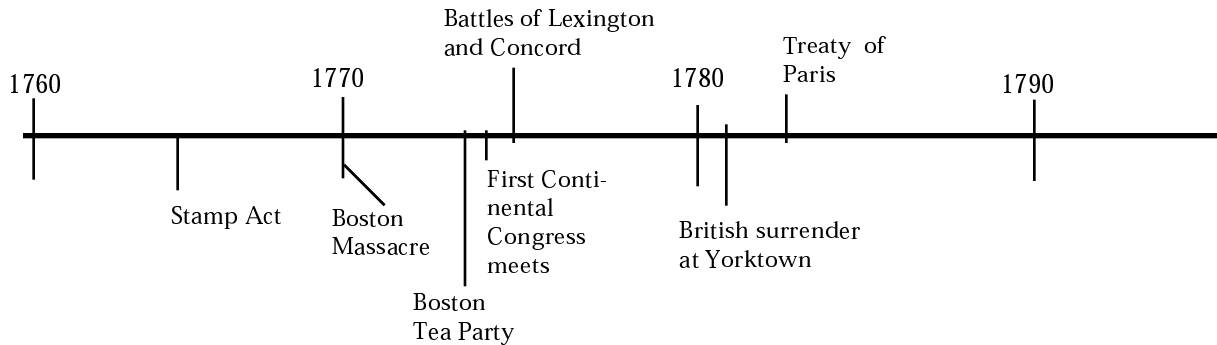
8. The highest mountains in the United States are a part of what chain? _____
9. About how tall are the highest mountains in the U.S.? _____
10. About how tall are the Appalachian Mountains? _____

Using Tables, Charts, and Diagrams

POST-TEST (Page Two)

DIRECTIONS: Use this time line to answer the following questions.

American History 1760-1800



11. What is the title of this time line? _____
12. What years are shown on this time line? _____
13. When did the Boston Massacre take place? _____
14. When was the Stamp Act passed? _____
15. If the Battles of Lexington and Concord started the Revolutionary War and it ended with the Treaty of Paris, how many years did the war last? _____
16. Put the following events on the time line.
 George Washington becomes president 1789
 Bill of rights 1791
 John Adams becomes president 1797
 France became an ally 1778

DIRECTIONS: Answer the following questions in the space provided.

17. What is the purpose of a storyboard? _____

18. What is a concept map? _____

19. What is a flow chart? _____

20. What are cutaway or cross sectional diagrams? _____

21. What is a diagram and how is it used? _____
