ACTIVITY 4.6

Developing Concepts

Group Activity for use with Lesson 4.6

Graphing Families of Linear Equations

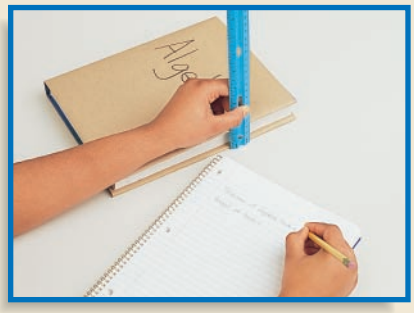
GROUP ACTIVITY
Work in a small group.

MATERIALS
- desk
- textbooks
- graph paper
- meter stick or metric ruler

QUESTION What are some relationships that exist between members of a family of equations?

EXPLORING THE CONCEPT

You can use a linear equation $y = mx + b$ to model the height from the floor to the top of a stack of books that are m centimeters thick sitting on a desk b centimeters high.



1. Measure the thickness of your algebra textbook. Measure the height of the top of your desk to the floor.
2. Write a model for the height y from the floor to the top of a stack of x algebra books the same size as yours sitting on your desk.
3. Graph and label your model from **Step 2**.
4. Measure the thickness of your English textbook. Write a model for the height y from the floor to the top of a stack of x English books the same size as yours sitting on your desk. Graph this model in the coordinate plane you drew in **Step 3**.
5. Repeat **Step 4** using another book.

DRAWING CONCLUSIONS

1. Equations that have characteristics in common can be thought of as a *family of equations*. List all of the characteristics that the equations have in common. List all of the characteristics that their graphs have in common.
2. Suppose in **Step 2** you used the same book but on a desk or a table of a different height. Write models for the height of a stack of algebra books on a desk 74 cm tall and on a computer table 68 cm tall. Graph these models in the same coordinate plane. What characteristics do the equations share? What characteristics do their graphs share?
3. What characteristics are shared by the family of equations in which $m = 4$?
4. What is true about the family of linear equations with graphs passing through the point $(0, 5)$?