

# AND THE WINNER IS...

ITV SERIES

MATH TALK: #104:  
Polls and Surveys

GRADES 5-7

## PREVIEWING ACTIVITIES

It would be helpful if students have had lessons on constructing and interpreting graphs. (This is an excellent disciplinary unit, see Extensions). This activity should be done in a whole group setting. In order to formulate an opinion on prior knowledge of the students, the teacher should conduct a discussion on polls/surveys students may have participated in or are familiar with in their lives.

Before starting this activity, divide the class into 4 groups. (All blonde girls, all blonde boys, remaining girls and remaining boys.) Do not tell why they are in these particular groups. Give each student two 3 x 4 blank pieces of paper. Instruct students that they cannot talk or make any gestures to their group or the class. While talking, teacher takes 1 bag of candy at a time and pours into separate bowls and places labels in front of each bowl. Teacher says, "I have a dilemma. I want to buy candy for the entire fifth grade, but I can only buy one kind and do not know which to choose. I want to make sure that the majority of the fifth grade students would like the one I choose. Please do not tell me or your neighbor which you would choose, but raise your hand and tell me how I could solve this problem." Have several students give their suggestions.

Then say, "I know. I will ask (pick a male student in the class) and have him write on his piece of paper his secret choice." Have the student write his answer and record on your tally sheet his answer. Keep overhead off and do not let students see answer. Ask students "Have I solved my problem?" Call on a couple of girl students to answer. Then say, "Oh, okay I will ask all this group (pick all blonde girl group) to write their answer down." Have blonde girls do this and record their answer on your tally sheet. Listen to complaints!! "Oh, then I will ask this group," (all blonde boys). Have boys write their choice and record answer. Listen to complaints!! "Oh, then these two groups," (all girls). Record their answer. Then pick all boys and record answer. "I am really confused. Maybe I need to find out how to conduct a valid survey. I have a video all about surveys. Let's see what we can learn."

## OVERVIEW

In this lesson the students should discover the importance of accurate data collection and selecting a representative random sample when conducting surveys. Students will develop and implement a survey of their own on their selected topic. Through the experience of gathering and recording their survey data, the students should gain an understanding of how collected data is used by scientists, businesses and government organizations for predictions and financial/developmental decisions.

The students will choose an issue (questions) for their survey, make a prediction, and decide on targeted participants. The students will be actively involved in developing a random sample for their survey, will canvass an area for an opinion on their issue, will collect the data, organize and interpret their data, graph their results, and communicate their findings to one another.



## AND THE WINNER IS...

## LEARNING OBJECTIVES

Students should be able to:

- Define vocabulary terms related to surveys and graphs.
- Construct a survey question.
- Identify targeted participants for their survey. (both a random sample and complete audience)
- Implement a valid survey
- Collect data.
- Create a bar and circle graph using the information from their data sheets and interpret their results.
- State their prediction and communicate their findings to one another.

## MATERIALS

## Previewing Activities

- 3 bowls
- 1-2# bag each of Gummy Bears, M & M's and Runtts (candy selection can be teacher's choice)
- chalk/white board or overhead projector/pens
- questionnaire transparency for teacher
- tally sheet transparency for teacher
- card table or table for candy bowls

## FOCUS FOR VIEWING

To give students a specific responsibility while viewing the video, distribute the two page "Callous Candy Company" handout. Have students read vocabulary words and brainstorm definitions. These vocabulary words can be taught in language arts as spelling words and quick writes using the words in sentences. Ask students to watch for some of the vocabulary words in the video. Ask students to watch for how a survey should be conducted and how we could solve the dilemma of the candy choice. Ask students to watch how data is collected, organized and results recorded. Tell students we will pause several times during the video for them to discuss questions.

## VIEWING ACTIVITIES

**BEGIN THE VIDEO** where Maria Lopez says, "Hello! And welcome to SQUARE ONE TV's *Math Talk*."

**PAUSE THE VIDEO** where Buster Parrot says, "I'll molt." Discuss questions 1 and 2. **RESUME THE VIDEO.**

**FREEZE FRAME** on sales chart where Becky Sue says, "More than 50% of the people in Dallas and Waco are buying gum drops." Discuss questions 3 and 4. What is the title of the graph? What information is found on the bar graph? Horizontal axis? Vertical axis? What do the bars represent? What data is being compared? **RESUME THE VIDEO.**

**PAUSE THE VIDEO** where Marie Lopez says, "Just watch." Discuss questions 5, 6, and 7. **RESUME THE VIDEO.**

**PAUSE THE VIDEO** where Marie Lopez say, "Watch, watch..." Discuss questions 8, 9, and 10. Vocabulary words: **fair sample, interview, data.** **RESUME THE VIDEO.**

**FREEZE FRAME** on circle graph, when J. B. Callous says, "A picture speaks louder than a thousand words." Discuss questions 11 and 12. What is the meaning of this statement? Analyze the graph. **RESUME THE VIDEO.**

**PAUSE THE VIDEO** where Marie Lopez says, "Everybody had the same chance of being asked." Discuss questions 13, 14, and 15. Vocabulary words: **representative, majority.**

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## VIEWING ACTIVITIES (continued)

**FREEZE FRAME** on circle graph, when Marie Lopez says, “You’ve got a whopping 68%.” Discuss new circle graph. “How will this improve their business? What do you think the company will do now?” **RESUME THE VIDEO** (very short spot until end of segment).

**STOP THE VIDEO** where Marie Lopez says, “What was that?” End of survey segment. Discuss Buster Parrot’s prediction about if they change the gumdrop maybe those who did not like the gumdrops may change their mind. How would that change the circle graph?

## POST VIEWING ACTIVITIES

### Activity One

Discuss with students how we can solve the dilemma of which candy to choose. Who should I interview? What should my questionnaire ask? Discuss the importance of age, gender, and whether they have tried all three candies. Talk about **random samples**. How could we do a random sample in our classroom? Perhaps draw names (3 girls, 3 boys). After selection of 6 students, have them fill out survey. Write out the results on white/blackboard or on blank transparency. Divide class into groups. Give each student copies of Tips on Building Graphs, Building Circle Graphs and Building Bar Graphs. Have each group analyze the results of the survey, construct bar and circle graphs of the results. Groups should be able to make a prediction of which candy would be the choice of the majority of our fifth grade class. Compare results and graphs of each group. **EAT CANDY!**

### Activity Two

Now have each group survey the other fifth grade classes, pick a random sample from each class, interview (with questionnaire), collect data, graph their results on a bar and circle graph, make their prediction and compare each group’s results and graphs. You need to let the other teachers know these groups will be coming to their class. We have five fifth grade classes, so I divided the class into 4 groups because we had already completed our own class.

## MATERIALS (continued)

- cardboard labels: M & M’s, Runts, Gummy Bears (or names of candy chosen)
- 3 x 4 blank pieces of paper, 2 per student

### Focus for Viewing Activities and Viewing Activities

- Callous Candy Company handout for each student

### Post Viewing Activities

Per group

- candy preference questionnaire
- blank transparency

Per Student

- tips for building a great graph
- a blueprint for building graphs
- building circle graphs

### Optional Action Plan

- bulletin board (students bring in copies of graphs and surveys from newspaper and magazines to display)

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## ACTION PLAN

Students can search the Internet for the types of surveys on the net, take part in a survey (pre-approved by the teacher), and make a copy of that survey. There are many sites under "School Surveys."

Students can also research and cut out or copy surveys from magazines, newspapers, and journals for class discussion and display on a bulletin board.

During local, state or national elections have students conduct a poll on voter preference for candidates or ballot issues.

Invite a representative from the newspaper or a local business who conducts surveys to speak to the class.

## VIDEO AVAILABLE FROM

ITV Overnight Blockfeed which may be taped off-air. Consult your local PBS station for schedule.

## POST VIEWING ACTIVITIES (continued)

### Activity Three

Have each student create a valid survey question (a scientific or social issue) of their own and develop a questionnaire, identify targeted participants for their survey, collect data, construct a bar and circle graph using the information from their data, interpret their results, state their prediction, and communicate their findings to the class.

### EXTENSIONS

#### Interdisciplinary Unit on Surveys and Graphs:

**Math** - instruction on collecting and displaying data, statistics (collecting, organizing, displaying and analyzing data), using tally sheets, frequency tables, and bar graphs, pictographs, line graphs and circle graphs.

**Social Studies** - instruction on conducting valid random and representative surveys. Reading and analyzing graphs on U. S. history and elections. Have students develop a social issue questionnaire and conduct a survey.

**Science** - instruction on how scientists use surveys on health issues, genetics, animal population, etc. Have students develop a scientific issue questionnaire and conduct a survey. (Students choose either a social or scientific issue in our team.)

**Language Arts** - Survey and graph vocabulary words are their spelling words. Have students do "quick writes" using the vocabulary in their own sentences. After analyzing and graphing results from their survey, have students write a report on their findings and make an oral presentation to their class with their graphs as visuals.

**Internet** - The fifth grade team can develop a home page with a questionnaire to be answered by students from other schools. Students can use their survey from post viewing activity and invite a fifth grade class in another state to take part in this survey.

Lesson plan developed by Master Teacher Paulette A. Blain,  
William Thomas Middle School, American Falls, Idaho.

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SURVEY????????SURVEY????????SURVEY

## Callous Candy Company

RANDOM SAMPLE \_\_\_\_\_

OPINION \_\_\_\_\_

FAIR SAMPLE \_\_\_\_\_

SURVEY \_\_\_\_\_

DATA \_\_\_\_\_

MAJORITY \_\_\_\_\_

REPRESENTATIVE \_\_\_\_\_

INTERVIEW \_\_\_\_\_

SURVEY????????SURVEY????????SURVEY

1. Define survey.
2. How can a survey be tricky?

SURVEY????????SURVEY????????SURVEY

3. What do you have to be careful about?
4. Discuss sales chart.



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## SURVEY????????SURVEY????????SURVEY

- 5. What does J.B. Callous tell his daughter, Becky Sue, to do?
- 6. What does she need to find out? Why?
- 7. How can this information help their candy sales?

## SURVEY????????SURVEY????????SURVEY

- 8. What did Becky Sue find out?
- 9. Who did she interview? What was wrong with her survey?
- 10. What does Sue Becky Callous suggest would be a better survey?

Vocabulary Words : **fair sample, interview, data**

## SURVEY????????SURVEY????????SURVEY

- 11. What were the results? How did they record their results?
- 12. Discuss "A picture speaks louder than a thousand words."
- 13. What is the principal reason they do not eat the gumdrops, or what do the majority of the people think?
- 14. Why are these people in Grasshopper Gulch different from the state of Texas? How can this affect survey results? What is their solution to get more people to buy their candy?
- 15. Why was it a good survey?

Vocabulary words: **representative, majority**

## SURVEY????????SURVEY????????SURVEY

- 16. Discuss circle graph?



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## Candy Preference Questionnaire

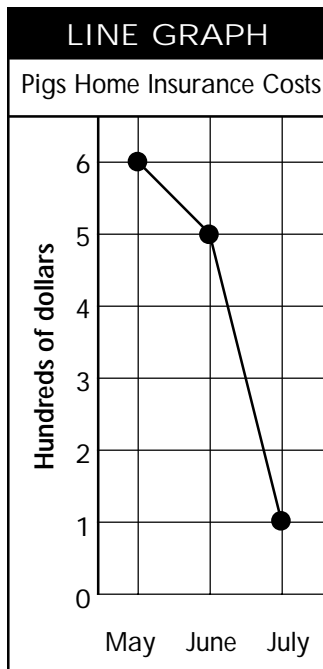
**Please fill out my Survey.**

1. How old are you? \_\_\_\_\_
2. Male \_\_\_\_\_ Female \_\_\_\_\_
3. Where do you live?  
American Falls \_\_\_\_\_  
Aberdeen \_\_\_\_\_  
Rockland \_\_\_\_\_  
Arbon \_\_\_\_\_  
Pocatello \_\_\_\_\_
4. Do you like candy? \_\_\_\_\_
5. Have you ever tasted:  
M&M's            Yes \_\_\_\_\_ No \_\_\_\_\_  
Gummy Bears    Yes \_\_\_\_\_ No \_\_\_\_\_  
Runts             Yes \_\_\_\_\_ No \_\_\_\_\_
6. If you had the money, which of these candies would you buy? **Choose one:**  
M&M's \_\_\_\_\_  
Gummy Bears \_\_\_\_\_  
Runts \_\_\_\_\_
7. Name of homeroom teacher  
\_\_\_\_\_



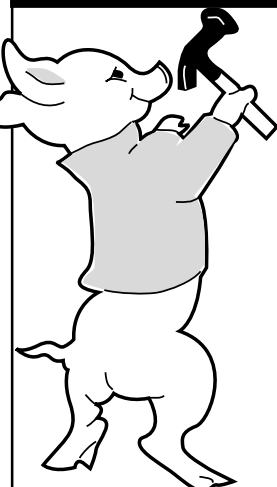
TALLY SHEET	
Best Building Materials*	
Straw	
Sticks	
Bricks	
*According to P.B.A. (Pig Builders Association)	

FREQUENCY TABLE	
Materials	Number of votes
Straw	3
Sticks	7
Bricks	12

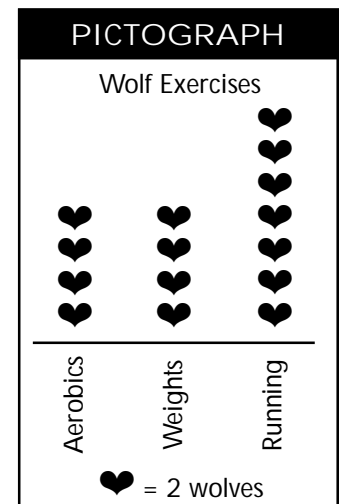
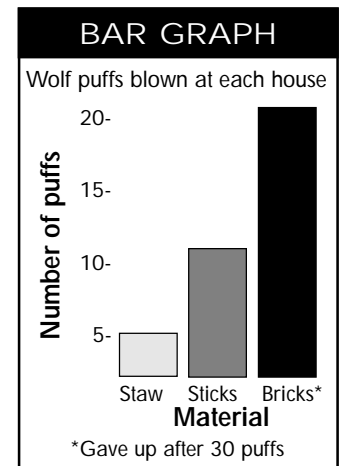
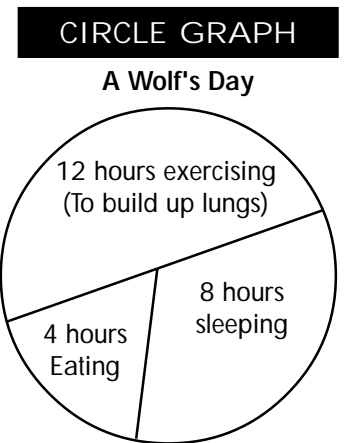
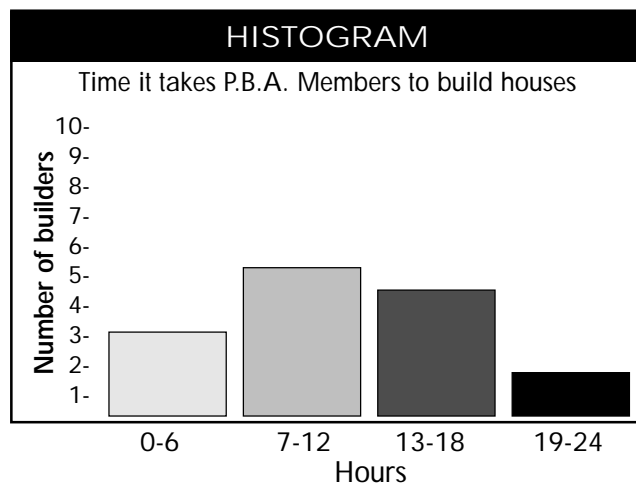


(Architect's Name)

## TIPS FOR BUILDING A GREAT GRAPH



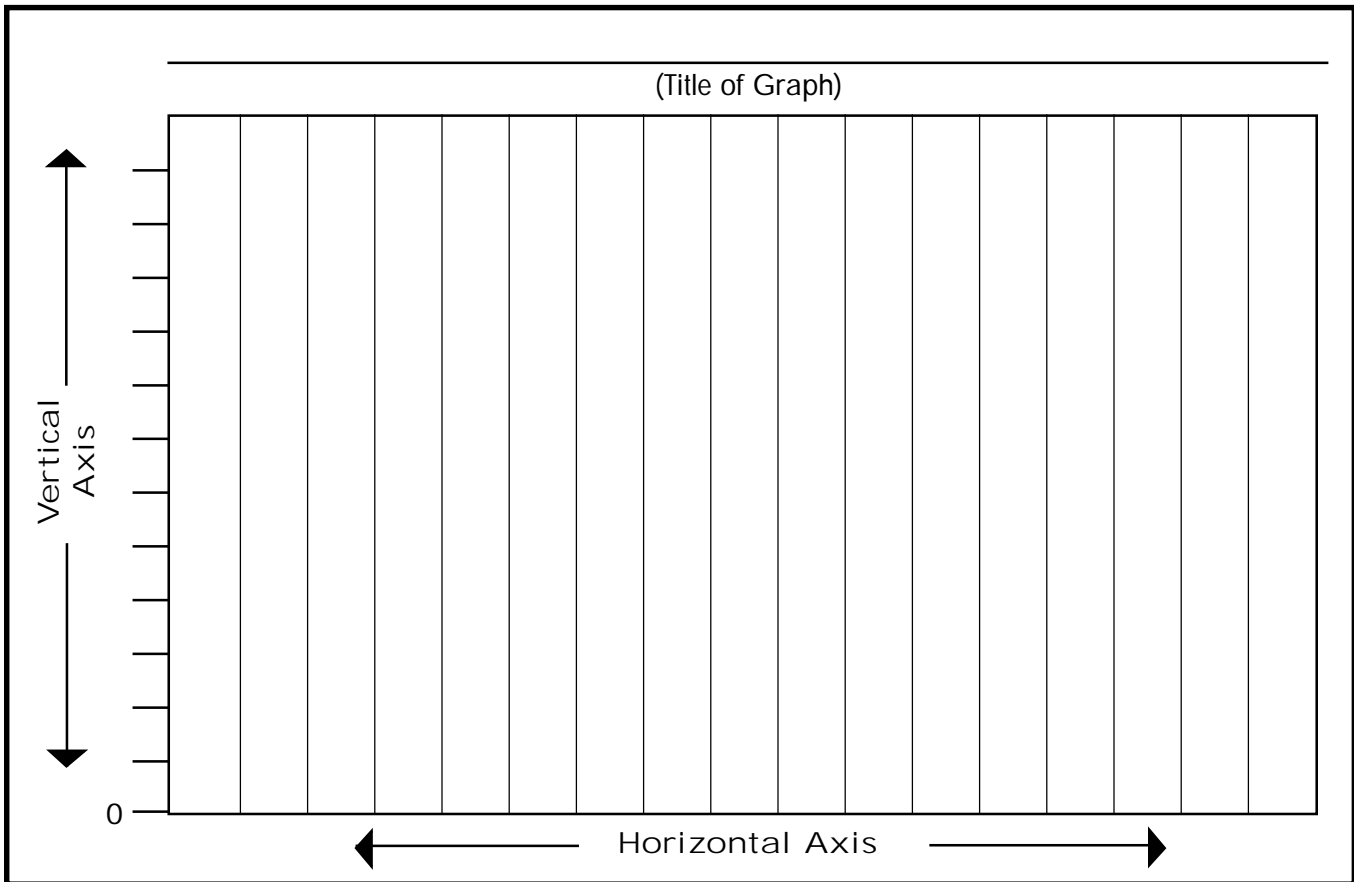
1. Give your graph a title.
2. Label the vertical axis – from left to right at the bottom.
3. Label the horizontal axis – from base to top at the left.
4. If you're making a pictograph, show the symbol and its value in a key.
5. If you're making a bar graph, make sure the bars are the same width. Also use equal space between the bars.
6. If you're making a histogram, all of the bars should be side by side.
7. Use the correct number scale. Make sure the intervals are equal (for example: 1–5, 6–10, 11–15, 16–20, etc.)



## A Blueprint for Building Graphs

Follow this plan to create graphs that are the envy of the neighborhood.

1. Title the graph.
2. Label the vertical axis: base to top.
3. Label the horizontal axis: left to right at the bottom.
4. **Bar Graph:**
  - a. Bars should be of equal width.
  - b. Use equal space between bars.
  - c. Use a number scale with equal intervals (ranges).
  - d. Use a ruler to make sure the bars are the right heights.
5. **Pictograph:**
  - a. Use a key to show the symbol and its value.
  - b. Label only one axis.
6. **Histogram:**
  - a. Bars should be of equal width.
  - b. Bars are connected. There is no space between them.
  - c. A histogram gives general information. For example: the number of runners who finish a race between 50 and 60 minutes.
7. **Line Graph:**
  - a. Make a bar graph, but leave off the bars!
  - b. Mark points on a line graph.
  - c. Connect the points with straight lines.



## Building Circle Graphs

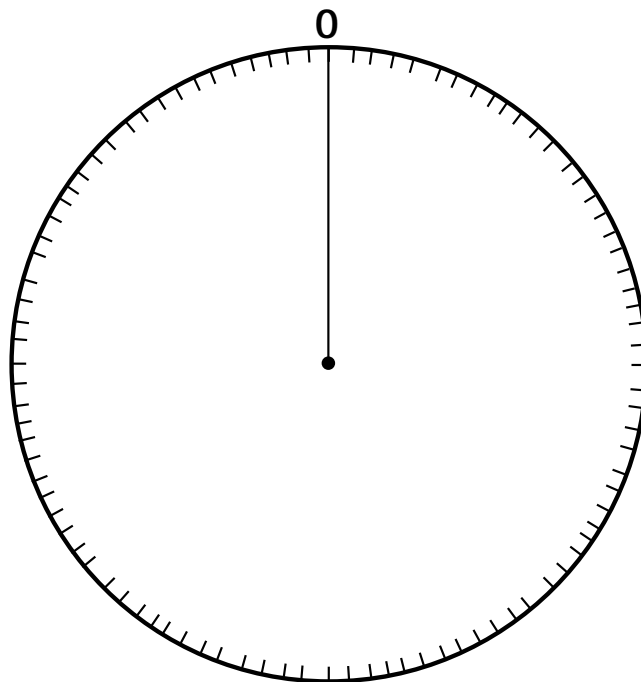
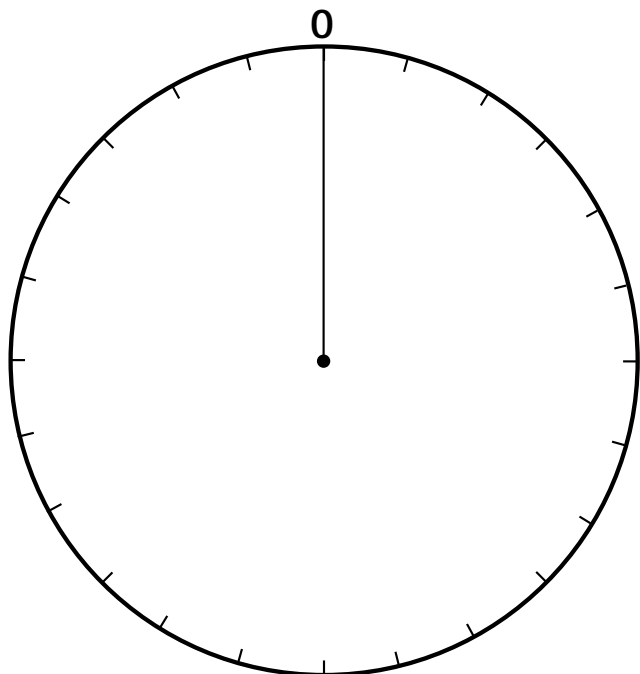
Name: \_\_\_\_\_

A circle graph divided into 24 equal sections can be used to show a variety of data.

- Use the graph to display data about a 24-hour day.
- Divide the graph into 3, 4, 6, 8 or 12 (all factors of 24) equal sections to display other data. For example: 1 of 12 equal sections equal 5 minutes of an hour.

A circle graph divided into 100 equal sections can be used to show a variety of data.

- Use the graph to display percentages, which are based on 100.
- Use the graph to show parts of a dollar. For example: 10 of 100 equal sections equals 10¢.
- Divide the graph into 5, 10, 20, 25 or 50 (all factors of 100) equal sections to display other data. For example: 8 of 50 equal sections equals 8 U.S. states.



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