

# Candy Math

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As a high school teacher and parent, I am always trying to design interesting mathematics activities that I can do with my children at home. When my children were working on fractions in school and having some difficulty with the concepts of fractions, I did the following activities with them. The activities will only be successful if you become the "question-asker." In other words, it is important to let your children be the thinkers and answer-givers. In the activities described below, suggested questions are identified by "Q" while desired answers are in parentheses. You will need several pieces of licorice, scissors to cut the licorice, and paper and pencil to write fraction names and fraction symbols.

## Activity 1: Naming Fractions

Cut a piece of licorice in half and then cut the halves in half.

Q: What do we call these pieces? (Fourths.)

Pick up one of the pieces.

Q: So what is this piece called? (One fourth.)

Pick up two pieces.

Q: And these are . . . ? (Two fourths.)

Q: Yes, it is two fourths. But is there another name for this? (One half.)

Continue this questioning with three fourths and four fourths.

Q: How many halves in four fourths? (Two.)

Q: How many wholes in four fourths? (One.)

Take a second piece of licorice and one fourth from the old piece.

Q: How much do we have now? (Five fourths or one whole and one fourth.)

Do the same with six fourths, which can also be expressed as one whole and two fourths or one whole and one half. Continue this activity as far as you wish. It is important to stress the different ways we can name fractions as well as focusing on fractions greater than one whole. As you may know, many young children do not think that five fourths is a fraction. This is probably due to the fact that elementary curricula tend to focus on fractions less than one in their introduction to fractions. If your children are at

an age when they are working on fraction symbols, write down all of the fractions on paper as you discuss them. You may also write equations for the equivalent fractions.

## Activity 2: Adding and Subtracting

Put two fourths on the table.

Q: If I add one more fourth, how much will we have? (Three fourths.)

Q: Is that more or less than one whole piece? (Less.)

Q: Is it more or less than one half? (More.)

Show them a whole and a half for them to compare it to. Now let's eat one fourth.

Q: How much do we have now? (Two fourths.)

Q: What if we eat another fourth? How much will we have left? (One fourth.)

## Activity 3: Adding Unlike Denominators

It is very difficult for young children to understand why we need common denominators to add and subtract fractions. I have found that the following informal activity is effective if repeated often with many different fractions.

Take two pieces of licorice. Cut one in half and one in fourths. Take one half and one fourth.

Q: How much do you have? (Three fourths.)

If you need to cut the half into two fourths, do so. Write the addition equation on paper. It is not necessary at this point to explain the common denominator procedure, but rather simply to write the equation. Now take two pieces of licorice and cut one in half and one in thirds. Take one half and one third.

Q: How much do we have now?

They probably will not be able to tell you the answer here, because it is like trying to combine an apple and an orange. What else can you say except that you have an apple and an orange? Well, children will respond the same way by saying, "We have one half and one third." Then you can do your magical demonstration by making the pieces the same size. Cut the halves into thirds (creating six pieces in all)

and cut the thirds into halves (creating six pieces in all). Now the one half is three sixths and the one third is two sixths, so one half and one third is five sixths.

## Activity 4: Multiplying with Fractions

Take a piece of licorice and cut it in half. Hold up one piece.

Q: What do you have? (One half.)

Write the fraction symbols on paper as children respond. Then cut one of the halves in half.

Q: What do you have now? (One fourth.)

So half of a half is one fourth. Cut one of the fourths in half.

Q: What do you have now? (One eighth.)

To help children know what fraction they have, ask them to pretend you've cut all four fourths in half. Continue cutting in half for as long as you wish, through sixteenths, thirty-seconds, sixty-fourths and so on. (By then the pieces will be pretty tiny!)

Q: Let's look at all of the fractions we just wrote. Do you notice any pattern in the denominators of all of these fractions? (Each denominator is double the one before it.)

Q: So if we cut one sixty-fourth in half, what would that piece be called? (One one-hundred, twenty-eighth.)

Q: Are the fractions getting larger or smaller in value? (The denominators are getting bigger, but the fraction pieces are getting smaller.)

Q: What do you think would be the smallest fraction piece we could get if we could keep cutting pieces in half? (There is none. It would keep getting smaller and smaller, infinitely.)

I have done these activities with my children many times. On those cold, dark winter evenings, my children frequently beg for licorice math after dinner. Even if their teachers are doing hands-on activities with fractions in the classroom, your children will certainly benefit from the one-on-one interaction they receive from you at home. These are just a few ideas, and I hope you will be able to come up with ideas and extensions of your own to help make fractions more meaningful to your children.

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### How Many Pages?

If you start reading a book at the top of page  $x$  and, without skipping any pages, you read to the bottom of page  $y$ , how many pages will you have read?

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