

Line Graph Math

MATERIALS

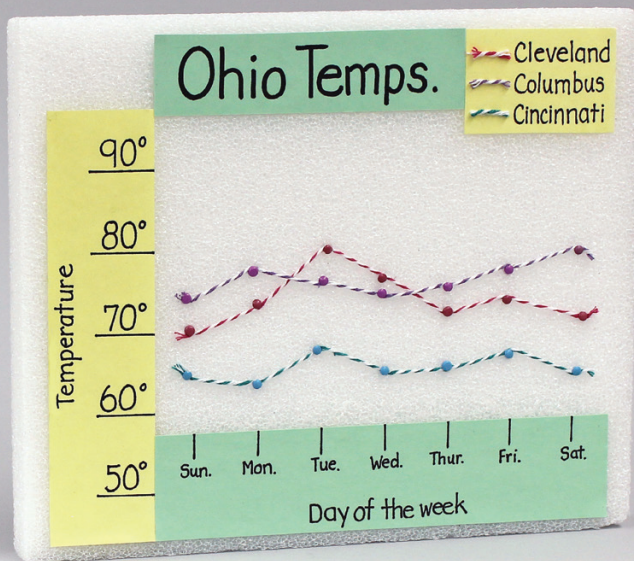
FOR STUDENT:
(one per two students unless otherwise noted)

- FloraCraft® Make It: Fun® Foam Block, 1 3/16" x 9 7/8" x 11 7/8"
- Cardstock, two 2" x 12" strips of each of two light colors (such as yellow and green) per group
- Baker's twine (or yarn) three 14" – 18" lengths in each of three colors (or as required by research)
- Brads (paper fasteners), seven - twelve 3/16" diameter (mini), in each of three colors (or as required by research)

- Pencil
- Washable black fine tip marker
- Ruler
- Scissors
- Glue stick
- Paper plate
- Small plastic cup (to hold brads)

FOR TEACHER:

- Cardstock, 12" x 12" sheet of each of two light colors, per three groups
- Sheet of white address labels
- Pencil
- Washable black fine tip marker
- Ruler
- Scissors
- Paper cutter
- Glue gun (for teacher only)
- Paper towels



MATH

GRADE LEVEL
FOURTH – FIFTH

COMPLETION TIME

- 50 minute session

OBJECTIVES

Students learn to:

- Either conduct research by comparing information or find studies that provide comparative information
- Interpret information and determine how to report
- Chart information in a dimensional line graph

STANDARDS

- Measure and interpret data
- Reason abstractly and quantitatively; Make sense of problems and persevere in solving them
- Look for and make use of structure; Model with mathematics

LESSON INTRODUCTION

• Discuss the various types of graphs (bar graphs, line graphs, pie charts, etc.) Then show the students examples of line graphs, pointing out that they compare two variables that are plotted on either a vertical or a horizontal axis. Show how numbers, days, dates and colors, etc. are used.

• In advance of the class, have the students design and conduct a research study with classmates, family or community on a topic of their choice. Or have them find research results that they can put into a line graph. (Note: It is recommended that you have them find written data or data in another type of graph so that they are figuring out how to communicate the data in a line graph.) Approve each group's plan before the class.

TEACHER PREPARATION

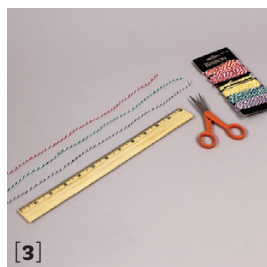
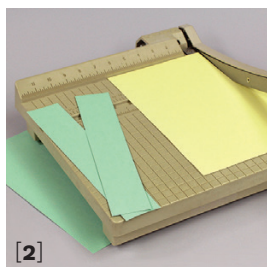
Note: Read through all the instructions first and check out the TIPS! Students can work with a partner to do the research, or find the data and then, they can make the line graph. Have a glue gun plugged in and ready to use (ideally set on low temperature) but out of student reach. This can give you immediate adhesion when in a hurry to help students. It is also recommended that you make a sample first, before preparing the materials for any others, since knowing the process, first hand, might affect how you prepare.

[1] Open the packages of foam blocks, one per two students.

[2] Use a paper cutter to cut two 2" x 12" strips of each of the two light cardstock colors (yellow and green) per group.

[3] Use a ruler and scissors to measure and cut three 14" lengths of each of the three colors of baker's twine, per group.

[4] Put on a paper plate: Glue stick, ruler, pencil, marker, scissors, cardstock pieces, label, three twine lengths, and brads in a cup. Put the foam block under the plate. Repeat for all the groups.



makeitfuncrafts.com

INSTRUCTIONS

[1] Have the students find their approved-by-you data and discuss with their partner how to create the graph, figuring out everything from their title to which colors of cardstock strips will be used and where they will be used.



[2] Ask the students to work in pencil first, measuring and planning. Explain that they may use scissors to trim strips as desired. Remind them that they will need a key that identifies the colored baker's twine representing their data. Encourage the use of light pencil guidelines for writing the title and any captions and being accurate with measurements. (You may want to approve their strips first, before they go over the pencil in marker.)

Also ask them to put their names on the label and attach it to the back of their foam block.



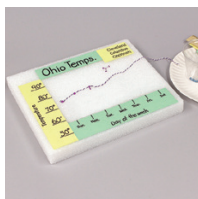
[3] Have the students lay out all of their title and data strips before gluing anything. Demonstrate and have them lightly mark the foam with a pencil, at the corners of one strip so that they know the gluing area of that strip. (Have them work on only one strip at a time.) Remove the strip, apply a generous layer of glue stick to the foam so that it fills the pores and connects with the strip, and set it back in

place. Repeat with the other strips.

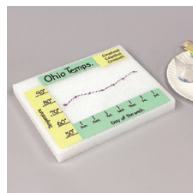


[4] Demonstrate how to set the correct color of baker's twine on the foam with the end on the first data point. (Show them how they figure out the data points by following over and up the axis on the chart, using a ruler if needed to be accurate.) Leaving just a little of the twine end extended beyond the first data point, insert a correct color brad through the twine, going down into the foam at that correct point. Gently guide the twine to the next point and insert a brad.

Continue inserting into the data points all across the foam block.



[5] Double check for data accuracy and then when you're sure that the data points are correct, trim off the extra baker's twine with scissors. Have the students attach their first graph line. (You may want to check them before they go on to their next graph line.)



[6] Have the students repeat with their other graph lines, explaining that the twine may go over the earlier lines as the numbers require. Remind the students to cut short little snips of twine to glue to their key.

MODIFICATIONS

To simplify project:

- Give students the data for just one graph line and focus on understanding the concept.
- Photocopy the data strips and have all the students use the same research.

To expand project:

- Use a longer foam block and chart the data for a longer period of time.
- Increase the number involved in the research, thus, increasing the number of baker's twine lines.
- If students did not do their own research for this project, have them design and conduct their own study next.

For multiple ages:

- Younger and older students can work side-by-side, with the older students doing their own research and the younger ones helping chart it, or charting their own with data you provide for them.
- Younger students can chart just one graph line of their own data that they have researched.

ADDITIONAL IDEAS

- Have several groups of students (or all of them) work together to create a larger research project with more complex line graph reporting.
- Give students groups of data for them to determine how a line graph could be made for each.
- Have students find examples of other research projects that could be reported with a line graph.
- Come up with a longer-term research project that the students can plot weekly or monthly on a large foam piece with regular size brads.
- Have students create the other types of graphs. Use a foam disc and cut it apart for a pie chart, painting the sections different colors. Use strips of foam, cut with a plastic knife, for a bar graph, also painting each one.



makeitfuncrafts.com

TIPS

- Have extras of everything.
- If the label won't stick, have the students apply a generous layer of glue stick to the foam and set the label onto it. This allows there to be a build up of glue on the surface, and gives the best adhesion.
- If you anticipate changing the data, don't trim the end of the baker's twine. Wrap the end around to the back and secure with a brad. That way you have enough twine to adjust the graph line as data directs. (For that matter, if you anticipate changing any of the cardstock strips, don't glue those down. Just insert brads into the corners to hold them.)
- If students have trouble with the beginning or ending of the baker's twine pulling out of the brad, tie a knot, or spot glue it with glue stick.
- Have paper towels ready to distribute to any gluey fingers.

REFERENCES

Graphing Hidden Pictures by Carson-Dellosa
Bars, Lines, & Pies by Scholastic
Sir Cumference and the Off-The-Charts Dessert by Cindy Neuschwander
Tiger Math by Ann Whitehead Nagda