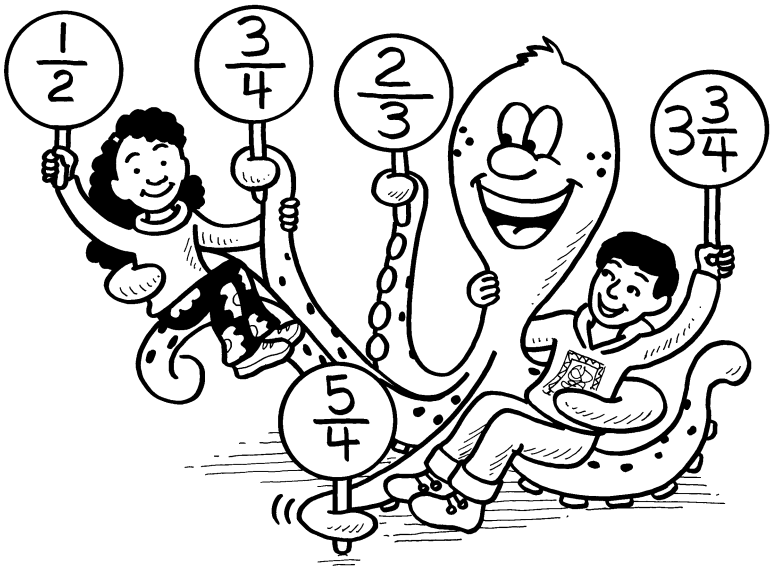
Fractions Are Numbers, Too

Fractions are everywhere—a quarter-pound hamburger, walking halfway around the block, or even cutting a brownie into thirds to share with friends are some examples your child will recognize. Playing with fractions in these games and activities will put her at ease with their everyday use.



Fractions you can count on

Help your youngster recognize how orderly fractions are by counting them with her. Counting $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$ is similar to counting 1, 2, 3, 4—she's just counting fourths instead of whole numbers.

To start, encourage her to substitute a fun word for the denominator. For instance, she might count elephants like this: 1 elephant, 2 elephants, 3 elephants, and 4 elephants. Then, she can count fourths the same way: 1 fourth, 2 fourths, 3 fourths, 4 fourths.

Now have your child find examples of fractions around the house to count. If you have a 6-pack of microwave popcorn, she could count each bag ($\frac{1}{6}$, $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$, $\frac{5}{6}$, $\frac{6}{6}$). Or help her cut a pan of cornbread into 12 pieces and count ($\frac{1}{12}$, $\frac{2}{12}$, and so on).

Tip: This thinking also comes in handy when she adds fractions: $\frac{3}{4} + \frac{2}{4} = \frac{5}{4}$ is like adding 3 elephants + 2 elephants = 5 elephants, or 5 fourths.

Features of fractions

Denominator: the bottom number, 4 in $\frac{3}{4}$, represents the number of equal parts that the whole is divided into

Numerator: the top number, 3 in $\frac{3}{4}$, represents the number of equal parts

Improper fraction: a fraction with a larger numerator than denominator ($\frac{5}{4}$, $\frac{7}{2}$)

Mixed number: a number that combines a whole number and a fraction ($1\frac{1}{2}$, $3\frac{2}{3}$)

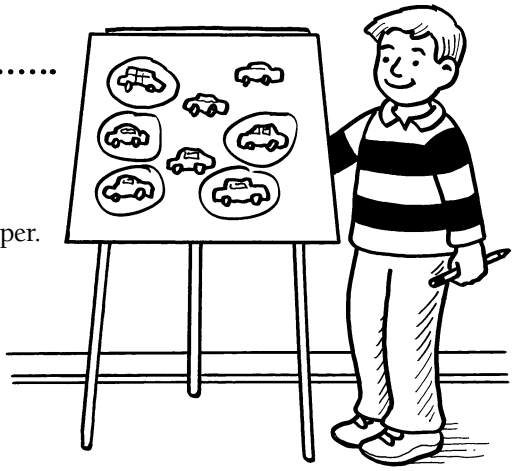
Equivalent fractions: fractions that have the same value ($\frac{3}{4} = \frac{6}{8}$ or $\frac{1}{2} = \frac{5}{10}$)

Picture parts

This quick-draw game lets your youngster see fractions in real-world items.

Ask your child and his friends to write 10 fractions and mixed numbers ($\frac{1}{3}$, $2\frac{1}{2}$) and the names of 10 easy-to-draw objects (cookies, cars) on 20 separate slips of paper. Put the fractions in one pile and the names in another, all facing down.

Your youngster should pick a paper from each stack. Then, on paper or a whiteboard, he can start drawing something to represent the fractional picture. If he picked "$2\frac{1}{2}$" and "cookies," he would begin sketching $2\frac{1}{2}$ cookies. Or if he picks $\frac{5}{8}$ and cars, he could draw 8 cars and circle 5 of them. As he draws, his friends try to guess what it is. Whoever figures it out first gets to be the next artist.



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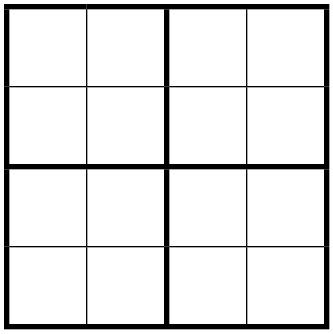
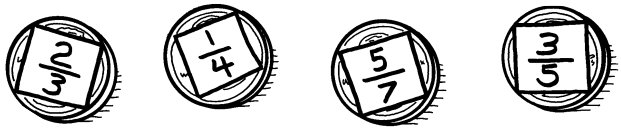
Fraction Sudoku

Your child will enjoy this version of Sudoku with a fraction twist—all while practicing recognizing fractions.

Draw a game board by making a 4 x 4 grid with lines darkened to create four sections (pictured at right).





Let your youngster put masking tape on 16 pennies. Have him pick four different fractions ($\frac{2}{3}$, $\frac{1}{4}$, $\frac{5}{7}$, $\frac{3}{5}$) and write each fraction on each of four pennies. His challenge? To arrange the pennies on the grid so each row, each column, and each 4-square box has all four of the fractions without any repeats. There are many possible answers (one is pictured at right). How many different solutions can he find?

$\frac{2}{3}$	$\frac{1}{4}$	$\frac{5}{7}$	$\frac{3}{5}$
$\frac{3}{5}$	$\frac{5}{7}$	$\frac{2}{3}$	$\frac{1}{4}$
$\frac{5}{7}$	$\frac{3}{5}$	$\frac{1}{4}$	$\frac{2}{3}$
$\frac{1}{4}$	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{5}{7}$

Encourage your child to play again with different fractions. *Idea:* Suggest that he use improper fractions.

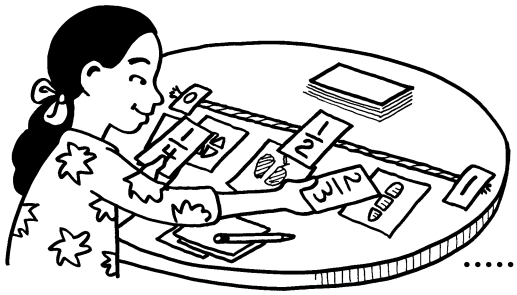
Fraction lineup

Comparing fractions—and understanding which one is larger or smaller—will strengthen your youngster's "fraction sense." For this activity, have her write 20 fractions on separate index cards. *Note:* She should make them all less than 1, such as $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{3}$, and $\frac{1}{2}$.

Shuffle the cards, and stack them facedown. Have her take the top four. Her job is to put them in order from smallest to largest ($\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$).

Suggest that your child stretch out a piece of string and, using masking tape, label one end 0 and the other 1. As she picks each card, she can place it where it goes on the number line. *Hint:* Drawing pictures of the fractions (an apple divided in half or a pie cut into six pieces) will help your youngster compare their values and decide where they go. When she finishes putting down the cards, they'll be in order.

Variation: Use fraction cards that include mixed numbers ($1\frac{1}{2}$, $3\frac{2}{3}$) and improper fractions ($\frac{4}{3}$, $\frac{5}{2}$). Your child should label the end point of her number line with a bigger number to match (4, for example).



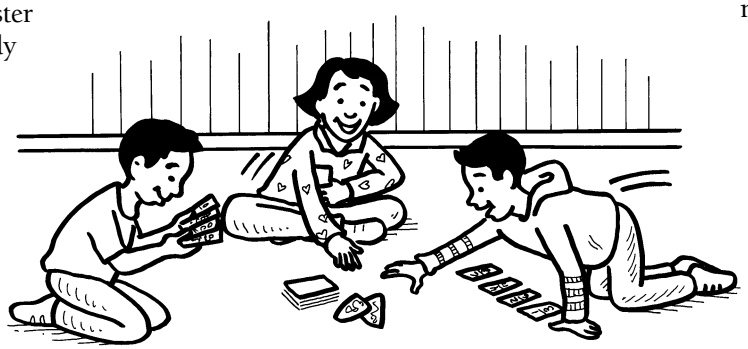
Equivalent fraction detective

Being able to "detect" that $\frac{1}{2} = \frac{4}{8}$ or $\frac{2}{3} = \frac{4}{6}$ is a crucial part of adding and subtracting fractions. Use this game to practice.

Together, write sets of four equivalent fractions from the same "fraction family" on index cards. *Example:* The $\frac{1}{3}$ family could include $\frac{1}{3}$, $\frac{2}{6}$, $\frac{4}{12}$, and $\frac{6}{18}$. Write one fraction per card, making two more sets than the number of players (five sets for three players). Let your youngster make detective badges out of sturdy paper, one fewer than the number of players (two badges for three players).

Shuffle the cards, and deal four to each player, stacking the rest facedown in the middle of the floor or table. Put the badges in the middle, too. The object is to collect one set of equivalent fractions. The first player picks the top card from the stack and decides either to pass it to the player at his right or to keep it and pass a card from his hand. Each player then does the same, with the last player passing to a discard pile.

Continue playing until someone has collected 4 equivalent fractions. He quickly grabs a detective badge. As other players notice, they also grab a badge (even if they haven't formed a set yet). The last person to notice gets no badge—and is out of the game. Put the badges back in the center (one fewer than the number of players left), and play until one player remains. That last detective wins!



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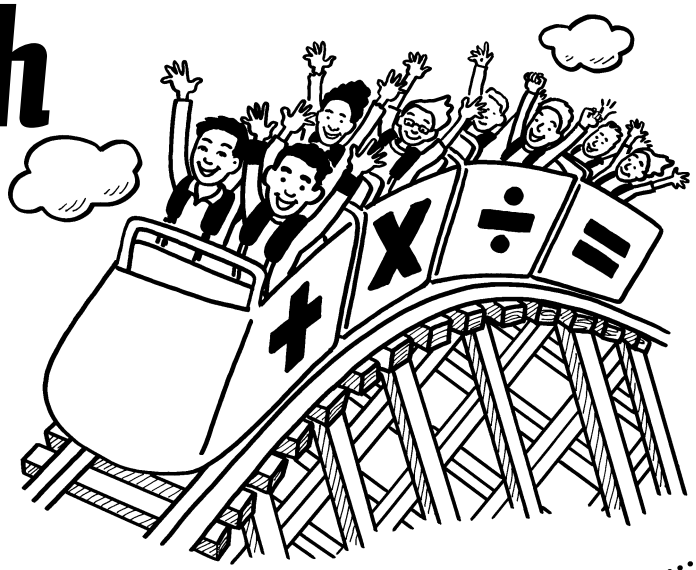
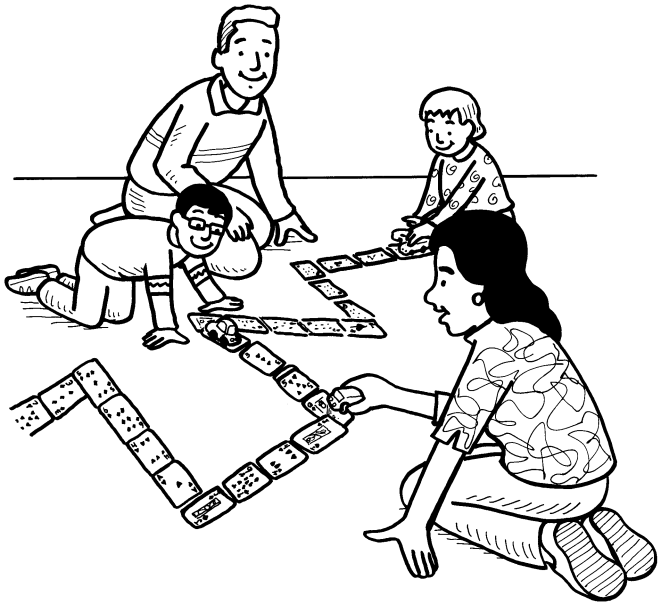
Amazing Math Games IV



Let's play math! With this collection of games, your youngster will sharpen multiplication, division, and other math skills as he has fun with family and friends.

Multiplication road race



In this game, the right multiplication answer moves your child ahead—but the wrong answer stops him in his tracks.

You'll need: 2 decks of cards (kings removed, ace = 1, jack = 11, queen = 12), toy cars, 2 dice

1. Let your youngster create a track out of the cards, laying them faceup in a spiral, a straight line, or a zigzag path. Then, everyone places his cars on the first card.

2. The first player rolls the dice. He multiplies the sum of the dice by the value of the card he's on and says the equation. For example, if he rolls a 2 and a 3 while he's on a 9, he would add 2 + 3 = 5 and say "5 x 9 = 45."

3. If his answer is correct, he moves the number he rolled (5). If it's wrong, he has to stay put. The first player to reach the end of the road (or go past it) wins.

Division dance

Taking time to solve a division problem carefully is more fun when your child and her friends have to dance until it's done!

You'll need: slips of paper, pencil, math textbook, whiteboard and dry-erase markers (or sheet of paper and regular markers), music

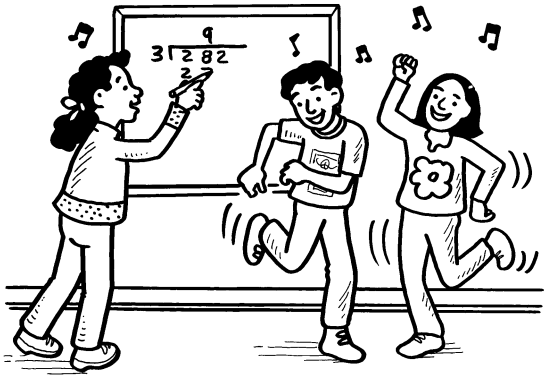
1. Write division problems on scraps of paper. *Tip:* Look in your youngster's math book for samples (40 ÷ 5, 282 ÷ 3).

2. Set up the board so everyone can see it, or hang the paper on the wall.

3. Player one picks a division problem and turns on the music. Then, the other players dance while that person solves the problem.

4. The first dancer to notice that the problem is solved stops dancing and checks to make sure the answer is correct. If it is, the solver gets 10 points, and the checker gets 5 points. Then, the checker solves a new problem while the others dance.

5. Score 40 points to win.



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Round-off

Try this quick game to help your child practice rounding numbers. But beware! It starts out easy and becomes trickier toward the end.

You'll need: bottle caps, permanent marker, bowl, paper, pencils

1. Have your youngster use a marker to number 10 bottle caps, 0–9, and put them in a bowl.

2. Each player takes a piece of paper as her score sheet. On it, she should write the numbers 10–90 by tens (10, 20, 30) and 100–900 by hundreds (100, 200, 300). To win, she'll need to be the first player to cross out every number on her sheet.

3. The first person takes three bottle caps and uses them to form any 3-digit number. If she draws 3, 4, and 5, she may decide to make 345 or 453, for example.

4. Now she chooses whether to round to the nearest ten or the nearest hundred so she can cross out a number. She could round 345 to 350 (nearest ten) and cross out 50, or she might round it to 300 (nearest hundred) and cross out 300. She'll have to think strategically to be the first person to cross out every number.

Prime time

Be the fastest to recognize a prime number to win the cards—and maybe the game. *Note:* A number is prime if it is larger than 1 and can only be divided by 1 and itself (*examples:* 2, 3, 5).

You'll need: deck of cards (ace = 1, face cards removed), timer

1. Deal the cards evenly to all players. Each person should stack his cards facedown without looking at them.

2. Set a timer for 5 minutes.

3. Players take turns placing the top card from their stack faceup on a shared stack in the middle. If anyone plays a prime number, players race to slap it. Whoever is quickest gets to add the entire shared stack to the bottom of his own stack.

4. The winner is the one with the most cards when the timer goes off (or when all the cards have been played).

Get to the decimal point

One little dot—a decimal point—can completely change the value of a row of digits. This clever game will show your youngster how.

You'll need: die, masking tape, pencil, deck of cards (ace = 1, face cards and 10s removed), paper, bingo chips or small circles cut from paper

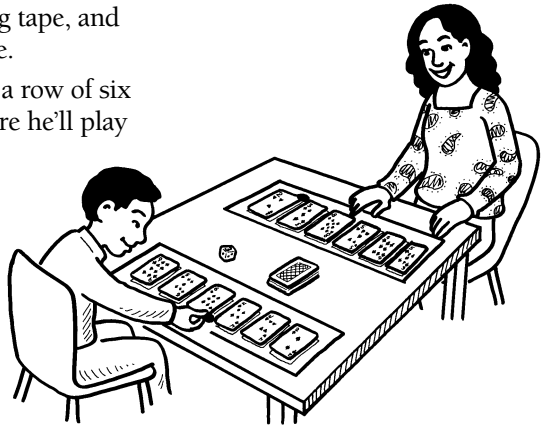
1. Cover the 4, 5, and 6 on the die with masking tape, and write 1, 2, and 3 in their places. Set the die aside.

2. Each player makes a game board by drawing a row of six card-sized rectangles on his paper—this is where he'll play his cards.

3. Shuffle the cards, and stack them facedown.

4. Compete to form the largest six-digit number. The first player draws the top card and decides which position on his board he wants it to take. *Tip:* If it's a large number like 8, he might want to place it in the first rectangle on his board. Players take turns drawing cards until they each have six. Once placed, a card must stay put.

5. Each player rolls the die to determine where to place his decimal point (bingo chip or paper circle). If you roll 1, put the decimal point so one digit follows it (846,321 would become 84,632.1). Roll 2 to place it with two digits after it, and roll 3 for three digits after the decimal.



6. Have each person read his number aloud, and compare them. The player with the largest number wins the round. *Hint:* A player may think a number starting with 9 will be larger than one that starts with 8, but it all depends on where the decimal point is—for instance, 9,345.12 is less than 86,255.3.

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That's a Good Question!

The first time your child asked why magnets stick to the refrigerator or where the mold on bread comes from, she was beginning to think like a scientist! That's because scientists start their investigations with questions. This guide provides eye-opening experiments that let your youngster answer five fascinating questions.

1. Why do geese fly in a V formation?

There are actually two answers to this question! Here's how your child can understand both reasons for the way geese fly.

You'll need: 3 or more people with bikes

Here's how: Have your youngster and two (or more) friends or family members ride their bikes in a V formation—one rider in front and the others behind her on either side. As they ride, they should trade places so each one takes a turn leading the pack. Next, ask them to repeat the experiment but this time ride in a straight line.

What happens? They'll find it's easier to pedal when someone is in front of them in a V formation.

Why? The people in back face less wind resistance because the first person blocks some of the wind. This phenomenon benefits geese in a flock. Also, the leader moves back when it gets tired, and another goose takes a turn, allowing the flock to fly for a longer period of time.

Plus, the V shape helps the geese see more of the flock so they can all keep track of each other—in a straight line, each goose would see only the bird directly in front of it.

2. What makes tornadoes form?

Suggest that your child create a model of a tornado in a bottle. He'll get a good idea of how a real tornado forms during a thunderstorm.

You'll need: 2 same-size empty plastic water bottles, water, 1-inch washer (optional), duct tape or packing tape

Here's how: Let your youngster remove the caps from the water bottles and fill one halfway with water. If you have a washer, he can place it on the opening of the bottle containing the water (the washer will help create a tighter seal). Let him turn the other bottle upside down and hold its opening directly on top of the other, while you seal the necks together with the tape. Now, have him grasp the necks firmly and swirl the bottles quickly in a circular motion. He should turn over the bottles so the one containing water is on top and then suddenly stop swirling.

What happens? The water rotates as it drains into the bottom bottle.

Why? During a thunderstorm, warm, humid air may rise into a vertical column and begin to rotate. The whirling air mass (*vortex*) can form a funnel cloud. Rain or hail in the thunderstorm sometimes causes the funnel cloud to descend—when it comes down, swirling like the water in the bottle, it's called a tornado.

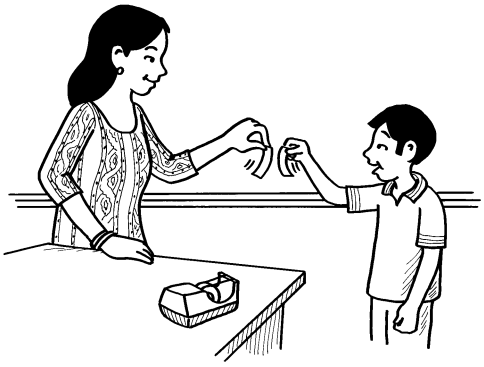
continued

3. How do magnets work?

When your youngster creates his own magnets, he'll see how positive and negative charges repel or attract each other.

You'll need: clear tape

Here's how: Let your child stick two same-size strips of tape (each about 4 inches long) on a table so they extend slightly over the edge. Tell him to quickly pull off both pieces at once. He can give one to you while he holds the other. Now, dangle your strips (sticky sides facing each other) a few inches apart, and observe. Do the experiment again with fresh tape, but this time stick only one piece of tape to the table first.



What happens? The first set of strips will repel (move away from) each other. The second set will attract (move toward) one another.

Why? Like charges repel, and opposite charges attract. When your youngster pulled two tape strips from the table, they both either lost or gained electrons, giving them the same charge (either positive or negative). But when he did the experiment by pulling only one of the two strips off a table, only one lost or gained electrons. That gave the strips opposite charges, which attracted each other.

4. Why does bread get moldy?

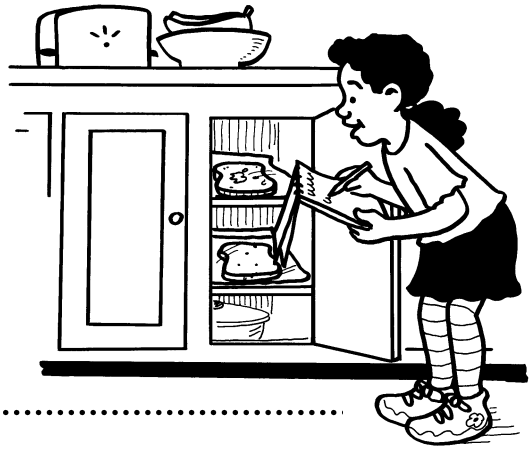
Your child can make "mold labs" to find out.

You'll need: 4 slices of bread, 4 plastic zipper bags, water, permanent marker, paper and pencil

Here's how: Have your youngster put the slices of bread into separate bags. She should sprinkle water into two bags and leave the other two dry. Ask her to use the marker to label each bag "Wet" or "Dry." She can place one wet and one dry bag on the counter and put the other two in a cupboard. Let her check each day and sketch what she sees.

What happens? The dry bread on the counter should stay mold-free the longest. The wet bread in a dark place (the cupboard) should get moldy the quickest, followed by the wet bread on the counter and then the dry bread in the cupboard.

Why? Mold is a living thing called a *fungus*. Unlike plants, which grow from seeds, fungi start as tiny spores in the air. When the spores land on bread, they grow. Fungi grow faster in wet, dark conditions, so the damp bread and the bread in the cupboard got moldy fastest.

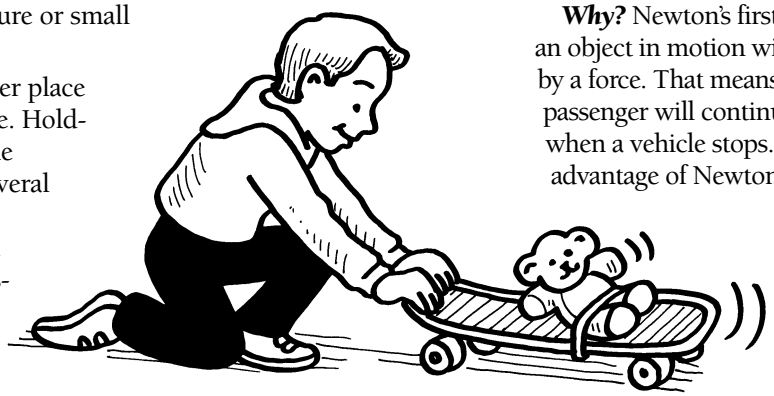


5. Why do I have to wear a seat belt?

Here's an experiment that will show your child the importance of buckling up in the car.

You'll need: "vehicle" (toy car, skateboard), "seatbelt" (rubber band), "passenger" (action figure or small stuffed animal)

Here's how: Have your youngster place the passenger on top of the vehicle. Holding onto the back of the vehicle, he should quickly push it forward several feet and then stop suddenly. Next, have him repeat those steps—but this time, he should fasten the passenger securely to the vehicle with a rubber band.



What happens? When the vehicle stops suddenly and the action figure or stuffed animal isn't wearing a seat belt, it will fly forward. But if it's buckled up, it stays put.

Why? Newton's first law of motion states that an object in motion will continue unless stopped by a force. That means that without a seat belt, a passenger will continue moving forward, even when a vehicle stops. Luckily, a seat belt takes advantage of Newton's third law—if a car brakes suddenly, the belt exerts a force on the passenger and stops his forward motion!

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