

SAY IT WITH A GRAPH

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Tazewell Middle School, Tazewell, VA

GRADE LEVELS:

5th – 8th grades

TIME ALLOTMENT:

4- 45 minute blocks

SUBJECT MATTER:

Social Studies, Science, Language Arts, Math

OVERVIEW:

This lesson will focus on the four main types of graphs. The students will learn about the organization, structure and use of line graphs, pie charts, bar graphs, and pictographs. The students will create graphs to represent data and information. The students will interpret graphs by working with the name of the graph, the x-axis and the y-axis values.

They will identify the independent and dependent variable. Then students will use their language arts skills to write a persuasive and descriptive article about a fictional place for a travel brochure. Using a graph, the students will write the article encouraging people to visit their exciting place. The graph will support the student's description of the place and/or reason for visiting that particular place.

LEARNING OBJECTIVES:

Students will be able to:

- Define/differentiate between the four major types of graphs.
- Describe the use of the four kinds of graphs: line, bar, pie, and pictographs.
- Read and interpret information from various graph types.
- Determine what variable goes on the x- and the y-axis of a graph.
- Define/differentiate between independent and dependent variable.
- Write a descriptive and persuasive article on a fictional place, using a graph.

STANDARDS:

State Standards:

The objectives listed may be used in part to address the Virginia Standards of Learning at <http://www.pen.k12.va.us>

VA SOL Math (5.18, 6.18, 7.17, 8.12)

VA SOL Science (5.1, 6.1, LS.1, PS.1)

VA SOL Social Studies (USI.1, USI.2, CE.1, WHI.1)

VA SOL Language Arts (5.8, 6.6, 7.8, 8.7, 9.6)

MEDIA COMPONENTS:

Video:

Geography Basics: Globes, Maps, & Graphs – United Streaming –
<http://www.unitedstreaming.com>

Computer
TV

MATERIALS :

Materials needed for Introductory Activity:

- a mini bag of M&Ms or Skittles per student
- 1 piece of clean paper to make graph on
- 2 licorice twists per student
(Optional: can be given to a group of 2 each)

Materials needed for Learning Activity:

- Computer(s)
- Television
- Pencil
- CD with United Streaming video (if downloaded onto CD)
- Graphs and Graph Information Sheet

Materials needed for Culminating Activity:

- Graphs (line, bar, pie, and pictographs)
- Computers with Microsoft Word or other writing program
- Printer or save to a disk
- Template for brainstorming

PREPARATION FOR TEACHERS:

- ✓ Download the United Streaming videos to your desktop or download the United Streaming videos to a CD.
- ✓ Make sure you go through the instructions from the student materials handouts so that you understand and are familiar with the lesson format and what the students need to do or understand for the lesson.
- ✓ When using media, always provide the students with a *Focus for Media Interaction*, which is a specific task to complete during or after viewing video segments, Web sites, or other media material.
- ✓ Have copies made of the Graph Information Sheet (see end of lesson).
- ✓ Have copies of graphs for students to use to write their persuasive article.
- ✓ Students need to know what independent and dependent variables are.

Introductory Activity

Tell students that we are going to make an unusual graph.

1. Pass out a large, clean sheet of paper. Now, have the students get the 2 twists of licorice and place them on the inside edges of the paper in a 90 degree figure, leaving enough

room on the outside edges of the licorice to write the values or variables on the axis.

Ask: “Where is the y-axis?”(on the vertical line) “Where is the x-axis?” (On the horizontal line) **Say,** “We are now going to do a bar graph.” Have the students label the x- and y-axis. **Ask,** “What variable goes on the x- axis?” (independent variable) “Where does our dependent variable go?” (on the y-axis)”

- 2. Say,** “Now, I’m going to give each of you a mini pack of M&Ms (or Skittles). I do not want you to eat them yet. Yes, you will get to eat them when we are finished. Take the candy out of the package and make a vertical bar with all the yellow candies by stacking them one above the other, beginning above the horizontal licorice. (The licorice is the x-axis.) Now do the same with red as the next vertical bar. Next, we’ll do blue, orange, green, and brown.” Give the students time to graph their data. When they are finished, **ask** each group, “What color did you have the most of? Which color did you have the least of? If you looked at your neighbor’s graph, would you have to count the colors to answer those questions or can you just look at the graph and answer?” (just look at the graph) “Can you think of another way to graph these M&Ms (or Skittles)?” (Accept reasonable answers.) “What is our independent variable?” (the colors of the candy) “What is our dependent variable?” (the number of each color of candy)
- 3. Say,** “We are now going to be learning about the four major types of graphs. We are used to making and reading graphs in math, but we use them in science, social studies, and other academic areas as well as in math. We are going to watch a video that will tell us why we use graphs and why we use each different kind of graph.”

LEARNING ACTIVITIES

*Note to teacher: Have the United Streaming video downloaded to desktop or on CD ready for viewing before class starts.

- 1. Focus for Media Interaction:** **Say,** “Today, we are going to watch a video on graphs, why we use graphs, and the different kinds of graphs. I want you to watch and be able to tell me what they say a graph is. I want you to tell me after viewing this, what you need to do before using a graph and what the first graph shows.” **Start video** when you **see** the word *Graphs* and **hear** “Now we’re going to talk about graphs.” **Pause** when you **see** *in billions* and **hear,** “The number will be given in billions.” **Ask:** “What did the video say a graph is?” (a device that helps us) “What do you need to do before using a graph?” (look at the title) “What does the first graph show?” (the world’s population during a 100 years)
- 2. Focus for Media Interaction:** **Say,** “During this next segment I want you to see what the video is referring to when it says ‘...we get down to the specifics.’ Also, I want you to tell me what goes on the vertical axis and the horizontal axis of this graph.” **Resume** and **Pause** when you **see** the graph completed but without bars or lines and **hear** “...the years in which the populations has been tabulated or projected.” **Ask:** “What are the specifics that the video referred to?” (the vertical and horizontal axis) “What does the vertical axis of this graph show?” (the number of people or population) “What does the horizontal axis of this graph show?” (the basis of comparison)

3. **Focus for Media Interaction:** **Say**, “Next, I want you to listen for the name of the graph and how to locate specific information on this graph.” **Resume** and **Pause** when you **see** a full graph with lines drawn from x-axis to y-axis and **hear** “Remember, the numbers shown are in billions.” **Ask**: “What is the data shown on?” (a bar graph) “What is the graph called?” (a vertical bar graph) “How do you locate specific information on this graph?” (Locate the top of the bar and then look at the vertical axis when they both meet.)
4. **Focus for Media Interaction:** **Say**, “Now, I want you to listen and find out how a bar graph might be fixed for more detailed information. What can you do with this kind of bar graph?” **Resume** and **Pause** when you **see** taxis on a busy street and **hear** “...plains, trains, ships, buses, and cars require energy to move.” **Ask**: “How might a bar graph be fixed for more detailed information?” (the bars in the bar graph can be divided into sections) “What can you do with this kind of bar graph?” (You can make some educated guesses) “What is the educated guess made from this graph?” (The United States uses far more energy than any other nation.) “Why?” (The U.S. has a much more extensive transportation system.)
5. **Focus for Media Interaction:** **Say**, “We’re going to look at another graph that is similar to the first graph, but is different. Listen for what this graph is called and what is its title? Also, be able to tell me what goes on the vertical and horizontal axis.” **Resume** and **Pause** when you **see** the horizontal bars completed on the graph and **hear** “...those things to be compared along the vertical axis.” **Ask**: “What is this kind of graph called?” (horizontal bar graph) “What is the title?” (Leading Steel Producing Countries) “What almost always lies along the horizontal axis?” (numerical data) “What usually goes along the vertical axis?” (those things to be compared)
6. **Focus for Media Interaction:** **Say**, “In this next section I want you to listen and tell me why the bars of the graph are segmented? Which country produces the most stainless steel? How much more carbon steel is made in China than Russia?” **Resume** and **Pause** when you **see** the number 60 flashing at the bottom of the graph and **hear** “...60 million metric tons is the answer.” **Ask**: “Why are the bars of the graph segmented?” (to show 2 or more classifications of data) “Which country produces the most stainless steel?” (Japan) “How much more carbon steel is made in China than Russia?” (60 million metric tons) “Now, why do we use bar graphs?” (for comparison)
7. **Focus for Media Interaction:** **Say**, “Now we’re going to look at line graphs. When we have finished watching this part of the video, be prepared to answer the following questions: What do line graphs show? What does this specific graph show? What do scientists use this data for?” **Resume** and **Pause** when you **see** a tractor plowing a field and **hear** “...after scientists recognized the trend.” **Ask**: “What do line graphs show?” (trends or movement over time) “What does this specific graph show?” (during the past 50 years the desert lands have grown from 18.5% of all the world’s land to almost 20%) “What do scientists use this data for?” (to predict future trends and to develop strategies to solve problems).
8. **Focus for Media Interaction:** **Say**, “Now, I want you to watch for the reason why we use multiple line graphs (graphs with more than one line). What is the title of this graph

and how do these kinds of graphs help diplomats and other officials?” **Resume** and **Pause** when you **see** a lady putting tomatoes into a blue basket and **hear** “...billions of people who will be born in the years to come.” **Ask**: “Why do we use multiple line graphs?” (They are used to compare trends.) “What is the title of this graph?” (Population Growth) “How do these kinds of graphs help diplomats and other officials?” (to plan for the future)

9. **Focus for Media Interaction: Say**, “Now, we have found out that bar graphs are used to show what? (comparison) Line graphs are used to show what? (trends or movement over time) Let’s look at another kind of graph. Let’s watch to see what this graph is called and why is it called that? Using the graph, be ready to tell which occupation has the most workers in Brazil and which has the smallest number of workers?” **Resume and Pause** when you **see** 2 pictures come on the screen on top of the pie graph and **hear** “...obviously transportation and communication.” **Ask**: “What is this graph called?” (a pie graph) “Why is it called by that name?” (It is circular and is divided into wedges) “Which occupation in Brazil has the most workers?” (Service) “Which has the smallest amount of workers?” (transportation and communication)
10. **Focus for Media Interaction: Say**, “The next graph we are going to look at in this video is the pictograph. After this segment, be ready to answer the following questions: What is a pictograph also called? What represents data in a pictograph? What is the key used for in a pictograph?” **Resume** and **Stop** when you **see** the graph with the title “*Wheat Production*” and **hear** “...it produces 110 million metric tons of that grain.” **Ask**: “What is a pictograph also called?” (a picture graph) “What represents data in a pictograph?” (small drawings or symbols) “What is the key used for in a pictograph?” (It explains what those symbols mean.)
11. If time permits for the 1st day, review each graph. **Ask**: “What are the four main types of graphs? Why is a bar graph used? Why are line graphs used? What is on the x-axis? What is on the y-axis? Why are circle graphs used? What is a pictograph? What do all graphs need?”

2nd Day

Before beginning the second day, refer to what students have learned the previous day. Review the 4 main types of graphs: bar, line, pie chart, and pictograph. Ask students the use of each type of graph. Ask the students what each graph must have. (It would be a good idea to use a graph and demonstrate how a graph is read-what to look for and what to identify.)

1. **Say**, “Today you are going to read and interpret graphs. You will work with a partner to do this. First, however, let’s review what we know about graphs. Where is the x-axis? (on the horizontal line) Where is the y-axis? (on the vertical line) What do all graphs have to have? (A title, values on the x- and y-axis, and the values titles) Why do we use line graphs? (to show trends) Why do we use pictographs? (to show

comparison) Why do we use pie charts? (to show comparison with each being a part of 100%) Why are bar graphs used? (to show comparison).”

2. **Say**, “Now, I am going to let one of each group come and get two graphs to read and interpret.” (Have a collection of graphs from magazines, newspapers, old textbooks, etc. for students to choose from. Let one student from each group come and get two graphs.)
3. **Say**, “I want you to take some time to consider the first graph. Think about the title of the graph. What is the graph telling you? Look at the x- and y-axis. What are the independent and the dependent variables? Is the graph comparing some thing? Is the graph showing you an increase or decrease in a trend? Is the graph showing you a lot of information? Is the graph showing you percentages? Consider these things as you read and interpret your graph. Record on paper the answers to the questions asked about the graphs from the Graph Information Sheet , which I am giving to you.” (Give out the Graph Information Sheet. See at end of lesson). “After you have done this to the first graph. I want you to do the same to the next graph.”
4. Give the students time to read, interpret, and record information about the graphs. As they work on these, walk around and see if students are reading and interpreting correctly. Check the students’ work for comprehension.
5. After each group has interpreted their graphs, have the groups exchange graphs and do the same as they did with the first two graphs. Have your graphs copied on an overhead transparency. When the groups have finished, use each graph transparency and go over each graph. Answer the questions from the Graph Information Sheet. See if each group got the same interpretation of the graphs. (Optional: Students can use the transparency of their graph and give the interpretation of the graph to the class, explaining the graph to the class.)
6. Optional activity: Students can enter data in Microsoft Excel and create their own graphs.

CULMINATING ACTIVITY

(3rd Day)

This activity will provide a constructive use of a graph. The students will use a graph to write an article about a fictional place. This article will be descriptive and persuasive.

1. Have the students go to the computer lab or wherever they can be on a computer. The students will work in groups of two. This will give students the opportunity to bounce ideas off of each other.
2. **Say**, “You are going to be the writer for a travel brochure. In this brochure will be your article about a place that you want people to visit. Someone is paying you to write the very best article about this place. They want you to make this place sound like the only place to visit. You will use the graph that I am going to give you to base your information on.” (Use the graphs at the end of the lesson or some of your own. Another

option is to allow your students to create their own graphs.) “You will first name your wonderful place and where it is located. Then you will begin writing about this place. Remember to use words and phrases that are descriptive and persuasive. You are persuading people to visit a place by using words that paint a picture.”

3. Have an example of a brochure article and a graph that goes with it. (See the example of a brochure article with graph at end of lesson.) Read the article to the class and show the graph.
4. **Say**, “Now, you are going to write the article with your partner. You will have today to compile the brochure article. Tomorrow we will read these to the class. There may be constructive suggestions given to improve the article. You will need to name your graph, put the x- and y-axis values, and put the value of each picture in the key of the pictograph. You will be given a template to do some brainstorming with your partner. When you have the template finished, you can begin writing.” (Template will be at end of lesson. Or you may get one from Inspiration 7.)
5. Allow the students to write. If not finished by the end of class, allow students to finish as homework. (Be sure to have the students save their work on a disk or network or print it out if finished.)

(4th day)

1. Have the students present their brochure article to the class. Each group can tell the name of their place and then read their brochure item. After each group has presented to the class, allow the students to give constructive suggestions to improve the article.
(Optional: Allow time for the brochure article to be edited.)

CROSS-CURRICULAR EXTENSIONS

Science:

1. Students can collect data by polling the student body and graph the data. Such questions that students could ask in the poll:
 - A). Which soft drink is your preference?
 - B). What size shoe do you wear?
 - C). How many siblings do you have?
 - D). What chore do you do the most at home?
2. Students can collect data from experimentation and graph the data. After graphing the data, the students can use the graphing calculator and check their graphs.

Language Arts :

Students can write a letter to a friend describing their fictional town and encouraging their friend to come for a visit.

Art:

1. Students can design and illustrate their travel brochure. In the brochure, their article will be featured with their graph.
2. Students can draw and elaborate on their graph for the brochure. They can use different pictures or symbols for the graph or they can “dress up” the graph with color.
3. Students can draw or design their fictional town using different mediums.

Math:

1. Students can be given data and told to do a graph to show comparison or a trend. The student will have the choice of which kind of graph he/she will do. They are to use the same data and try to use it in a different kind of graph.
2. Students can use data from graphs to find percentages of a total.
3. Use following Web sites for making graphs. They can use data they have collected or data that has been given to them for the purpose of creating a graph.

Web Sites:

<http://nces.ed.gov/nceskids/graphing>

Students can create bar, line, area, or pie graphs online! They submit the data and the Web site does the rest.

<http://math.rice.edu/~lanius/Lessons/graph.html>

At this site the student can change the values in the table for the graph and then click and they will see a new graph. Also, the students can do their own survey and make their own graphs.

Social Studies

1. Students can graph the diverse population of America in a specific year or graph the growth of a distinct ethnic group over a certain span of time. (Example: U.S. immigration between 1800-1900)
2. Students can use bar graphs to show comparison of such things as: the laws overturned by the Supreme Court over a certain time period, the percentage of votes for the presidential elections over a time period, the growth of a state for a certain time span, the funding for schools from state, local, and federal government, the increase or decrease of crime in a certain city over time and the crime rates in different areas of the United States. (These graphs could be converted to circle graphs or pictographs.)

COMMUNITY CONNECTIONS

1. Invite the farm extension agent from your community and have him/her discuss the different graphs that he/she refer to in order to answer questions from the people in the community.
2. Another resource person that can be invited to the classroom would be a person in marketing. He/She could show the class the kinds of graphs that he/she have to refer to when making decisions about the sales of products.
3. Have the students communicate with the local newspaper and find out why graphs are used in the paper and how graphs are chosen.

GRAPH INFORMATION SHEET

Graph 1

1. Title of Graph _____
2. What kind of graph is it? _____
3. Does this graph have a legend or key? _____ If it does, what is it? _____

4. If the graph is a bar, line, or pictograph, what is on the x-axis (Independent variable)? _____
_____ What is on the y-axis (Dependent variable)? _____

5. If the graph is a pie graph, is the percentage expressed or not expressed? _____ Explain.

6. If a pie graph, list in order from greatest to least the pie graph values. _____

7. The graph is a horizontal bar, vertical bar, or a pictograph, what is being compared? _____

8. If the graph is a line graph, what is the trend? _____
_____ Based on the given data, will the trend increase, decrease, or stay the same? _____

Graph 2

1. Title of Graph _____
2. What kind of graph is it? _____
3. Does this graph have a legend or key? _____ If it does, what is it? _____

4. If the graph is a bar, line, or pictograph, what is on the x-axis (Independent variable)? _____
_____ What is on the y-axis (Dependent variable)? _____

5. If the graph is a pie graph, is the percentage expressed or not expressed? _____ Explain.

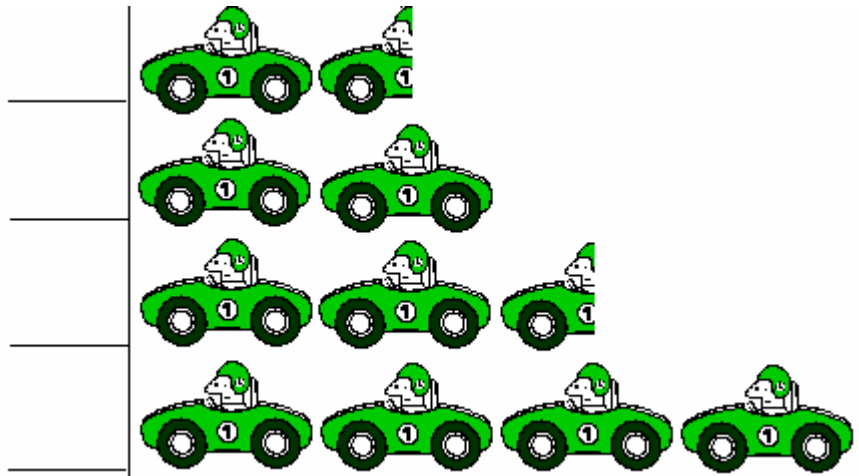
6. If a pie graph, list in order from greatest to least the pie graph values. _____

7. The graph is a horizontal bar, vertical bar, or a pictograph, what is being compared? _____

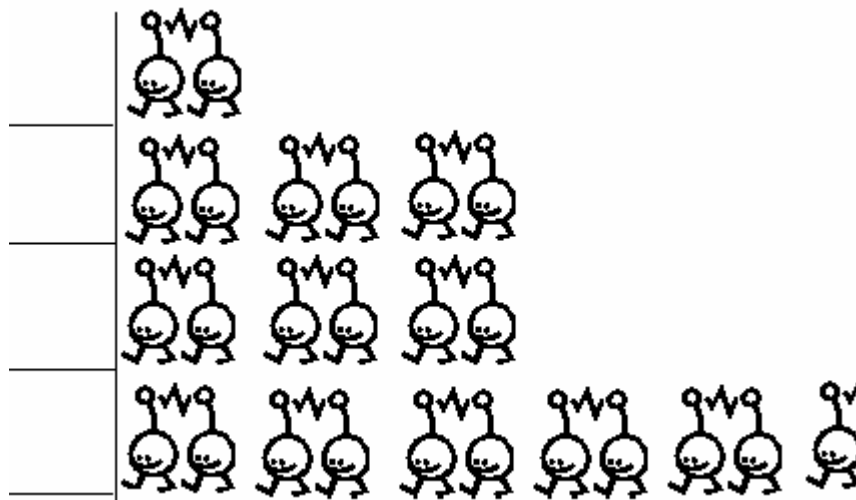
8. If the graph is a line graph, what is the trend? _____
_____ Based on the given data, will the trend increase,
decrease, or stay the same? _____



Name of Graph _____



Name of Graph _____





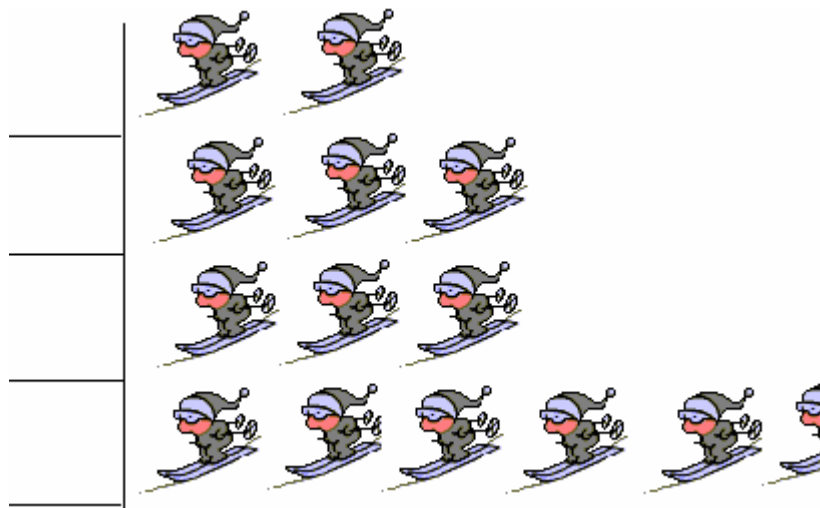
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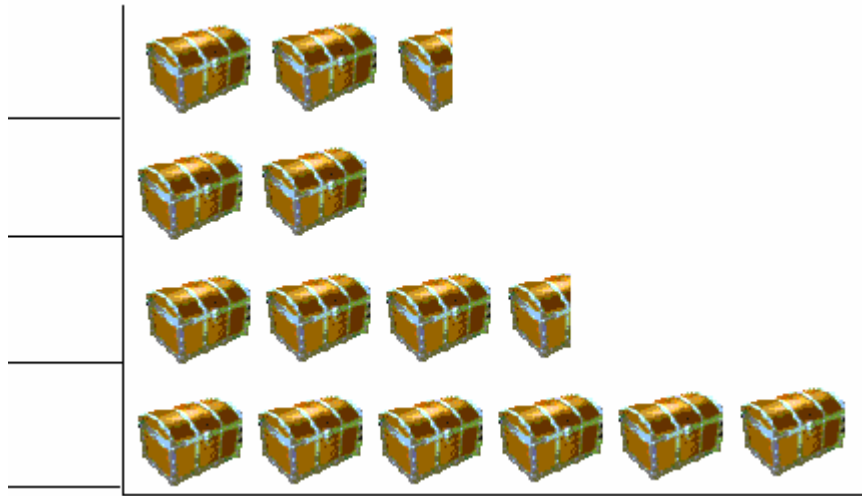
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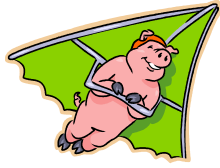
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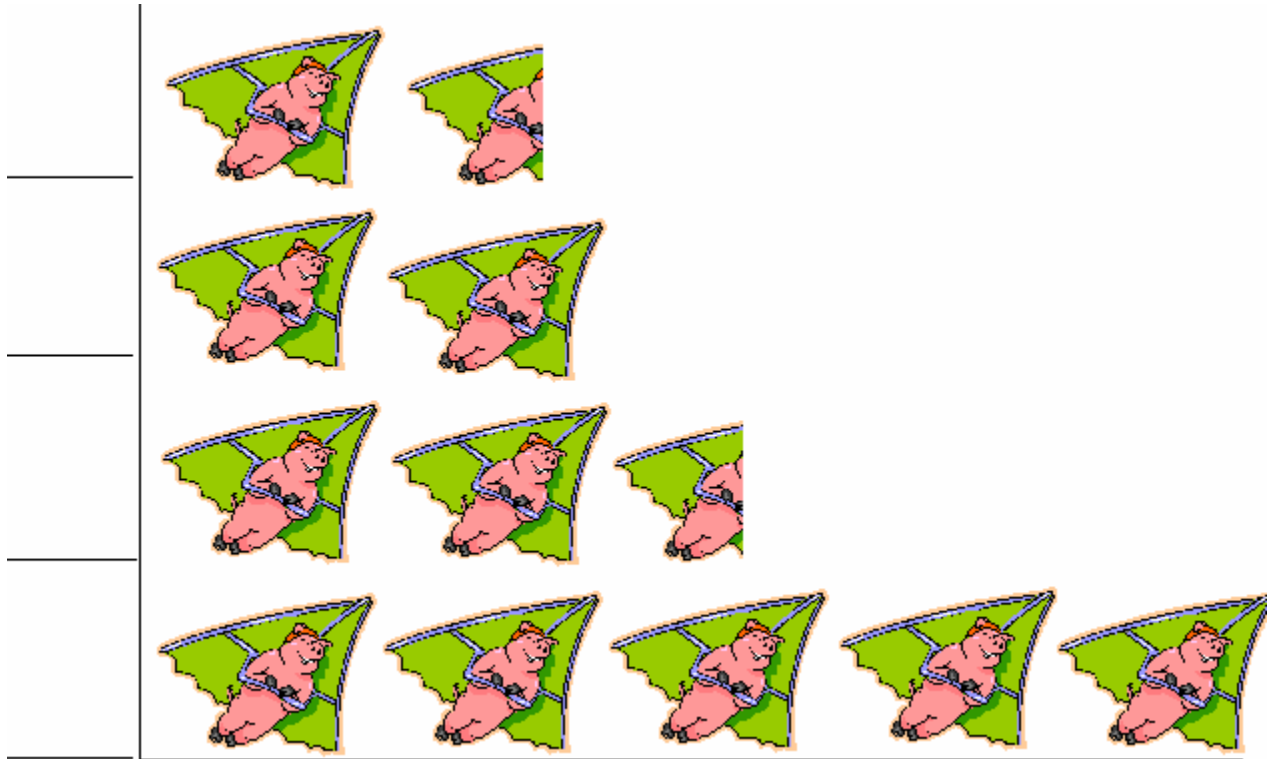
Name of Graph _____





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Name of Graph _____



VISITORS TO GOLDEN CROWN GET A BITE

A lively retreat is waiting for those who would venture to this lovely town. You will always find some adventure when you step into the Golden Crown city limits. Visitors will find skiing and snowboarding in the winter and fishing, camping and boating in the summer. Our shining lakes and majestic mountains sparkle with light like a spotlight on a gold tooth. However, the main attraction is the year-round Celebration of the Teeth. The people of Golden Crown, Minnesota love to celebrate the teeth with all the visitors that come to this town.

The Celebration of the Teeth began in 2001 when Mayor C.M. Smile decided to commemorate the life of the first doctor of Golden Crown, Dr. I.N. Cisor. Dr. Cisor was known as Old Doc Cisor. Doc moved into town to begin his “dentistry” career many years ago when the town was fairly young. However, because of the wonder-working mineral water, there were few cavities and no one needed false teeth. Old Doc’s dentistry supplies became expired and of no benefit. As a matter of fact, Doc Cisor had thought about being a guide for the hunting and fishing around the area.

Then one day in May, a gold miner showed up with NO teeth. The old fellow saw Old Doc’s sign hanging lopsided above his door and decided to have some false teeth made. When he approached Doc he was saddened to find that the Doc had no supplies to make his teeth. Wanting to eat succulent steak, juicy corn on the cob, and other such goodies, he implored the Doc to make him something to use for eating. Telling the Doc that he even had some gold that the Doc could use to make the teeth, he finally convinced Doc Cisor to make the teeth as best as he could. Doc Cisor went to work and make some teeth for the miner. They weren’t pretty, but they were teeth. The “Billy Bob” teeth were invented!!

The miner wore them from that time on and Doc Cisor began to do business. Everyone loved them! No function happened without people sporting their “Billy Bob” teeth. Even Farmer Jake had his favorite pig fitted for “Billy Bob”teeth. When Farmer Sykes saw the pig, he was green with envy and tried to out do Farmer Jake by having his pet turkey fitted for these teeth. However, the turkey did not have enough gums to hold the teeth in its mouth.

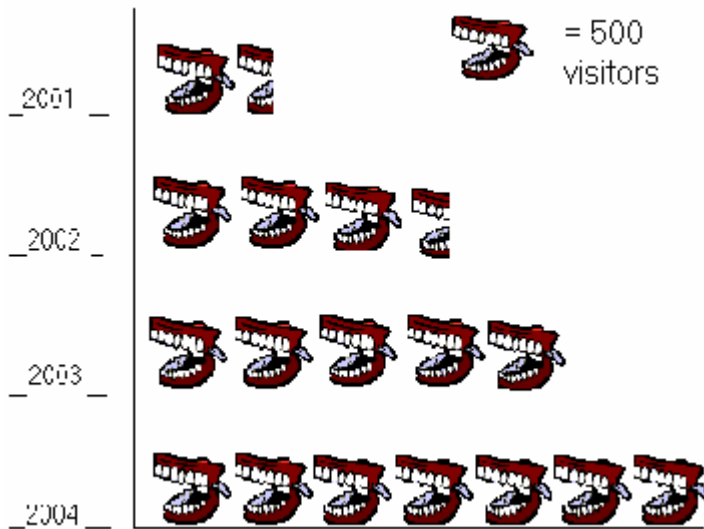
A few years later, the teeth had become so popular that people were coming from neighboring town just to get teeth. Then the renown sculptor, Kut A. Hunk, carved the “Billy Bob” teeth into the mountain west of town. The mountain became known, as is still known today, as Gnawing Mountain. Even Mrs. Hatford, the millner, began making hats with teeth on them. It was a good time for Doc Cisor and the people of Golden Crown.

Over the years, however, people began going away to larger cities for their dental work because Doc Cisor was getting old and blind. The popularity of the “Billy Bob” teeth faded and other fads took their place.

Years past and Doc Cisor died. Then Mayor C.M. Smile had the brilliant idea of celebrating Doc Cisor’s life and his invention of the “Billy Bob” teeth. The Celebration of the Teeth was conceived and that was the beginning of the comeback of the “Billy Bob” teeth and Golden Crown.

In 2001, the beginning of the Celebration, the town had about 750 visitors for the year. Word started getting around about what a wonderful celebration the town had. The second year of the Celebration, over 1500 people came to town to enjoy “Billy Bob” teeth. The Celebration got bigger and better. Beauty Contests became famous with those who wanted to prove that their “Billy Bob” teeth out shined all others. Pie eating contests became

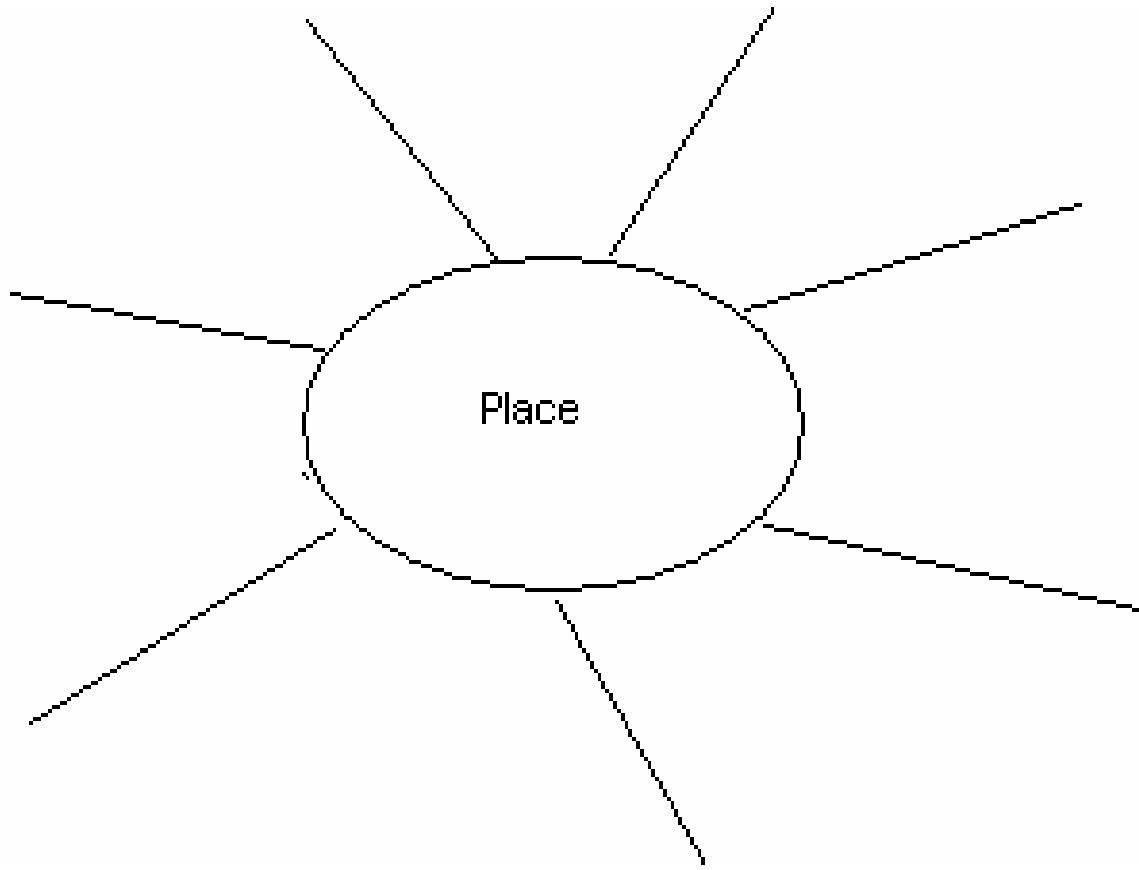
popular with all who wanted to show how useful, as well as beautiful, their “Billy Bob” teeth were. Other contests were added the following year.



When 2003 visitors' tally was completed, it was found that about 2500 people had come to town for the Celebration. That was a good time for Golden Crown, but it wasn't until 2004 that the town became world-renowned. This happened on February 24, 2004, when Farmer Pyle, the grandson of Farmer Jake, took his pet pig, Miss Pinkie, to Hollywood for the Tonight Show. Farmer Pyle had grown up listening to the stories of his grandfather's pig with the “Billy Bob” teeth and wanted a pig like his grandfather had. As soon as Miss Pinkie was old enough, Farmer Pyle had her very own “Billy Bob” teeth made. She became so proficient with those teeth that people stared with amazement. She was wonderful as she grunted out The Star Spangle Banner without losing her teeth. Then the Tonight Show called after hearing about Miss Pinkie's accomplishments and arranged for her TV debut. She was such a hit that people talked about her for months and months. Due to Miss Pinkie's appearance on the Tonight Show, the tourist increased to 3500 this past year.

Preparations are in the making for this year to be bigger and better. “Billy Bob” teeth can be found for sell in every store in town. They come in every size possible with some variations. New contests are being planned to add to the other contests that have been a big hit in the past. Miss Pinkie has been taught to whistle Beethoven's 5th through her teeth. Farmer Pyle is expecting a call from David Letterman any time now for Miss Pinkie to appear on his show. This could be the beginning of the greatest celebration of all. Everyone is invited to come for his/her personal “Billy Bob” teeth and to have fun.

TEMPLATE FOR BRAINSTORMING



Story starters:

The people of _____ (did this) _____
_____ in _____. Then they...

or

_____ is a place where the people _____ and in
_____ they ...