

Math Parent Functions Pop-Up Books

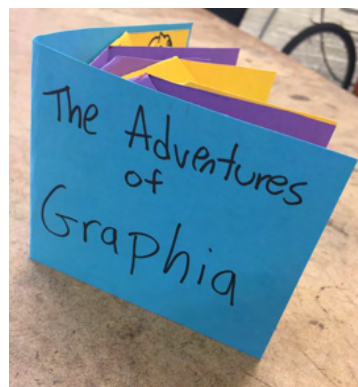
Shared by: Megan Flynn, MIT class of 2021

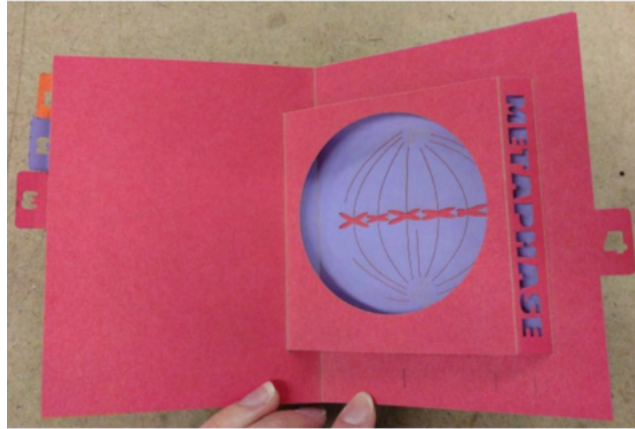
Specialized tools/technology used:	Experience level required:
Vinyl cutter <i>Alternative: scissors/craft knife</i>	Beginner <i>Alternative: Intermediate</i>
<i>Optional:</i> 2D modeling software like Gravit	Intermediate

Grade Level (of this example): 4-10

Content Standards (of this example): Learning parent functions, graphing inequalities

Summary of Project: Students learn common functions in math by creating a pop up booklet that tells a creative story with graphs. Utilizing parent functions and/or inequalities, students are able to make a variety of trajectories for the characters and scenes in their stories and demonstrate them in pop-up form. For example, the square root function could represent a plateau, or a quadratic function could depict a large hill. By the end of their story, students will have a better understanding of the parent functions and their characteristics. Students can use measurements given below to create a basic template, or use a scaled version of their own making. Examples provided here were cut by hand, but for a professional look, students can use a drawing program to create the graphs, and a vinyl cutter to cut the pages. Students may work individually to create their own stories, or combine pages to make a group story. This project will take about two to six hours to complete and can be presented as a library of booklets or as an individual storytelling presentation. Students do not need any prior experience making pop-ups but should be proficient with scissors or craft knives or have access to a vinyl/paper cutter.





Other Possible Content Explorations:

ELA

- Give students a storytelling goal to meet -
 - A story archetype of their choice (journey, coming-of-age, self vs. nature, etc.)
 - A reboot of a familiar story or sequel/prequel to a familiar story

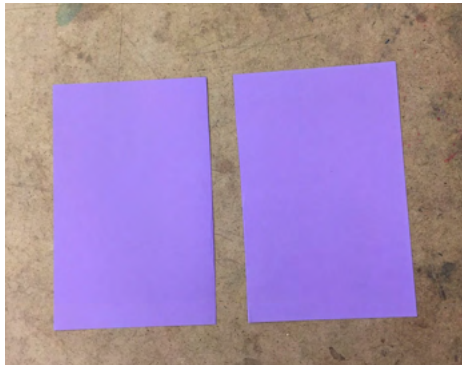
Social Studies/Math

- Geographical data research projects: create a pop-up pamphlet with creative infographics

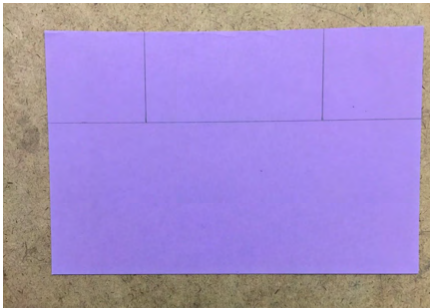
STEM: Biology or Chemistry

- Create a visual glossary or field guide to a collection of vocabulary
Example: phases of mitosis, designed using Gravit, laser-cut from cardstock

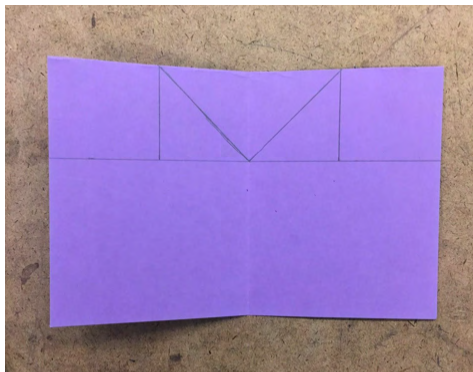
Visual how-to-make overview:



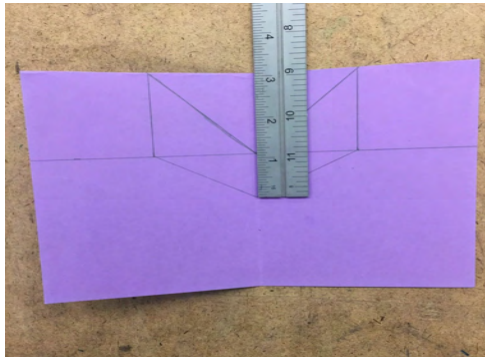
Start by cutting a piece of $8\frac{1}{2}$ by 11 inch paper in half along the longer edge. You'll be using one piece with a long edge as the top



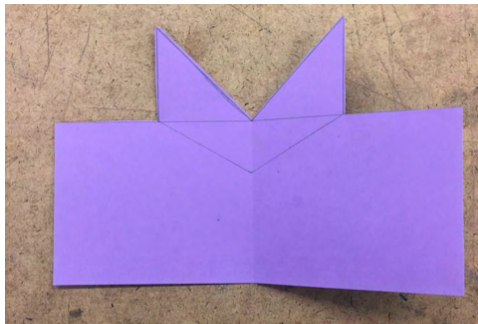
Draw a line two inches from the top, boxing off $2\frac{1}{4}$ from the sides to make a 4 by 2 inch box for your graph to go in the center.



Draw your graph, folding your page in half hamburger style to help center your drawing.



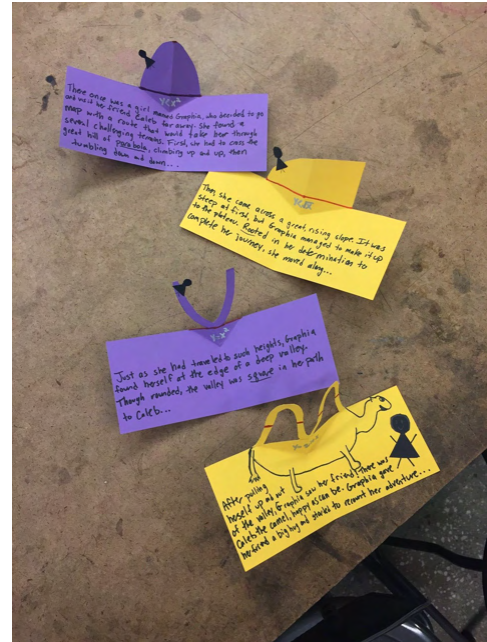
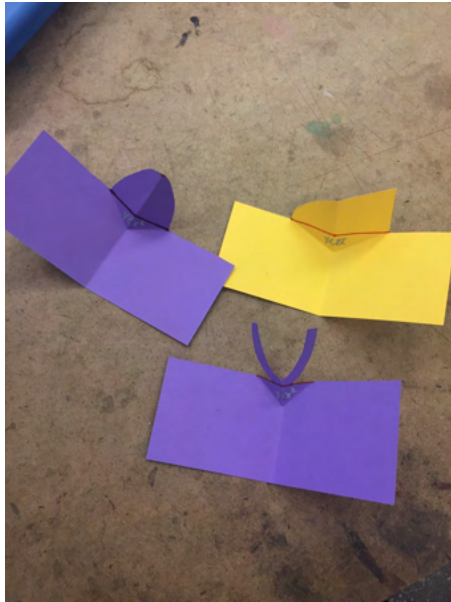
Make a mark about an inch below your horizontal line on the centerfold, connecting the bottom corners of your graph box.



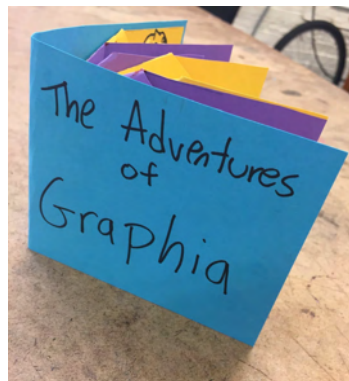
Cut out your graph, leaving the bottom intact if you're graphing an inequality. (In this example we have $y < |x|$)



Fold the graph down by the diagonal lines, letting the centerfold of the graph invert.

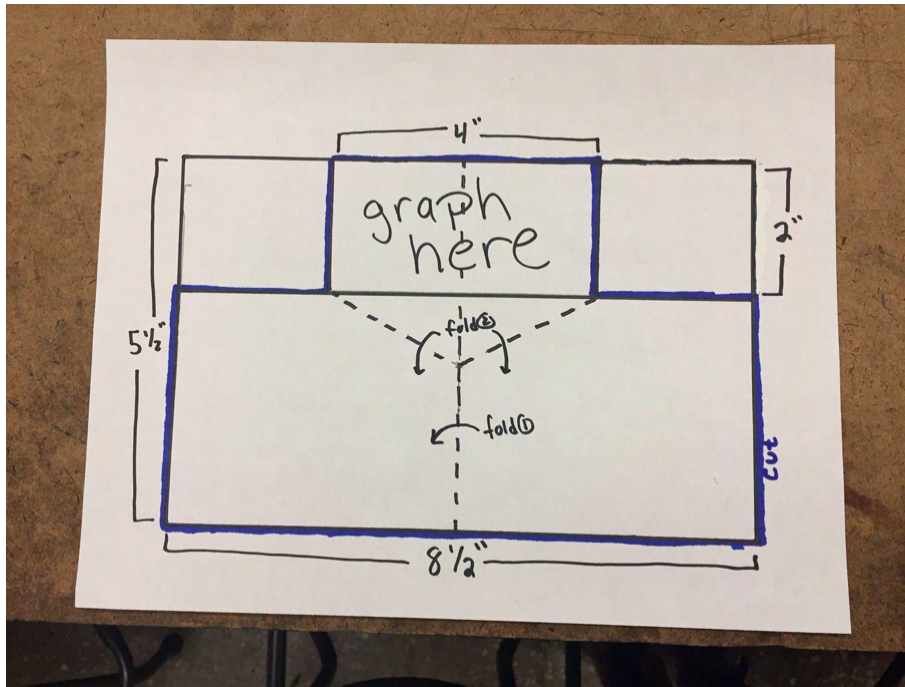


Repeat for various graphs, labeling the functions and adding a story with decorations.

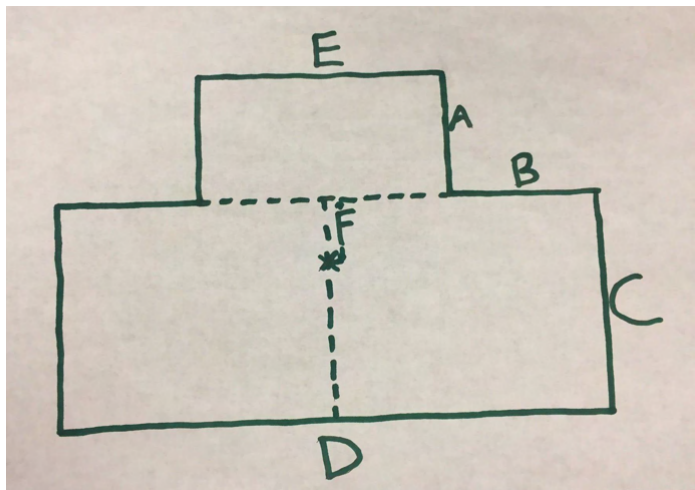


Glue the pages together and add a cover to keep your book contained and looking nice!

Here is a basis of the template with dimensions



If you're making new dimensions



$$A < B$$

$$A < C$$

$$E/D \leq \frac{1}{2}$$

F about 1 inch

(last two help with the level of pop up)