

Collecting Data 2

Summary

Students will be involved in collecting and describing data. They will learn to predict information, find the actual amount, and compare their findings with their predictions.

Main Core Tie

Mathematics Grade 2

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

Materials

- bag of coins - penny, nickel, dime and quarter (1 per group)
- Paper towels
- eye dropper
- cup of water
- [Drops of Pennies Data Chart](#) pdf
- Math Journal
- [Tigers](#) pdf
- *Tiger Math Learning to Graph From A Baby Tiger*
- Tiger Math overheads (pgs. 8, 14, 16, 26)
- [Rubric for Graphs](#) pdf

Additional Resources

Books

- *Lemonade for Sale*
, by Stuart J. Murphy; ISBN 0-06-446715-5
- *Graph It!*
by Lisa Trumbauer; ISBN 0736812822
- *Graphs*
, by Sara Pistoia; ISBN 1567661203
- *Graphing Activities*
, by Joy Evans; ISBN 1557991243
- *Graphs*
, by Bonnie Bader; ISBN 0448432374
- *Learning to Graph from a Baby Tiger*
by Ann Whitehead Nagda and Cindy Bickel. ISBN:978-0805071610

Background for Teachers

Students should be involved in collecting and describing data. Students will learn to predict information and then find the actual amount. They will compare their findings with their predictions. Students should be taught and very familiar with the following graphs: Bar graphs, line graphs, and pictographs. Students will choose and construct their own graphs. The Tiger Math activity is a great review and assessment of how well they have learned each of the graphs.

Intended Learning Outcomes

2. Become effective problem solvers by selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches to solve problems.
4. Communicate mathematical ideas and arguments coherently to peers, teachers, and others using

the precise language and notation of mathematics.

5. Connect mathematical ideas within mathematics, to other disciplines, and to everyday experiences.

Instructional Procedures

Invitation to Learn

This activity is called *Drops on Pennies*. Hold up a penny and a cup of water. Do you think the penny can hold water like the cup? How many drops do you think it can hold? Think to yourself first and write your prediction in your journal: I think the penny will hold ____ drops of water because _____. Have a few students share their answer. Come to a class consensus. How about other coins like a dime, nickel and quarter? As a class, come to a consensus for each of the coins. Prepare 2 class charts ahead of time; chart #1 with the data table and chart #2 with the bar graph as shown in the attached *Drops on Pennies Data Chart* document. Post the charts prominently in front of the classroom. RECORD THE CLASS PREDICTIONS ON CHART #1.

Tell students that they will work in groups to see if their predictions are correct. Divide the class into small groups of no more than four per group. Give each group a bag of coins, an eye dropper, and a cup of water. Each member of the group is responsible for one coin. Each member will take turns doing the following with their coin.

- 1) Put their coin on top of a paper towel.
- 2) Fill their eye dropper with water and carefully drop water on their coin.
- 3) Keep track of the number of drops of water the coin can hold.
- 4) Record the number of drops on chart #1 *in the space provided for their group only*.

Once the class chart #1 is filled, have them compare their prediction with the actual numbers that groups got and see if they were close. Demonstrate how to represent the information in a bar graph. Involve the class in making a bar graph with the data.

Have a class discussion. Compare the number of drops of the different coins. What do you notice? What information does our bar graph give us about the coins? Then have students come up with their own questions. For example, do all pennies hold the same amount of water? What other things besides size affect the number of drops each coin can hold? Will salt water make a difference?

Instructional Procedures

Tiger Math

In this activity you will give students the opportunity to read a graph and then transfer their knowledge to make a different kind of graph. This can be done in their journals and it is a great way to assess their knowledge of graphing different types of graphs.

Read the book *Tiger Math Learning to Graph From A Baby Tiger*.

Explain to students that they are going to make different graphs from this book. Hand out the *Rubric for Graphs* to put in their journals and go over each of the requirements for each graph. Make an overhead of page 8 in the *Tiger Math* book. It shows a pictograph of tigers in the wild. Go over this graph with your students. Explain the categories and how they would read this graph.

Have students make a bar graph from the information given to them in the pictograph. This should be done in their journals.

Have them share their bar graphs with their tables.

Make an overhead of page 14 in the *Tiger Math* book. It shows a bar graph of T.J.'s weight. Go over this graph with your students. Explain the categories and how they would read this graph.

Have students make a pictograph from the information given to them in the bar graph.

Have them share their pictograph with their tables.

Make an overhead of page 16 in the *Tiger Math* book. It shows a bar graph and compares Matthew and T.J.'s weight in time. Go over this graph with your students. Explain the categories and how they would read this graph.

Have students make a line graph from the information given to them in the bar graph. Explain that line graphs can only be used to graph if you are graphing something over time.

Have them share their line graphs with their tables.

Make an overhead of page 26 in the *Tiger Math* book. It shows a line graph and compares Matthew and T.J.'s weight in time. Go over this graph with your students. Explain the categories and how they would read this graph.

Have students make a bar graph from the information given to them in the line graph.

Have them share their bar graphs with their tables.

Extensions

For advanced learners, have students come up with more than one different type of graph for each overhead presented.

For learners with special needs, have them work with a partner at their table.

An extension to this lesson is to have students do a pictograph of the tigers in the wild by using small plastic tigers. Get a plastic clear tarp and draw and label the axis and place the tigers on the plastic to form a pictograph.

An extension you could use with the graph on page 22 would be to show the different weight and sizes of T.J. To do this you would need four different-sized stuffed tigers that represent each of the different weights T.J. is throughout the 14 weeks. You could use the same plastic tarp used above, but change the graph to represent T.J.'s weight.

Another way to use line graphs would be to grow a plant in your class and graph the size of the plant over time.

Family Connections

Students should take home their journals and share with their family the different graphs they used.

Students could construct a graph of their own that shows their growth over time. They could do a line graph of their weight throughout the first few weeks of their life.

Students could be assigned a graph that they would make at home that would have to do with something about their family. They could then bring this to school to share with everyone.

Assessment Plan

When students are sharing their different graphs with their tables the teacher should walk around and make a quick assessment to see if each student understands the graphing assignment.

Students should hand in their journals and the teacher will assess their graphs to see if they have included all the information needed to complete each of their graphs. This assessment should be done by using the rubric given to the students at the beginning of the lesson.

Bibliography

Baxter, J.A., Woodward, J., & Olson, D. (2001). *Writing in mathematics: An alternative form of communication for academically low-achieving students*.

In this study, they analyze how one teacher used writing to support communication in a seventh-grade, low-track mathematics class. For one school year, they studied four low-achieving students in the class. Students wrote in journals on a weekly basis. Using classroom observations and interviews with the teacher, they developed profiles of the four students, capturing their participation in class discussions. The profiles highlighted an important similarity among the four students: marginal participation in both small-group and whole class discussions. However, their analysis of the students' journals identified multiple instances where the students were able to explain their mathematical reasoning, revealing their conceptual understanding, ability to explain, and skill at representing a problem.

Stepanek, J., Jarrett, D. (1997). *Assessment strategies to inform science and mathematics instruction; it's just good teaching*. (ERIC Identifier: ED415114) Retrieved November 24, 2006. Using assessment to inform instruction is one of the most powerful tools a teacher has to improve her teaching. It is also one of the most overlooked. Teachers routinely use assessments for a variety of reasons, most often to assign grades and to report students' progress to their parents. However, assessment's real power is its ability to shape and direct classroom instruction.

Authors

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