

JUST FOR U.S.*

GRADES 4 - 5

*Understanding Science

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Coasting!

You worked hard to get up a hill. Now you can rest. Feel the rush of air around your face. Your shirt flaps in the wind. Faster and faster you go!

The next hill is coming up. It's higher than the last one. Do you think you can coast all the way to the top? You can't.

Why not? It's a physical law. At the top of the first hill you had *potential energy*. This is the energy gravity gives you.

As you coast faster and faster, the potential energy changes to *kinetic energy*. This is the energy of motion. Now you are going FAST!

As you coast up the second hill, the kinetic energy is changing back to potential energy. There is only enough energy to take you as high as the first hill. You are going slower... SLOWER...

Oh, well, better pedal again!



Photo: Bill Witherspoon

Biking's twists and turns

No one person invented the bicycle. It took many people almost one hundred years. Here are some of the big steps.

1490 - Leonardo da Vinci made a drawing of a bicycle. He was ahead of his time. No one built a bicycle for 300 more years.

1790 - Mr. de Sivrac of France made a "running machine."
You pushed the ground with your feet. You could run or roll.
You could not steer.

1817 - Baron von Drais of Germany added steering.

1855 - Ernest Michaux of France added pedals.

1870's - Bikes got a chain. Both wheels were now the same size. Bikes were safer. The ride was still rough.

1888 - John Dunlop of Ireland added air-filled rubber tires.
The ride was smooth. Bikes became a cheap, easy way to get around. Bikes gave freedom of movement to many people.

"The bicycle has done more for the emancipation [freedom] of women than anything else in the world." - women's rights leader, Susan B. Anthony, 1896

Today, there are about one billion (1,000,000,000) bikes in the world. There are only half that many cars.



Permission by www.pedalinghistory.com



"running machine"

Permission by www.pedalinghistory.com



"bone shaker"



bicycle with air-filled tires

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Biking to work

Do you know someone who bikes to work? You would if you lived in some cities. These cities decided to make biking safe and easy. Amsterdam is the biggest city in the Netherlands. You can stand on the corner there at 7:30 A.M. On some streets, the only sound you hear is WHOOSH! That is the sound of hundreds of people pedaling to work. Cars are not allowed on these streets.



Photo: Behr de Ruiter, Amsterdam



Bikes on a bridge in Amsterdam, a city that loves bikes!

The world's quietest rush hour!

On most other streets, there are special bike lanes. For many people, the bike is the fastest way to their work. Biking keeps them strong and healthy.

Bikes are also cheaper than cars. The city likes bikes, too. They take less space than cars. They don't pollute the air.

In Atlanta, some people bike to work. They know how to share the road with cars and trucks. There is a class called "Effective Cycling™" to teach them how. Sometimes they wish drivers would pay more attention. These people love the exercise. They are glad to help keep our air clean.

Staying safe on a bicycle

The safest place to ride is on a bike trail. You can visit the four-mile long trail near Stone Mountain. The 38-mile long Silver Comet Trail is west of Atlanta. It's a great family outing!

One day, you will ride in the street. An adult will ride with you at first. You must learn to be safe. You may know these rules already. Do you know the reasons for the rules?



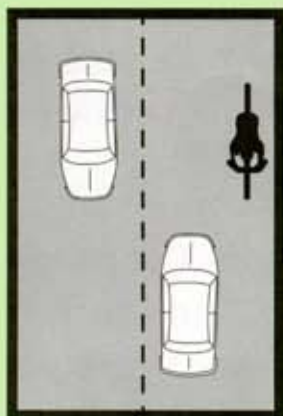
Wear a helmet. This is the law. This will protect your head if you fall. Ask the grown-up with you to wear a helmet, too.



Always stop before you enter a bigger street. Look left, then right, then left again. Cars are the biggest danger to bikers.



Ride only in the daytime. That way, drivers will see you.



Ride on the right side of the street. You must go in the same direction as the cars. That is where drivers expect to find you.

Do you speak Greek?

Maybe not, but the word bicycle comes from Greek words meaning "two wheels". How many wheels does a tricycle have? How many wheels does a unicycle have? Uni-, bi-, and tri- are all examples of *prefixes*. (Even the word "prefix" contains a prefix! Do you know what "pre-" means?)

Here are some more words with "bi-" and "tri-" prefixes.



Word Game!

How many words can you think of that use the "uni-" prefix?

Your Name or Teacher's Name _____ School _____ Grade _____

"uni-" words

Teachers: Your class can send a word list to Bill Witherspoon at Fernbank Science Center through courier and receive a certificate of recognition!

Written by Bill Witherspoon
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