

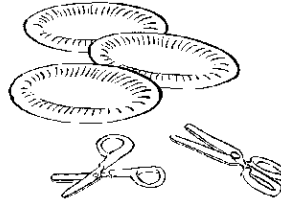


## *Paper Plate Math*

This activity was adapted from one by Carol Smith and Anne Linchan.

### **THIS IS ABOUT**

- Δ proportional reasoning
- Δ logical thinking



### **YOU WILL NEED**

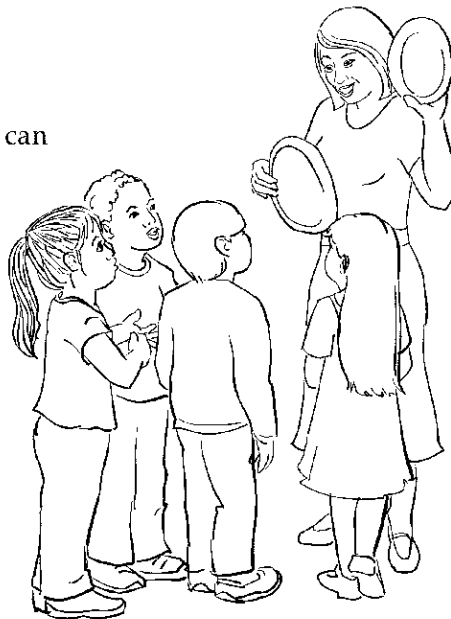
- Δ paper plates of two or three colors (or white plates may be colored with crayons or pens)
- Δ scissors

### **GETTING READY**

Think of things from children's lives that can be compared, such as

- Δ food they like
- Δ physical sizes
- Δ values
- Δ parts of a whole (fractions)
- Δ parts of a group
- Δ distances

Have children ask questions or make suggestions about what to compare.



### ACTIVITY

1. Mark the center of two plates. Make a slit on each plate from the edge to the center. (If children are able to handle scissors, they should make the cuts themselves.)
2. Match the slits of both plates, and slide them together.
3. Rotate the two plates in opposite directions. Make the two colors get larger or smaller.
4. What happens to one color if the other gets larger? (Be sure you and the child are both looking at the same side of the plates. From the opposite side, the relative sizes of the two colors will be reversed.)
5. Use the plates to compare things.  
"Think about yellow bananas and red apples. Use your plates to show which you like better. How much better do you like that fruit?"
6. If children are having difficulty, help them by asking more questions:  
"Do you like bananas a whole lot better than apples? Can you make the yellow part a whole lot bigger than the red part of the plates?"

For each question, decide which color represents each idea.

*Paper Plate Math (continued)*

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**Two-Color Questions:**

Allow time for your child to explain the answers. Do only a few at a time. Let your child ask you questions.

How much of each day are you asleep and how much are you awake?

How much time do you wish you could sleep (be awake)?

How much time do you watch TV and how much time do you play outside?

Show how many red and yellow flowers there are.

Show me how much you like summer and winter.

Show me one o'clock (or another time).

Show me something that's more than  $1/2$  (or another fraction).

Show me  $1/3$  and  $2/3$ .

Which would you rather play, checkers or dominoes?

How much bigger is your family than your friend's family?

Tell me a story using your paper plates.

When you have worked with two plates for a while, add another plate and make up new questions.

**Three-Color Questions:**

Show me how much you like the three colors of your plates.

How much do you enjoy playing ball, reading books, or helping clean up?

Show me how much time you spend at school, sleeping, and at the playground.

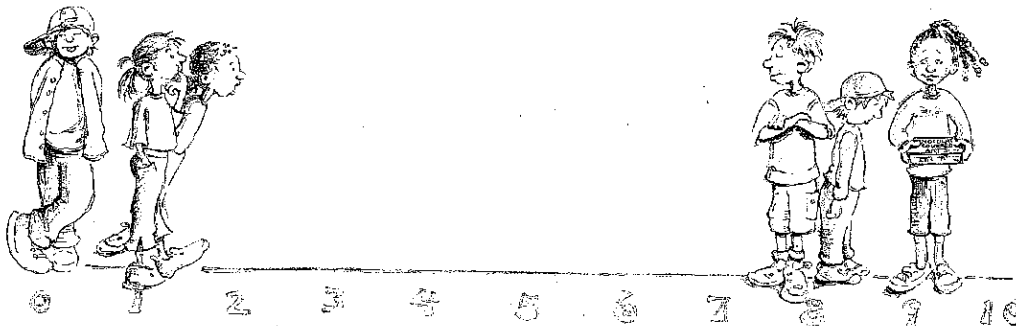
Show me which go faster: cars, dogs, or turtles.



SIDEWALK MATH

## Value Line

K-6



**MATERIALS**

chalk  
yourself and a couple of friends  
or family members

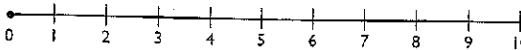
**REAL-WORLD CONNECTION**

Likert scales, graphing information, and making value judgments are aspects of collecting information and assessment. They are used for a variety of purposes such as marketing or providing products to specific communities or groups.

**How**

In this activity, we will use a value line to get children thinking about their opinions on particular issues.

- Draw a straight line about 10 feet long on a sidewalk or driveway. Write numbers on it from 0 to 10, like this:



*Figure out how to make these numbers evenly spaced without a yardstick.*

- Let 0 stand for NO WAY! and let 10 stand for ABSOLUTELY!
- Think of a question that requires an answer on a scale between 0 and 10. Ask each person (including yourself) to stand on the number that best represents his or her answer.





**This is about**  
understanding sequence  
on a number line.

Here are some questions you can ask. Or, you can make up your own.

- I would eat chocolate-covered ants.
- I would ski on a snowy day.
- I would sing on a stage for a large (100 people) audience.
- I would like to plant a garden.
- I would eat ice cream until I was ready to explode.
- After everyone has settled on where they want to stand, look around. Compare how many people are on each of the numbers. Discuss your differences of opinion.
- Here are some more statements, but in this case 0 stands for NEVER! and 10 stands for A LOT!
  - I go to the library.
  - I use the internet for homework.
  - I watch TV on the weekends.
  - I dance.
  - I recycle cans, glass, and paper.
  - I speak another language besides English at home.
  - Make up some more questions of your own and HAVE FUN!



## The Magnified Inch

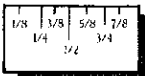
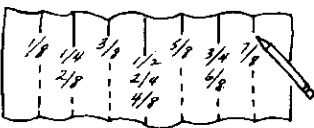
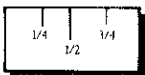
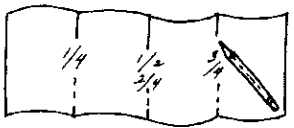
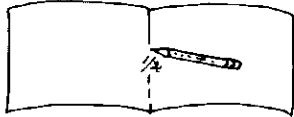
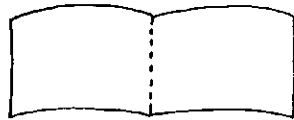


### TOOLS

8-1/2" x 14" paper or longer  
 (1 piece per person)

Pen or pencil

Rulers marked in  
 1/2, 1/4, 1/8 inches



### Why

To explain the lines representing fractions of inches on rulers

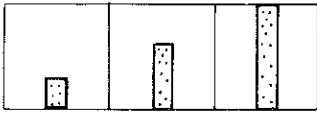
### How

- Pretend that the length of one inch has been magnified to the length of your paper.
- Fold the paper in half end to end.
  - How many sections does your paper have?
  - Draw a line along the fold about three inches long.
  - Write 1/2 under your line to indicate it is 1/2 of the way along the paper. Compare your paper to a ruler marked in half inches.
  - Use your magnified half-inch ruler to measure objects to the nearest half inch.
- Now fold your paper in half again.
  - Draw a line about 2-1/2 inches long on each new fold.
  - The first line is 1/4 of the way along the length of your paper.
  - Write 1/4 under it.
  - The next line is 2/4 or 1/2 of the way along.
  - The third line is 3/4 of the way along.
  - Write 3/4 under this line.
  - Compare your paper with a ruler marked by quarter inches.
  - Use your magnified quarter-inch ruler to measure some objects to the nearest quarter inch.
- Now fold your paper in half again.
  - How many sections are there now?
  - Fill in the rest of the numbers.

### More Ideas

- Continue this process with one more fold to indicate sixteenths. With two more folds to indicate thirty-secondths.
- Measure objects to the nearest sixteenth or thirty-secondth of an inch.
- Learn to read millimeters and centimeters on metric rulers.

# Making a Fraction Kit



**TOOLS**

Pencil

Scissors

Strips of 3" x 18" construction paper

For Kit I you need 4 strips of different colors

For Kit II you need Kit I plus 3 more strips of different colors

**Why**

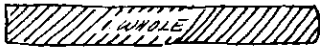
To see and understand the relative values of fractions by making physical representations

► When young children are learning simple arithmetic, it is essential that they have many experiences with concrete materials, such as blocks, before they can truly understand the difference between three  $\frac{1}{3}$  and five  $\frac{1}{5}$ . In the same way, making a physical model of fractions provides reinforcement for understanding the relative values of fractions. ◀

**How**

**To Make Kit I**

- Take 5 strips of different colors. With your children, compare the strips to be sure they are all the same length. Talk about the fact that the strips each represent "1 WHOLE" and that you will be cutting some into fractional parts.
- Label one strip "1 WHOLE." (Note: It is often convenient to use a black strip for your whole.)



- Take another strip and fold it carefully in half.
  - Fold by first lining up the edges of the strip and then creasing the fold.



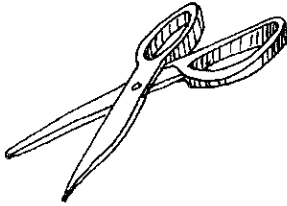
How many sections will you have when you open your folded strip?

Open it and count.

- Label each part  $\frac{1}{2}$  and cut on the fold line.



- Take another strip and fold carefully in half two times.



# ACTIVIDADES DE LOS MATEOYCIENTINA

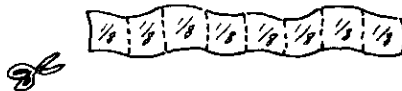


Guess how many sections you will have when you open it.  
Count the sections.

- Label each part  $1/4$  and cut them apart.



- Take another strip. This time fold it in half **three** times.  
Again, be very careful to fold accurately.  
How many sections will there be this time?  
Count to check.
- Label each part  $1/8$  and cut them apart.



- Continue with the last strip. Fold **very** carefully **four** times.  
This time you will get one-sixteenth ( $1/16$ ) for each section.

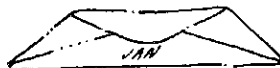


- Put your name on each part of your kit.
- Keep the pieces in a large envelope or a shoe box.
- This completes Kit I. Primary students should work with Kit I for some time before making Kit II.

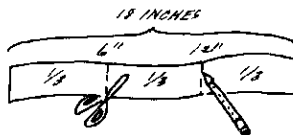


**To Make Kit II:**

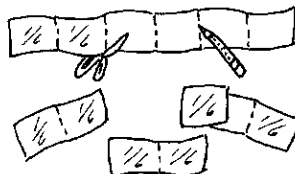
- Kit II consists of Kit I plus the pieces made from three more 18-inch strips.



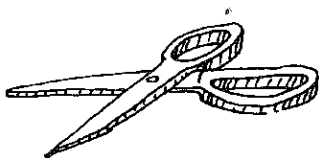
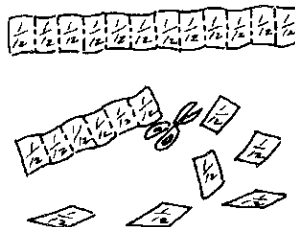
- Make Kit I.
- Take the next strip, measure and mark it with a pencil at 6" and 12" along the edge. Fold on these lines.
  - You will have three sections.
  - Label each 1/3 and cut them apart.



- Take the next strip. Make thirds and then fold each third in half.
  - How many sections do you have?
  - Label each section 1/6 and cut them apart.



- Take the last strip. Make sixths and then fold each sixth in half. You will have twelve sections this time.
  - Label each section 1/12 and cut them apart.



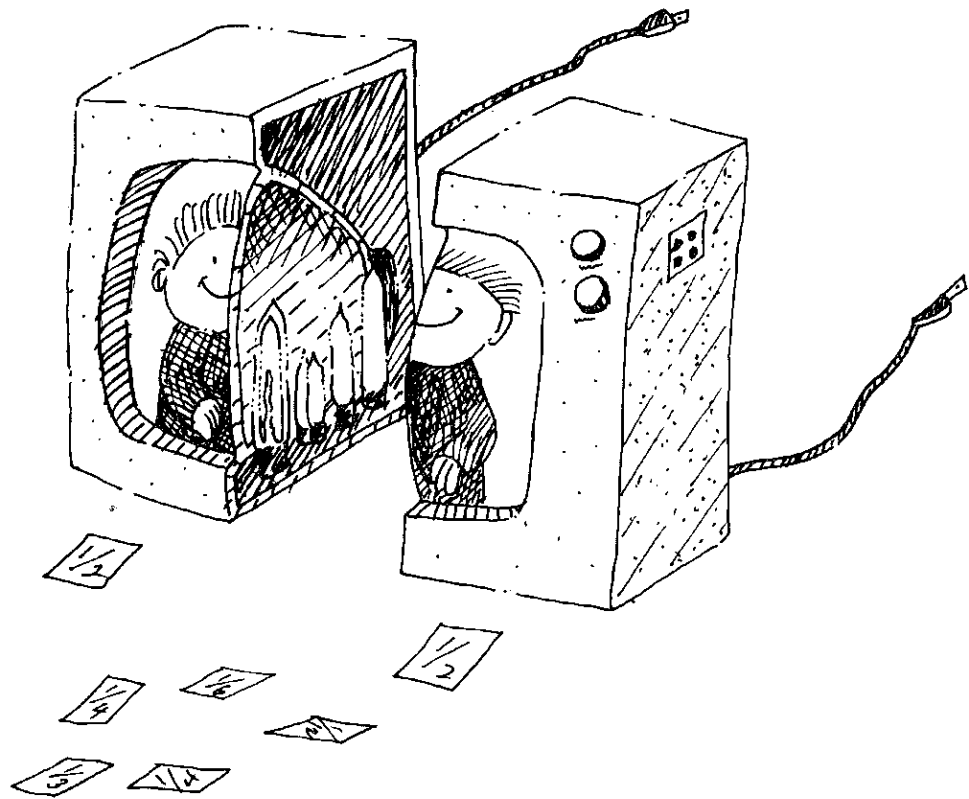


- Put your name on each part of your kit.
- Use your fraction kit to compare the sizes of different fractions and for Fraction Cover Up and other fraction activities.

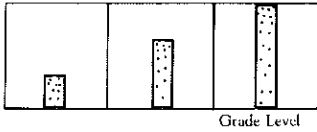
**More Ideas**

**Equivalent Fractions** are easily shown with these kits. For example, 1 WHOLE is the same as 2/2, 3/3, 4/4, etc. Explore with your children some other equivalent fractions, using your strips to check. Keep a record like this:

*1/2 IS THE SAME AS 2/4 OR 3/6 OR 4/8*  
*2/3 IS THE SAME AS 4/6 OR 6/9 OR 8/12*  
*3/4 IS THE SAME AS 6/8 OR 9/12*



## Fraction Kit Games



### TOOLS

A Fraction Kit for each player (see pages 120-123)

One die labeled:  
 $1/2$ ,  $1/4$ ,  $1/8$ ,  $2/8$ ,  
 $1/16$ ,  $2/16$   
 for Kit I or

One die labeled:  
 $1/3$ ,  $1/4$ ,  $1/6$ ,  $1/8$ ,  
 $1/12$ ,  $1/16$   
 for Kit II

Games for  
 2-6 players

### Why

To practice using fractional parts of a whole, recognizing relative sizes and **equivalent fractions**

- ▶ Before your children can learn to add, subtract, multiply, or divide fractions, they must understand the relationship between different kinds of fractions.

For example, in order to add  $1/6 + 2/3$ , it is necessary to realize that  $2/3$  is the same as or **equivalent** to  $4/6$ .  $1/6$  added to  $2/3$  may not make sense, but  $1/6$  added to  $4/6$  is  $5/6$ . Changing the thirds to sixths requires finding a **common denominator**, or a fractional part that is part of both sixths and thirds. ◀

### How

#### Fraction Cover Up

- Start with your "1 WHOLE" strip in front of you.



- Take turns rolling the die.
- Take the fraction you roll and place it on your whole.
- For example, you roll  $1/4$ .
- The first player to cover their whole **exactly** wins.

#### Fraction Exchange Subtraction

- Start with your WHOLE covered with two halves.



- Take turns rolling the die.
- Whatever you roll, you take off (or subtract) that fraction. You may have to exchange first. For example, if you roll  $1/8$  on your first roll, you must exchange  $1/2$  for  $4/8$  before you can subtract  $1/8$ .
- The winner is the first player to uncover his or her WHOLE, exactly.

### More Ideas

- Put two fraction kits together and play to cover up different amounts. For example, play to cover up two WHOLEs, or one and one-half WHOLEs.
- Play to see who can make the largest number after five turns.