

Mr. E Graphs

Summary

This fun activity will allow students to explore several ways to sort and graph information according to certain attributes.

Main Core Tie

Mathematics Grade 2

[Strand: MEASUREMENT AND DATA \(2.MD\) Standard 2.MD.10](#)

Materials

- *Math Concepts for Primary Grades*
DVD Chapters 2, 3, & 5
Four Letters from Captain Graff (below)
- [Evidence / fact sheet](#) (pdf)
- [Clue Graph](#) (pdf)
- [Evidence mystery tags](#) (pdf)
- [Detective Notebook](#) (pdf)
- [Detective Badges](#) (pdf)
- [19 cases](#) (pdf)

Introduction letter from Captain Graff: Dear Mr. E, I have enclosed a number of clues to a current case that we are working on. Please see what you and your assistant detectives can make of these items and get back with me. Thanks for your help with this, Your Friend, Captain Graff

Letter 1: Dear Mr. E and associates, I was just writing to check on the progress you have made on our top-secret case. I would love to see what you have come up with so I can compare it with what we were thinking here at the station. Please let me know what you have discovered as soon as possible. We are excited to hear from you. Your Friend, Captain Graff

Letter 2: Dear Mr. E and associates, Thank you for the helpful information you have sent to us. I was thinking about the same thing. I know that this case is not yet solved and would love to hear any other information you may have to help crack this case, I know we are close. Anxious to hear from you!
Your Friend, Captain Graff

Letter 3: Dear Mr. E and Associates, Thank you for your help in solving our mystery. You truly have learned a lot about sorting information to be used to make a graph. I have another case that I need your help with. I am attending a family reunion and my son wanted to keep track of facts that he gathers from the reunion. Can you help us think of different facts that we could collect to share with his teacher for extra credit? I have included a book of the facts with this letter. Good luck! I am excited to hear from you all. Your Friend, Captain Graff

Letter 4: Dear Mr. E and Associates, WOW! You have all become such great detectives! Thank you for helping me solve the case. I have a huge caseload that has just come up and would love any help you can give me with this. I know that you are all first rate detectives, and that these cases will be solved with ease! Good Luck. Your Friend, Captain Graff

Additional Resources

Books

- *Graphs*
, by Bonnie Bader; ISBN 044842962
- *Graphs*
, by Sara Pistoia; ISBN 1-59296-687-X

- *Who's Got Spots?*
by Linda W. Aber; ISBN 0-439-3326-5
- *Tiger Math Learning to Graph from a Baby Tiger*
, by Ann Whitehead Nagda and Cindy Bickel; ISBN 0-8050-7161-X
- *Get Up and Go!*
by Stuart Murphy; ISBN 0-590-23811-6
- *A Tiger Cub Grows Up*
, by Joan Hewett; ISBN 0-439-44193-5
- *The Great Graph Contest*
, by Loreen Leedy; ISBN 0-439-82838-4
- *Let's Graph*
, by Lisa Trumbauer; ISBN 0-7368-2891-5
- *Graph Games*
, by Susan Holding; ISBN 0-690-34964-5, 0-690-34965-3 (LB)
- *Great Graphing*
, by Martin Lee and Marcia Miller; ISBN 0-590-49470-8
- *Graph-A-Day*
, by Michelle Long Windmoeller; ISBN 0-7424-0146-0
- *Graphing Primer*
, by Laura Duncan Choate and JoAnn King Okey; ISBN 0-86651-486-4

Media

- *Math Concepts for Primary Grades*
, by 100% PRODUCTIONS 1998-2001, UIMC (Utah Instructional Math Consortium), Utah State of Education.

Background for Teachers

A graph is a tool that can show you things quickly. A graph uses pictures, shapes and colors instead of numbers to tell us how many of something there is. In Second grade students are responsible to use a variety of methods to organize, display, and label information, including keys, using pictographs, tallies, bar graphs, and organized tables.

In this lesson we will explore several ways to sort information according to certain attributes. We will then graph that information so we will understand quickly what we have sorted. Because of the versatility of graphs/data organizers being integrated in a multitude of other subject areas, this would serve as a valuable foundational lesson to teach at the beginning of the school year so that extension lessons can follow throughout the year.

Intended Learning Outcomes

5. Understand and use basic concepts and skills

Instructional Procedures

Invitation to Learn

Write the graph title "Today's lunch" on the board. Then under the title write "School lunch" and "Home Lunch," and have them line up behind the graph headings according to what they will be eating that day. Tell them they have just made a human bar graph. Record numbers on a piece of paper to refer to later and start on Instructional Procedures.

Sorting package contains several objects from each of the following categories: plants, animals, fantasy, reality, food, numbers, families, and communities where we live (urban, suburban, and rural).

Instructional Procedures

Case 1

Teacher arrives in the classroom dressed as a detective carrying a briefcase that contains *The Sorting Package*, (containing several objects from each of the following categories: plants, animals, fantasy, reality, food, numbers, families, and communities) the *Introduction letter from Captain Graff*, and introduces him/herself as MR. E. He/She welcomes the students to the Math Graph Detective Academy and tells students that they will be assisting in an important math mystery adventure. Inform them that they will gain important information for helping to solve the case by watching a top-secret video clip. Have students watch "3 Skill Building Sort and Group" Chapter 3 Section 1. Stop after 3:26.

Discuss what was disclosed as the first step in classifying (using your five senses to help you observe what things are alike). Invite students to help you sort the objects that arrived from Captain Graff into 5 groups by traits determined as a class. Once they have been divided, place the items in gallon size baggies and write on the *Evidence Mystery Tags* what trait each group is sorted by.

Break your class into five groups and have them subdivide their mystery tagged bags into smaller groups. When each group has completed their sorting have them stay where their group is and share how they separated their bags into different groups. Have each group place all objects from their bag back into the gallon bag and collect the bags at the end.

Case 2

Letter 1 arrives from Captain Graff asking if they have solved the mystery. Review with the class what they learned about sorting objects so far. Review as a class how they sorted their evidence mystery tagged bags as smaller groups yesterday.

Ask the class: how can we send all this information that we have been solving to the Captain? We can't just mail him all the evidence back. What would be an easier way to get him the information? On the DVD show chapter 2 "Skill Building with Graphs." Stop at the pictograph section of this chapter 1:45. Discuss the definition of a graph as given in this section: a graph is a tool. It can show you things quickly. A graph uses pictures, shapes, and colors instead of numbers to tell us how many of something there is.

Introduce their *Detective Notebook* (a notebook made to collect clues or data). Have them write the definition of a graph in their notebook. Ask: remember how we made a class human bar graph in class? Have any of you done graphs before? What other kinds of graphs are there? Continue on to the pictograph section of the DVD. Chapter 2 1:47.

As a class return to the information gathered in the invitation to learn, and draw a pictograph on a poster board of how they lined up. Then take that information from the pictograph, and have them help you make a bar graph of their lunch for that day.

Provide each student with an *Evidence/Fact Sheet* paper. Have them go back to their same mystery tagged bags they sorted on the first day. Have them collect facts or clues on their sheet. Taking the facts they have gathered, have them then make a bar graph with their detective team on their findings.

Case 3

1. Letter 2

arrives from Captain Graff stating that more information is needed to solve the mystery. Show the video on charts, Chapter 5 Charts, Graphs and Diagrams. Review what a pictograph is after the video.

Discuss each type of graph. As you discuss each graph from the video with the class, hand out the Clue Graph pages for them to glue into their clue diary. Invite them to write notes and draw pictures as you discuss these things, so they can be good detectives when they get back to their evidence mystery tagged bags.

Case 4

Letter 3 arrives from Captain Graff thanking the class for their help with the mystery. Read the letter to the class.

Pass out the *Evidence/Fact Sheet* and (as time allows), read sections of *Graphs* by Bonnie Bader to the class. Pause at each fact, or clue for the students to record the data presented. Do not show the pictures of the book at this time.

When you have completed the book or current section of the book you would like to work on, discuss the data from the book. Have them think of ways that they could graph the information they have collected. Working in small groups, have them pick a section of data or the current section you are on, and think of which type of graph they could use to show the facts the best with the class.

After they have worked on their graphs, have them share with the class what they found out. Prepare that information to send to the captain.

Before "mailing" the letter to the Captain, re-read *Family Reunion* to the class and compare their graphs to the ones in the book. Discuss what types of graphs his son used compared to what they used as a class.

Case 5

1. *Letter 4*

arrives from Captain Graff thanking them for solving the cases that he had assigned to them. Read the letter to the class.

Divide your class into seven groups and explain the *Seven Centers with Nineteen Cases* needing to be solved. Provide each detective group with materials needed at each station, and several *Evidence Fact Sheets* for them to gather their clues on and put in their *Detective Notepad*, have them write their case number on their Evidence Fact Sheets and glue into their Detective Notepad). Check each graph for accuracy against the case number that they received. Review each type of graph. Ask each student to tell and record in his or her clue journal his or her favorite graph discussed in the book. Present each detective with an official *Great Graph Detective badge*.

Extensions

Morning message: Put a letter for Mr. E filled with corrections for them to solve on the board for their daily work.

- [Monthly Integrated Graphing Ideas](#) (pdf)

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August: Summer Fun--Provide a sun-shaped paper for students to draw a favorite summer memory from one of the following categories: traveling, sports, family activities, other. Graph results.

September: Favorite School Subjects--Provide each student with piece of an apple pie (a circle approximately 14 inches in diameter, cut into as many equal sized pieces as you have students). They need to be equal pieces, so you may have to include yourself or other staff member. Have the students color their piece according to what their favorite school subject is. red: math, yellow: spelling, orange: reading, and so on. Glue each piece onto a circle, grouping them according to their color.

October: Pumpkins--Provide each student with a piece of orange art paper. Have them draw and cut out a pumpkin (you should get many sizes and shapes). Provide different kinds of art supplies to decorate their pumpkin with, such as paint, glitter, and sequins. Bar Graph the pumpkins by traits determined by the class.

November: Food Groups--Provide each student with a turkey clip art to draw their favorite type of food they eat on Thanksgiving Day on the belly of the turkey. Provide choices for them from each of the food groups. Graph turkeys on a food pyramid chart according to what they drew. Make a

pictograph of what they have drawn.

December: Money--Provide pictures of candy price marked with pennies, nickels, dimes, or quarters. Have them graph their candy according to the coin their candy is labeled with. To make it more challenging, have students graph according to the sum of their coins. Discuss the graph.

January: Weather Affects on Animals--Make a Pictograph of how the weather affects animals. Have the students draw an animal they would like to sort according to what the animal does in the winter, hide, migrate, hibernate or stay active. Discuss the graph.

February: Letter Writing--Read the story *Who Loves Mr. Hatch* by Ellen Spinelli. Discuss how the nice letter to Mr. Hatch made him a happier, nicer person. Have them choose to write a letter to a family member, friend, school staff, or other to brighten their day. Provide them with an envelope to write the name of the person the letter is going to. Bar graph the envelopes according to who they are sent to, a family member, friend, school staff, or other. Discuss the graph.

March: Weather--Bar graph the daily weather for the month, graph the students favorite kind of weather.

April: 'Egg'cellent Animals--Graph according to whether animals are born live or if they hatch from eggs. Have students draw their babies on a square-shaped piece of paper if they are born live and on an egg shaped piece of paper if they hatch from an egg. Graph results. Discuss other ways you could graph these animals as a class.

May: Second Grade Memories--As a class, make a timeline of the school activities you have had throughout the year. To create a class graph, have the students illustrate their favorite activity on a Post-it® note and place it in a category such as: field trips, friends, room-mother parties, assemblies, holidays, other.

Family Connections

Gather data about family--eye color, hair color, boys, girls, etc., make a graph at home.

Have them graph their favorite toys and bring data and how they sorted their toys.

Assessment Plan

Check the data and graphs from the 19 cases they have solved.

Check their Evidence Fact Sheets they completed on case 2 and 5.

Include some of the 19 cases in a center for them to choose their case to solve. Check their work.

Bibliography

Research Basis

Lee, M., & Miller, M., (1993). *Great Graphing*. Scholastic Inc. New York, NY ISBN 0-590- 49470-8
Learning graphing skills benefits children in a variety of ways; it encourages an investigative spirit as questions are generated, conjectures are made, and relationships are discovered. Higher-level critical skills are involved and communications skills are reinforced as children discuss and write about their methods and discoveries. Graphing help children appreciate how useful math can be in the world outside the classroom.

Authors

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