

For Creative Minds

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Force and Motion

A pull is a force that moves something toward you. *What are some things in the book that the boy pulls? What are some things that you might pull?*

A push is a force that moves something away from you. *What are some things in the book that the boy pushes? What are some things that Newton pushes? What are some things that you might push?*

Something's location can be compared to other things around it (on, in, over, under, next to, etc.) Where are you right now? *Look at the pictures in the book and describe where the boy is, where the dog is, and where the toys are?*

Things can move in lines that can be straight, zigzag, or curved (such a circles). *Can you push (roll) a ball in each of these motions?*

You can describe how something moves (motion) by comparing it to other things around it. *Push (roll) a ball and describe how it moves by using "location" words. For example: The toy truck rolled down the sidewalk and stopped in a bush.*



Things can move at different speeds (fast. or slow). *Can you push (roll) a ball so it goes fast and slow? What are you doing to change the speed of the ball?*

How fast or slow something moves depends on how hard or soft the push or pull and how heavy the thing is. *Push (roll) balls of different sizes and weights (a ping pong ball, a tennis ball, a baseball, a basketball, or a bowling ball). If you push the ball with the same force, which one do you think will go farthest and why?*

Forces can change the direction of something that is moving. *Have someone push a ball toward you. What will you do to make the ball go the other way? What kind of force are you using? Can the other person use that same force to send the ball back to you again?*

Friction slows or stops something from moving (motion). *What are some of the friction forces that slow or stop things from moving in the book? What are some ways that you can slow or stop a ball from rolling? Does the surface the ball rolls on matter on how fast or far the ball rolls? Try rolling a ball on different surfaces to see.*

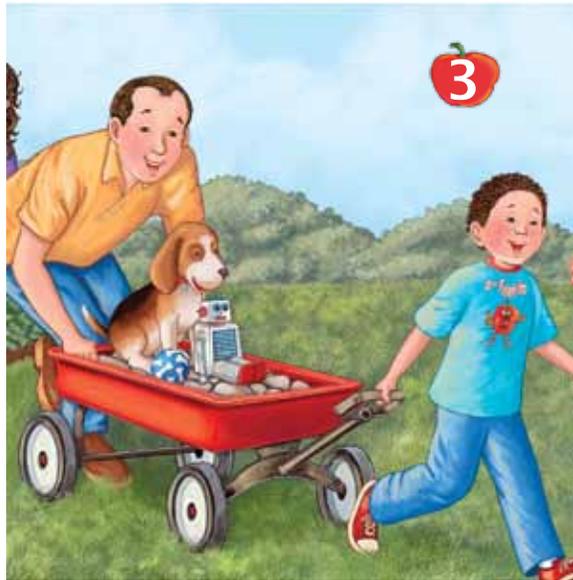
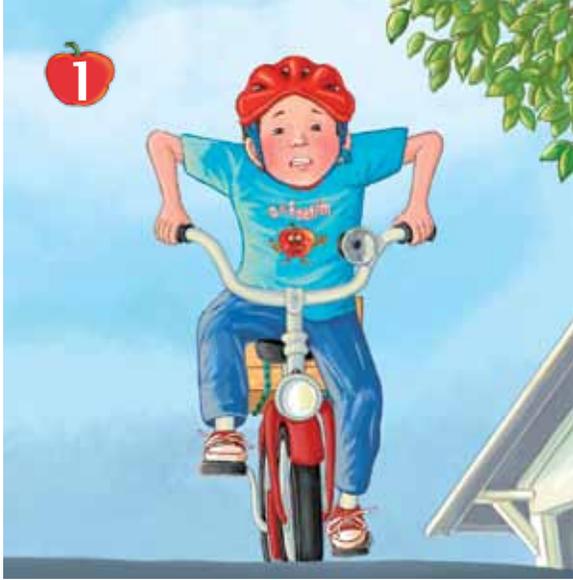
Gravity is a force that pulls things towards the Earth—what goes up will come down. *Can you throw anything in the air without it coming back down?*

Food for thought: What are some things you can do to help a ball roll fast and far? What do you think might happen if you push a ball twice as hard as a previous push?



Matching Forces

Decide which of the illustrations show pushes or pulls. Illustrations may apply to more than one force. Possible answers are upside down at the bottom of the page.



1. When riding a bike, you push down on the pedals.
2. A ball is pushed up into the air, but gravity pulls it back down again.
3. The dad is pushing and the boy is pulling the wagon.
4. Newton pushed one domino and each domino pushes another.



Who was Newton?

In this story, Newton is a dog. But in history, Sir Isaac Newton was a famous scientist and mathematician. Some of his many discoveries and contributions include:

- the law of gravity
- the laws of motion
- calculus
- the nature of light and color
- the cause of the tides (gravitational pull of the sun and the moon on the Earth)

Can you find any references to these statements in the illustrations?

- Newton was born in 1643 in Lincolnshire, England.
- It is said that he “discovered” gravity as he watched an apple fall from a tree.

Newton's Laws of Motion

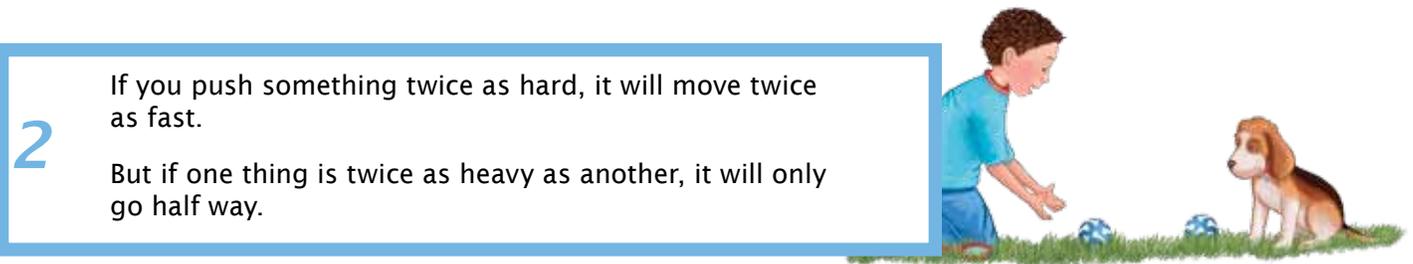
The first two laws have been phrased for age appropriateness. Newton's third law is above the scope of this book and is not included.



Something won't move unless a force makes it move.

1

Once it starts moving, it will keep moving in a straight line until another force makes it move in another direction, slows it down, or stops it.



If you push something twice as hard, it will move twice as fast.

2

But if one thing is twice as heavy as another, it will only go half way.

