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ABSTRACT

Children's first experiences with numbers affect the ways in which they view mathematics the rest of their lives. In order to make sense of math, children need to explore and investigate using real objects instead of just symbols; practice skills in an atmosphere of fun; see mistakes as just another way of learning new ideas; make use of a variety of tools in problem solving; understand that there may be many ways to approach a problem; view math as useful, important, and more than just arithmetic; and feel confident that they can become problem solvers. This booklet contains mathematics activities that families can experience together. The activities were written by leading mathematics educators and are designed to provide opportunities to nurture a child's natural curiosity and to share the joy of uncovering math in the world around them. The activities are organized into four themes: (1) Math in Your Home; (2) Math in Your Neighborhood; (3) Math on the Go; and (4) Math in the Store. (JRH)

Uncovering Math with Your Family

Uncovering Math With Your Family

Fun Activities in the World Around You

"My children ages 5, 7, and 9 all thought this was fun." ○ "It was interesting to see the approaches my daughter decided to take compared to what I might have done." ○ "The activities encourage youngsters to find math in the environment outside of the classroom." ○

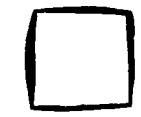
This booklet contains activities for you and your family to experience together. The activities were written by leading educators and are designed to provide opportunities to nurture a child's natural curiosity and to share the joy of uncovering math in the world around you.

The activities are organized into four themes:

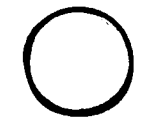
- Math In Your Home
- Math In Your Neighborhood
- Math On the Go
- Math In the Store

Look for these shapes that indicate the level of difficulty.

PreK-K



1st-2nd



3rd-4th

5th-6th

You may find fun ways of adapting activities from other levels.

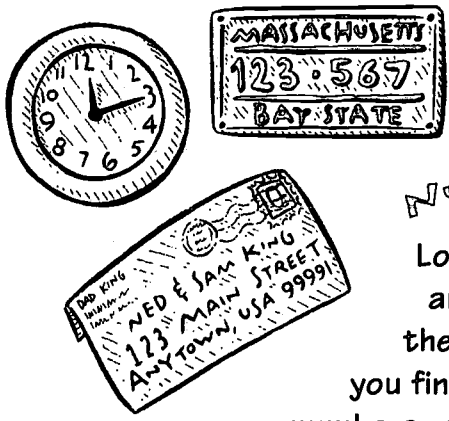
Children's first experiences with numbers will affect the ways they deal with math the rest of their lives. To make sense of math, children need to:

- **explore and investigate using real objects instead of just symbols;**
- **practice skills in an atmosphere of fun;**
- **see mistakes as just another way of learning new ideas;**
- **make use of a variety of tools to solve problems (such as coins, blocks, measuring cups, and calculators);**
- **understand that there may be many ways to approach a problem;**
- **view math as useful, important, and more than just arithmetic;**
- **feel confident that they can become problem solvers.**

"I always enjoy activities that let me and my son work together." ○

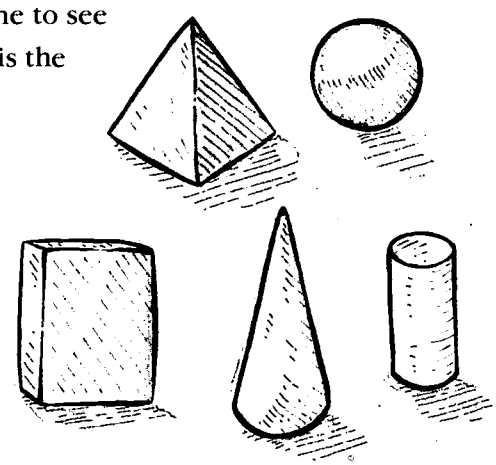
Scavenger Hunts

Because we want children to open their eyes to the wide world of mathematics around them, these activities begin with a series of "Scavenger Hunts" designed to uncover the numbers, patterns, and shapes that are a part of their lives.



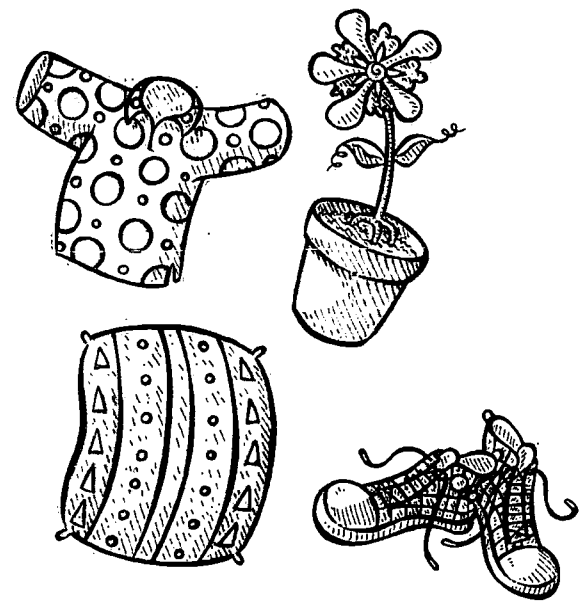
NUMBERS:

Look everywhere and talk about the numbers you find. Look for numbers on the wall, in the closet, in different rooms, on signs, on buildings, in the car, and on shelves. What numbers do you find? How are they alike or different? What do they tell you? Do these numbers tell about quantities (like how many), order (like first), identity (like a post office box)? What is the easiest one to see from far away? What is the greatest number you found? The smallest? Which number did you see the most often?



SHAPES:

Look everywhere and talk about the shapes you find. Look for shapes in the refrigerator, on TV, on doors, on shelves, in buildings, and on streets. What shape did you find the most? Which shapes are alike? Which shapes are different? Can you find shapes like those pictured?

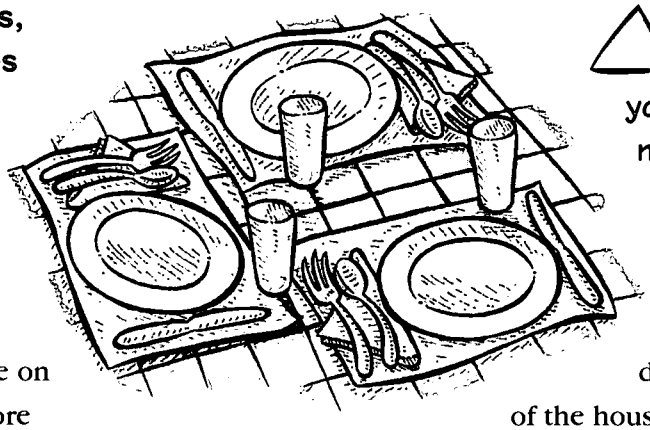


PATTERNS:

Look everywhere and talk about the patterns you find. Look for patterns on floors, on wallpaper, on ceilings, on clothing, on wrapping paper, on furniture, in structures, in nature, in streets, and on signs. What seems to happen over and over in your pattern? How do the patterns appear to grow? Do any of the patterns contain different sizes? How are the patterns alike or different? Can you describe the pattern in more than one way? Can you hear any patterns? Can you make your own sound pattern?

Math In Your Home

How many forks, glasses, plates will you need for everyone sitting at the table? Ask your child to guess the number of utensils needed to set the table. If there is 1 plate on the table, how many more will you need? Do you need the same number of each utensil? Why or why not? How long does it take you to set the table? What time do you need to start to set the table in order to have it ready for dinner?

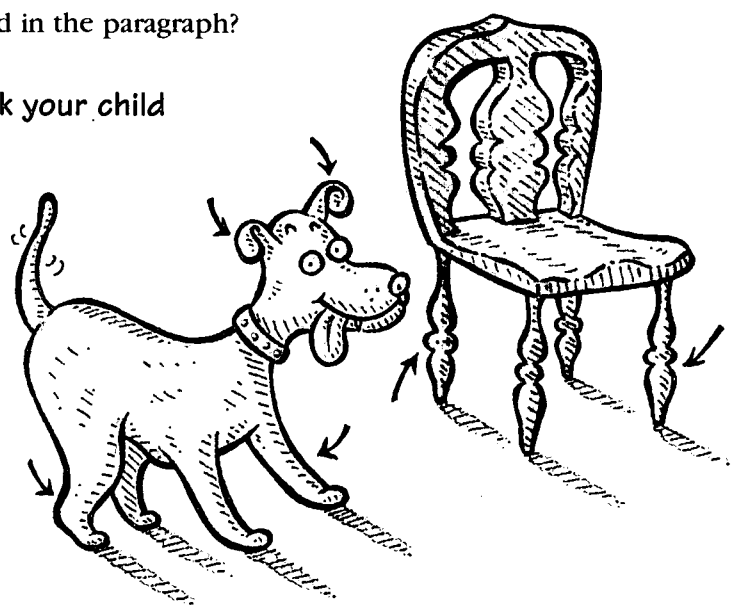


How many doors are in your home? Ask your child to count the number of doors and use objects like pennies or paper clips to help keep track of the count. Were there more doors in front or in back of the house? Which room has the fewest doors? Which has the most? Are all the doors the same size? Where is the smallest door? Where is the largest door?

"Two people did not eat applesauce with their dinner

How many letters are in a paragraph? Ask your child to count the letters in a paragraph from a newspaper or a book and keep track of how often each letter is used. How many vowels are there? How many consonants? Which letters were used most often? Which letters weren't used at all? How can you make a chart of the letters to show how often they were used in the paragraph?

What comes in 2's, 3's, or 4's? Ask your child to look around your home and find things that come in groups of 2's, 3's, or 4's. Which groupings were easiest to find? If you have 1 pair of shoes, how many shoes do you have? How about 2 pairs of shoes? 3 pairs of shoes? 4 pairs of shoes? If there are 4 legs to a chair, how many legs are there with 2 chairs? With 3 chairs? With 4 chairs? Teach your calculator to count by 2's, 3's, and 4's.



What products are advertised? Watch a 30-minute children's television show and a 30-minute newscast. Ask your child to keep a record of the products advertised during each show. How could you describe the two lists? How are the products alike? How are they different? If you were going to sell a new toy, when would you advertise it? Why?

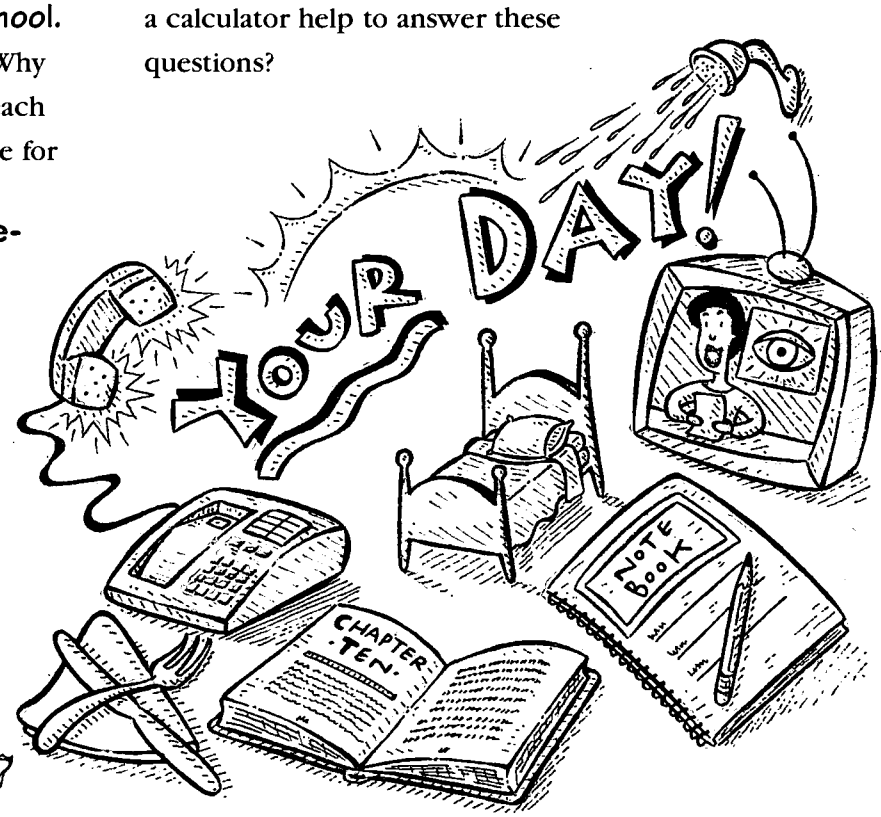
How long does it take? Explore time by asking your child to estimate and then time how long it takes to complete different household activities such as making a bed, setting the table, taking out the garbage, washing the dishes, or walking around the house. Which of your estimates were close to the actual time? Which were farthest away? Can you name an activity that you think will take less than 5 minutes? Try it and see how close you were. Think of an activity you estimate will take 10 minutes. Do it. What time did you start the activity and what time did you finish?

"The younger children did not use knives." Anne-Marie

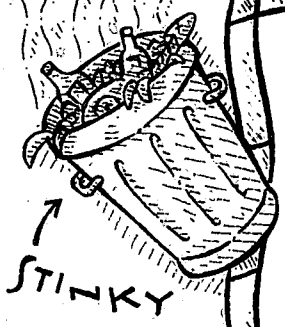
They did not need spoons."

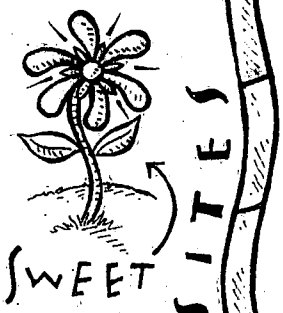
How do you spend your day? As a family, estimate the fraction of the day each of you spends eating, sleeping, on the phone, reading, watching TV, showering/bathing, at work, or at school. Would these fractions add up to 1 whole? Why or why not? About how many hours does each fraction represent? If you needed more time for studying, what activities could most easily be adjusted? How many hours a year do you spend sleeping or on the phone? How might a calculator help to answer these questions?

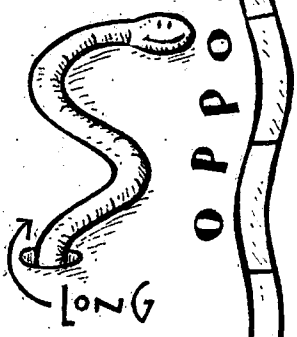
How many edges does an envelope have? Ask your child to imagine an envelope before it is folded and draw a picture of what the unfolded envelope looks like. Take an envelope apart. Is your drawing similar to the actual unfolded envelope? How many edges does the unfolded envelope have? Using the information you have found, what would an unfolded cereal box look like? How could you check?



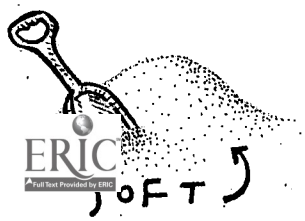
Math In Your Neighborhood







OPPOSITES



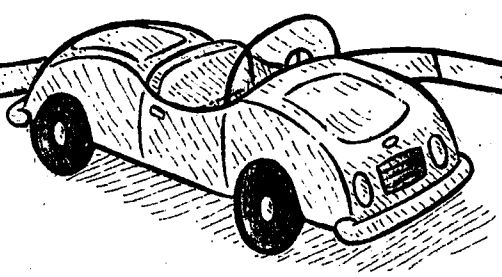
What can you find in your neighborhood? Ask your child to find 5 things that are soft and 5 things that are hard. How are both groups alike? How are they different? Would you find these things in every neighborhood? What if you looked for things that were smooth and rough? Do you think you will find more smooth things or more rough things? Try it and see. Can you think of any other opposites—like heavy and light, sweet smelling and nasty smelling, long and short? Try finding these.

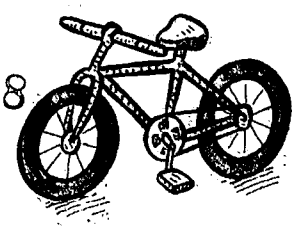
Is skipping or running faster? Ask your child to try moving from one place to another in two different ways. How can you tell which way is faster? Can you find another way to move? Is it faster or slower? What happens if you take giant steps or baby steps? Which is faster?

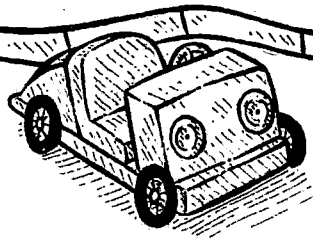
"Put one rock on each end of a see-saw and see the heavier one go down and the

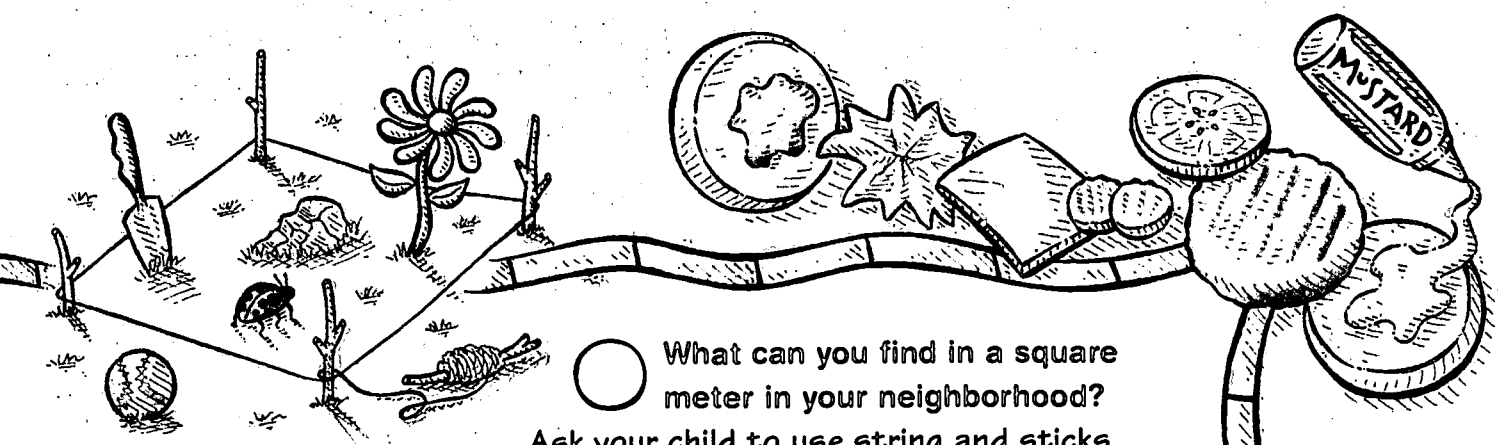
How can you measure a rock? Ask your child to find two rocks and think about ways to measure them. Compare your rocks. How could you find out how heavy they are? How could you find out how long they are? How could you find out how big they are around? What tools might help you? Which rock is heavier? Lighter? Bigger around? Longer? Wider? If your rock were in a group of 5 other rocks, could you describe it so someone could find it?

How many vehicles could your family have if you have 12 tires? Ask your child to think about the number of wheels on one car, one bicycle, and one tricycle. Talk about a way to find out and try it. How many answers do you think there might be? Is there more than one way to find the answer? Do you know anyone who has a unicycle? How many wheels does it have?









What can you find in a square meter in your neighborhood? **Ask your child to use string and sticks to outline a square meter (about thirty-nine and a half inches) and describe what is inside the string.** Are there more living or non-living things? How could you describe and count them? Would you have seen the same things if your shape had been different or if it were a different time of the year?

How many ways can you order a burger? Visit a restaurant. Identify the toppings for burgers. Ask your child to think about all the ways you can order a burger with three different toppings from the list. How will you solve the problem? How will you organize your thinking? Will you use a list, a picture, a chart, or another method? How will you know if you have all the possible ways? What if you choose four toppings?

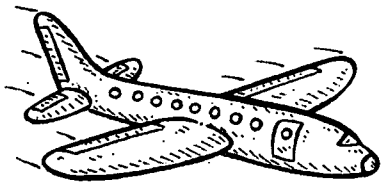
lighter one go up." "You can put one in each hand and feel the difference." Kara

How is your neighborhood organized? How are direction words used? Ask your child to make a map of the neighborhood and label it with words or numbers so someone could locate places. How are direction words used? Even and odd numbers? What number or letter patterns are on street signs? House addresses? Mail boxes? If you wrote directions to your neighborhood, what words or numbers would be helpful?

What shapes can you find on sports fields? Ask your child to identify shapes that can be found on sports fields and organize the information into a graph. Which shape did you find most often? Can you calculate the percent of each shape found? What is the area of each field? Is that an estimate or exact answer? Compare the areas of the different fields. Can you draw an accurate scale drawing of each field?

Math On The Go

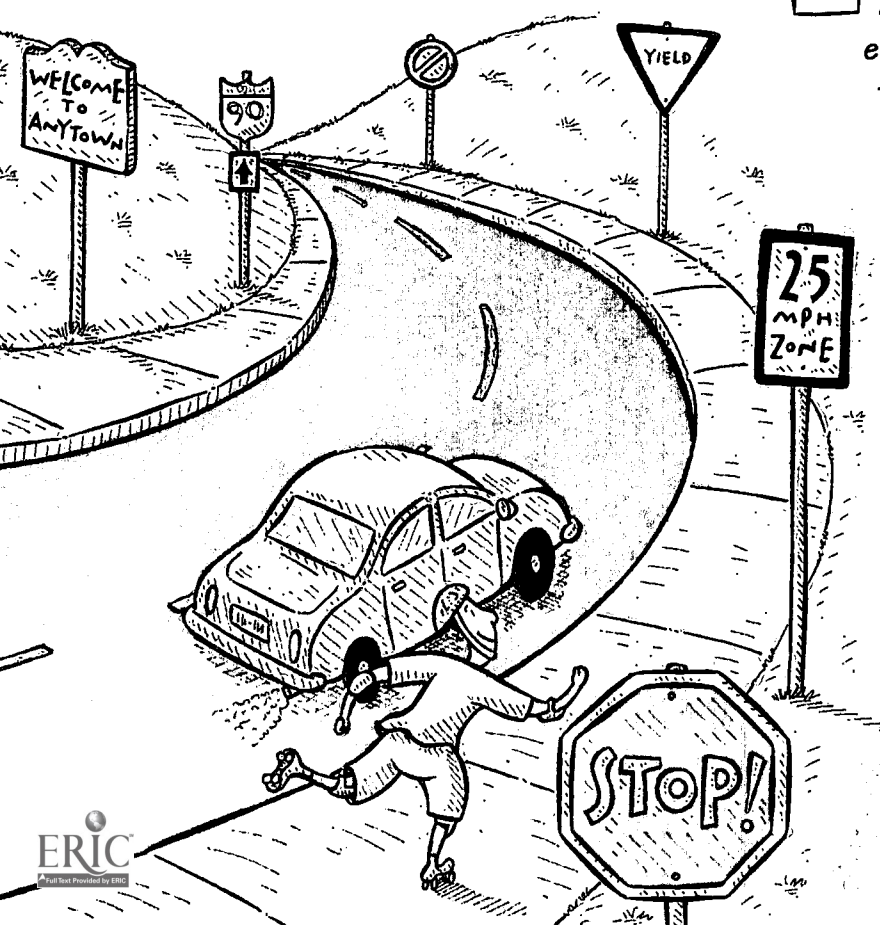
How can people move from place to place? Ask your child to think about how you get to the park, to the store, or to school. How are wheels used to move people? How could you travel if you didn't use wheels? Have your child find pictures of different ways to move from place to place and sort them. What will you call your groups? Can you push the pictures back into one large group and sort them in a different way? What are your new groups?



How many wheels belong to your family? Ask your child to count the wheels on your cars, bicycles, and toys. Do you have more big wheels or little wheels? How do you know?

"I found lots of ways to make ten."

What shapes can you find on signs? Ask your child to investigate different shapes found on signs as you travel. Are the signs themselves special shapes? Which shape do you see most? Which shape do you see least? Which shape was the biggest? Were any shapes alike? How do you know?



Can you make 10 using two numbers you see as you travel? Ask your child to find two numbers, add them together, and see if they make 10. What numbers did you use to make 10? How many different ways could you find to to make 10? How could you make 10 using three numbers? Can you find two numbers that will make 12? 15? 18?

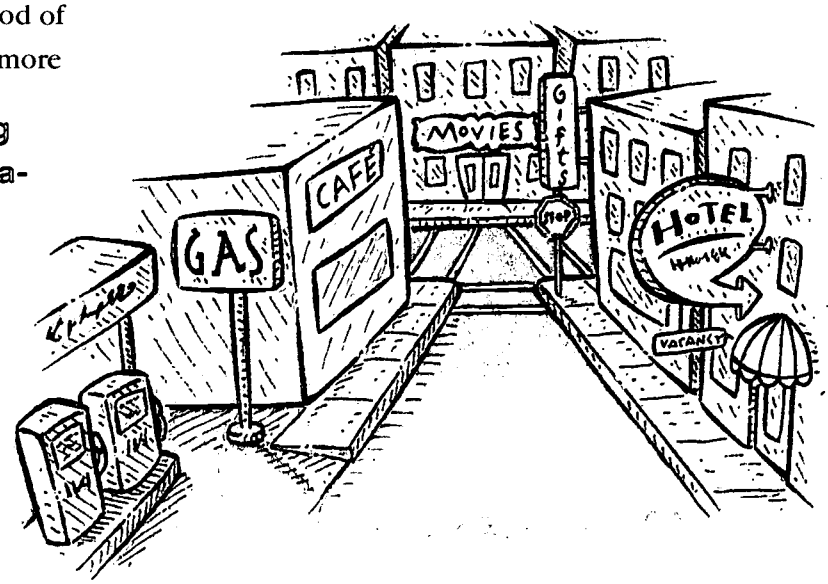
What numbers can you find on license plates? Ask your child what the largest number would be if all the numbers (digits) on a license plate were added together. Add the numbers on several license plates and compare. Can you estimate which sums will be largest? Will license plates with more numbers always have greater sums? Why or why not?

What is a mile? Ask your child to estimate where you would be if you traveled one mile from your house. Which direction will you travel? How will you check your prediction? Would you need to travel more than a mile, exactly a mile, or less than a mile to reach your estimated destination?

"We got the numbers from trucks, cars, vans, buses, and street signs."

"99¢ Store=18, Phillips 66 Gas Station=12, Roadside Highway 55=10." Andrea

How far could your family travel on 100 dollars? Ask your child to think about how you will travel, where you will go, the time it will take, and the number of people who will be going. What costs do you need to think about as you make your plans? How will you decide the method of travel? How will your plans change if two more people join your group? How will your plans change if you have twice as much money? How will they change if you have three-fourths of the money? How would a calculator help you with your plans?



How could you make 100 using addition, subtraction, multiplication and/or division? Ask your child to use numbers you see as you travel. How many different ways can you make 100? How do you decide what operation to use? What if your target number were 500? 1000? How would a calculator help you reach your target number?

Math In The Store

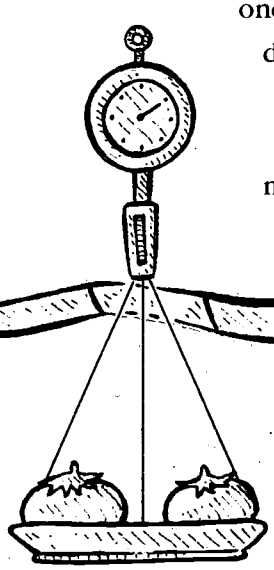
What's in a fruit? Ask your child to describe the fruits and vegetables in the produce department. How many "color" words did you use? What color did you see most often? What "size" words did you use? What shapes do you see? Which vegetables have about the same shape? Use two of the describing words (like "long" and "short") to put food into groups. Which group has more? Which has less? How do you know?

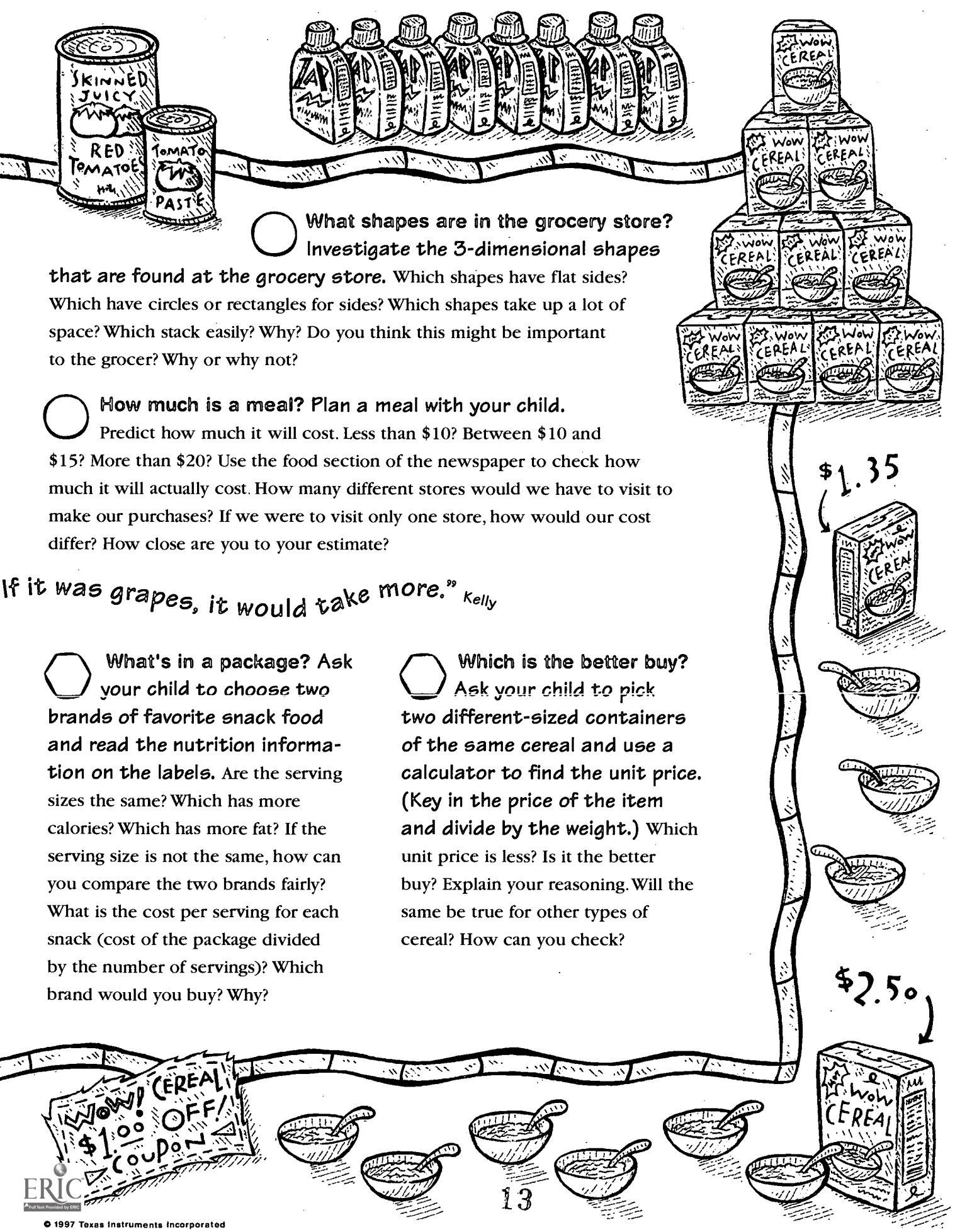
Where are the groceries? Investigate position words in the grocery store. Can you find examples of things which are "above" and "below?" Visit one aisle in the store. Which items are on the top shelf? Which items are on the bottom shelf? Which items are in between? Can you find things that are in front and behind? Find two items that are beside each other. Find something that is inside and something that is outside.

"It took three apples to make a pound.

Can you use coupons? Find a Sunday newspaper and ask your child to cut out cents-off coupons. How many different ways can you sort the coupons? Can you organize the groups into rows? Which row has the most? Which has the least? How can you tell?

How heavy is a pound? In the produce department, ask your child to choose a small item such as an apple. Guess how many apples it will take to weigh one pound. Ask your child to place apples on the scale one at a time until the scale shows about one pound. How many apples did it take? Was the number of apples higher or lower than your guess? How many apples do you think it will take to weigh two pounds? If you use another fruit, would it take more or fewer to make a pound? How could you check?





What shapes are in the grocery store? Investigate the 3-dimensional shapes that are found at the grocery store. Which shapes have flat sides? Which have circles or rectangles for sides? Which shapes take up a lot of space? Which stack easily? Why? Do you think this might be important to the grocer? Why or why not?

How much is a meal? Plan a meal with your child. Predict how much it will cost. Less than $10? Between $10 and $15? More than $20? Use the food section of the newspaper to check how much it will actually cost. How many different stores would we have to visit to make our purchases? If we were to visit only one store, how would our cost differ? How close are you to your estimate?

"If it was grapes, it would take more." *Kelly*

What's in a package? Ask your child to choose two brands of favorite snack food and read the nutrition information on the labels. Are the serving sizes the same? Which has more calories? Which has more fat? If the serving size is not the same, how can you compare the two brands fairly? What is the cost per serving for each snack (cost of the package divided by the number of servings)? Which brand would you buy? Why?

Which is the better buy? Ask your child to pick two different-sized containers of the same cereal and use a calculator to find the unit price. (Key in the price of the item and divide by the weight.) Which unit price is less? Is it the better buy? Explain your reasoning. Will the same be true for other types of cereal? How can you check?

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