

# WHEN IN DOUBT, GRAPH IT OUT!

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GRADES 5-8

## OVERVIEW

A graph compares information in a visual manner. In this "Information Age" graphing skills are utilized more and more. In order for the students of today to interpret information that is presented in this manner, integration of the graphing knowledge needs to be practiced and used at progressively higher levels. This lesson provides students an in-depth understanding of the graphing of data. Line, pie, and bar graphs are introduced in real-world settings and visualized in animated examples. Cooperative learning and multiple intelligence strategies are incorporated into the activities that present graphing content and skills in an age appropriate manner.

## KEDT EDUCATIONAL TELEVISION SERIES

Math Talk - #102 The Data Game: Using Graphs

## LEARNING OBJECTIVES

Students will be able to:

- \*differentiate between a line graph, a bar graph, and a pie graph;
- \*convert percentages onto a pie graph;
- \*interpret data on a line graph, a pie graph, and a bar graph;
- \*categorize data with the appropriate graph; and
- \*evaluate the advantages of using graphs to communicate data.

## MATERIALS

(Per pair)

- 1 Vis-a-Vis wet erase marker
- 1 Slate (laminated 8.5 x 11 tagboard)
- 1 Eraser
- 1 Pencil or slim Color marker
- 1 Activity Sheet #1

(Per student)

1 Activity Sheet #2

Transparencies:

Kagan Cooperative Learning Structures

Numbered Heads Together

Pairs Check

Activity sheets #3 (3 pages) - game graphs

## VOCABULARY

**graphs** - a diagram representing a system of interrelations among two or more things by a number of distinctive dots, lines, bars, etc.

**line graph** - a type of graph that shows or compares change over time

**bar graph** - a type of graph that shows comparisons

**circle/pie graph** - a type of graph that shows percentage comparisons

**point of origin** - the meeting point of the x-axis and the y-axis

**x axis** - horizontal plane of the graph

**y axis** - vertical plane of the graph

**variable** - the part of an investigation that could be altered or changed by the investigator

**manipulated variable** - the variable of an investigation that is purposely changed

**responding variable** - the variable that changes as a result of a manipulated investigation

## PREVIEWING ACTIVITIES

Brainstorm with the students a list of their favorite sports. ( The favorite sport they like to play or watch.) From the brainstorm list each student then writes on a slip of paper his/her favorite sport. Ask the students to form groups according to the sport they enjoy the most; the one written on the slip of paper. This prevents students grouping by "buddies." Next ask each of the "sport groups" to form a

single line side by side to the other "sport groups." This will form a human bar graph. Using brightly colored yarn string the top end person of each sport line together from one sport to the next, across all the "human bars." This will form a human line graph. Now have the groups join hands, then join hands with sport groups next to them and form a large circle. Teacher stands in the center of the circle and extends brightly colored yarn from the center to the outside person of each sport group. This will form a human circle/pie graph. Pass out Activity Sheet #1 to each pair of students. Using Kagan Cooperative Learning structure, Numbered Heads Together, (to assess prior knowledge) have the students list the 4 requirements of a graph. (1. Title; 2. Point of Origin; 3. X-axis, the manipulated variable; 4. Y-axis, the responding variable) Randomly ask for each requirement from various team members. Ask a random student read out the answer. This allows the class to correct any incorrect answers and verifies the correct answers.

### FOCUS FOR VIEWING

To give the students a specific task to focus their attention while viewing, say, "You will be watching a video that brings into focus that graphs help us communicate more easily. Look for the purpose of graphs." (Graphs help us see information.)

**Begin** tape. Video is the presentation credit: a television with Square One on the screen and Television on the base of the black monitor. Audio is telephone numbers being entered and music.

**Pause** the tape. Video is a green parrot, Buster, with a headset on his head. Audio is "Then watch this sketch from Square One and call me in the morning." Randomly ask a student to relay to the class the purpose of any graph. (Graphs help us see information.) Ask the students to record the purpose of graphs on the designated line.

### VIEWING ACTIVITIES

Say, "You will be watching a video sketch that shows how a line graph can organize data or information and communicated that data. See if you can identify the purpose or use of a line graph." **Resume** the tape.

**Pause** tape. Video is a yellow line graph. Audio is "but this line graph makes it easier to see." Using Kagan Cooperative Learning structure, Pairs Check, pose the

question, "What is a line graph and when would it be appropriate to use a line graph?" (Line graph is a quick, easy way to organize and display data that changes over time.) Have the pairs record the answers and draw a line graph in the designated place on Activity Sheet #1. Ask a random student read out the pairs' answer. This allows the class to correct any incorrect answers and verifies the correct answers.

Say, "Next you will watch a musical segment that illustrates a circle/pie graph and its purpose. Try to list how much and the kinds of love the guy gave away." The students could use the margins around the large circle to make the guy's love list. **Resume** the tape.

**Pause** the tape. Video is the circle/pie graph and a "100% red heart". Audio is "So you see that when you add up all of these slices, you get 100% of his love." **Rewind** the tape.

**Pause** the tape. Video is a guy and a girl in a red convertible. Audio is music. Say, "While you view the video the second time, fill in, complete, or correct the percentages of the guy's love with the matching love label." The teacher might need to pause the tape after the first few percentages are given to allow the students to become familiar with the procedure for listing the percentage with the love label. **Resume** the tape.

**Pause** the tape. Video is the circle/pie graph and the red heart with 8% on it designated by the name Sylvia. Audio is Buster's (the parrot) voice saying, "But Sylvia, you still get a whooping 8% of my love." Using Kagan Cooperative Learning structure, **Pairs Check**, ask the A's to draw and label into the pie graph 43% of the his love, then the B's are to draw and label into the pie graph 49% of his love. Using Kagan Cooperative Learning structure, **Pairs Check** again, ask the A's to identify the second type of graph and B's its data purpose. (Circle/pie graph is a way to visually display percentages.) The pairs, then, record the information and draw a pie graph in the designated places on Activity Sheet #1. Ask a random student read out the pairs' answer. This allows the class to correct any incorrect answers and verifies the correct answers.

Say, "As you view the next video segment, you will play the game along with the T. V. contestants. Use the Venn Diagram on Activity Sheet #2 to record the answer to the question asked by the game host. If you think Beverly is correct, put that answer in the part of the diagram that is designated for Beverly. If you think Cris

is correct, put that answer in the part of the diagram that is designated for Cris. If Cris and Beverly have the same answer, put answer in the overlap of the Venn diagram. Be prepared to justify your answer." **Resume** the tape.

**Pause** the tape. Video is the Venn diagram. Audio is "Me, too. I think Beverly is telling the truth, and Cris is bluffing. You, also, believe that Beverly is telling the truth, and Cris is bluffing." Say, "Think about your answer and how you could justify it. Watch the video for the justification of the answer." **Begin** the tape.

**Pause** the tape. Video is the bar graph. Audio is "You don't need to look at the red bars at all,..." Using Kagan Cooperative Learning structure, **Pairs Check**, B's identify the third graph type and A's identify its data purpose. (Bar graph is used to visually display data comparisons.) The pairs record the information and draw a bar graph in the designated places on Activity Sheet # 1. Ask a random student read out the pairs' answer. This allows the class to correct any incorrect answers and verifies the correct answers. Now, ask the teams to verify the recorded information on Activity Sheets #1 and #2 using Kagan cooperative Learning structure, **Numbered Heads Together**.

## POST-VIEWING ACTIVITIES

Say, "You have seen how the Challenge Game is played. Let's play the game using the data on one of the three kinds of graphs on the overhead transparencies I have for you. You will play as a team with your table group. Use the dry erase slates to record your answers. Be prepared to justify your answers to the class using Beverly's explanation of her answer as a model."

Show the first transparency and allow the teams 1 minute to record their answers. "When you have recorded you answers on the dry erase slate turn it over so I will know you have finished." When all "slates" are face down, have all the teams hold up their dry erase/laminated tagboard slates to reveal the teams' answer. Randomly ask a team member to justify the answer.

Continue with the game using the other data graphs on overhead transparencies.

## ACTION PLAN

1. Graph data from the weather page from a local newspaper.
2. Have the students collect as many data graphs as possible from newspapers,

magazines, and etc. Using these collected graphs have the teams make a team collage.

3. From a local newspaper collect graphs, then ask the students to itemize in a list all the data communicated on the graph.

4. From the Internet gather data to graph or graphs to download. Bring the data to class for graphing or interpreting.

## SITES TO VISIT

<http://www.goenc.com/> - Eisenhower National clearinghouse

This site provides K-12 teachers with a central source of information on mathematics and science curriculum materials and to encourage the adoption and use of such materials in order to support national goals to improve teaching and learning in mathematics and science.

<http://www.cs.ubc.ca/nest/egems/home.html> - E-GEMS: Electronic Games for Education in Math and Science. This site aims to increase the proportion of students in Grades 4-8 who enjoy learning mastering, and using underlying concepts of math and science.

## EXTENSIONS

### Computer Literacy

Visit websites and download data graphs.

### Language Arts

From a data graph write a composition based on the graph data.

### History

Create a graph from historical data.

- Ex. Population growth over a certain time period
- National representation at a conference

Activity Sheet #1

4 Requirements of a Graph

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

GENERAL PURPOSE:

\_\_\_\_\_

TYPE: \_\_\_\_\_

PURPOSE: \_\_\_\_\_

\_\_\_\_\_

TYPE: \_\_\_\_\_

PURPOSE: \_\_\_\_\_

\_\_\_\_\_

TYPE: \_\_\_\_\_

PURPOSE: \_\_\_\_\_

\_\_\_\_\_

## NUMBERED HEADS TOGETHER

1. Students Number Off
2. Teacher Presents Problem
3. Heads Together
4. A Number is Called

This strategy was adapted with permission from Dr. Spencer Kagan's Cooperative Learning Book available from Kagan Cooperative Learning, 1 (800) WEE CO-OP.

## PAIRS CHECK

1. Pair Work
2. Coaches Check
3. Coaches Praise
4. Pair Work
5. Coaches Check
6. Coaches Praise
7. Pairs Check!
8. Team Celebrates

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