Name: _____ Date: _____

Inertia and Seat Belts

Circle group

A car is going down the road. The driver slams on the brakes. The car stops fast, but the people inside seem to lurch forward. Why? The answer is inertia. All matter has it.

Inertia means a thing keeps doing what it is already doing. A thing at rest stays at rest. A thing that is moving keeps moving in a straight line at the same speed. This is true unless a force acts on it. This idea is Newton's first law of motion. Inertia is not a force. It is something every object has. The more mass a thing has, the more inertia it has.

When a car is moving, everything in it moves at the same speed. That includes you. When the brakes work, a force slows the car. But no force has acted on your body yet. So your body keeps going forward at the old speed while the car slows. Nothing throws you forward. You just keep moving at the speed you had.

A seat belt gives the missing force. It is made of strong straps that stretch a little. It crosses the strongest parts of your body, the hips and the chest. As the car slows, the belt pulls you back. It slows you down with the car. It does this over a bit more time and distance than a hard surface would. A longer stop means a smaller force on your body at each moment.

Inertia explains other things too. When a bus pulls away from a stop, you feel pushed back in your seat. Your body tends to stay at rest. When a bus turns a corner, people lean to the side. Their bodies want to keep going straight.

Questions

1. What is inertia?

_____

_____

2. What does Newton's first law of motion say?

_____

_____

3. Why do people lurch forward when a car stops fast?

_____

_____

4. What does a seat belt do?

_____

_____

5. Why is a longer stop better for your body?

_____

_____

6. Does something throw you forward when a car stops fast? Explain.

_____

_____

7. Why do you feel pushed back when a bus pulls away?

_____

_____

Words to know

inertia: the tendency of an object to keep doing what it is already doing
force: a push or a pull on an object
motion: the act of moving from one place to another
lurch: to move suddenly and unsteadily

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Inertia and Seat Belts

Triangle group

A car is traveling down the road when the driver slams on the brakes. The car stops quickly, but the people inside seem to lurch forward. Why? The answer is a property of all matter, which scientists call inertia.

Inertia is the tendency of an object to keep doing what it is already doing. An object at rest stays at rest, and an object in motion keeps moving in a straight line at the same speed, unless a force acts on it. This idea is Newton's first law of motion. Inertia is not a force. It is a property that every object has, and the more mass an object has, the more inertia it has.

When a car is moving, everything inside it is moving at the same speed, including you. When the brakes act on the car, a force slows the car down. But no force has yet acted on your body. So your body keeps moving forward at the old speed, even though the car is slowing. It is not that something throws you forward; you are simply continuing to move at the speed you already had.

A seat belt supplies the missing force. It is made of strong, slightly stretchy webbing, and it crosses the strongest parts of the human body, which are the hips and the chest. As the car slows, the belt pulls you back and slows you down along with the car. It does this over a little more time and distance than a hard surface would. A longer stop means a smaller force on your body at any moment.

Inertia explains other ordinary events as well. When a bus pulls away from a stop, you feel pushed back in your seat, because your body tends to stay at rest. When a bus turns a corner, passengers lean to the side, because their bodies want to keep going straight.

Questions

1. What is inertia?

_____

_____

2. What is Newton's first law of motion, as the passage describes it?

_____

_____

3. Why do the people in a car lurch forward when the driver slams on the brakes?

_____

_____

4. What does a seat belt do?

_____

_____

5. Why does a longer stop mean a smaller force on your body?

_____

_____

6. Is it correct to say that something throws you forward when a car stops suddenly, and why or why not?

_____

_____

7. Why do you feel pushed back in your seat when a bus pulls away from a stop?

_____

_____

Words to know

inertia: the tendency of an object to keep doing what it is already doing
force: a push or a pull on an object
motion: the act of moving from one place to another
lurch: to move suddenly and unsteadily
webbing: strong woven strips of fabric, such as in a seat belt

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Inertia and Seat Belts

Square group

Imagine a car traveling down the road when the driver abruptly slams on the brakes. The vehicle stops quickly, yet the passengers inside appear to lurch forward. What explains this? The answer lies in a fundamental property of all matter, which scientists call inertia.

Inertia is the tendency of an object to continue doing whatever it is already doing. An object at rest remains at rest, and an object in motion continues moving in a straight line at a constant speed, unless a force acts upon it; this principle is known as Newton's first law of motion. Importantly, inertia is not itself a force. It is a property that every object possesses, and the greater an object's mass, the greater its inertia.

When a car is moving, everything inside it, including you, is traveling at the identical speed. When the brakes engage, a force decelerates the car, but no force has yet acted on your body. Consequently, your body continues moving forward at the original speed even as the car slows beneath you. Nothing actually hurls you forward; you are simply continuing at the speed you already possessed.

A seat belt supplies the missing force. Constructed from strong, slightly elastic webbing, it crosses the sturdiest regions of the human body, namely the hips and the chest. As the car decelerates, the belt restrains you and slows you along with the vehicle, and it accomplishes this over somewhat more time and distance than a rigid surface would. A more gradual stop means a smaller force acting on your body at any particular moment.

Inertia also explains numerous ordinary experiences that you have probably noticed yourself. When a bus accelerates away from a stop, you feel pressed backward into your seat, because your body tends to remain at rest. When a bus turns a corner, passengers lean sideways, because their bodies tend to continue traveling in a straight line.

Questions

1. Define inertia as the passage explains it.

_____

_____

2. How does the passage state Newton's first law of motion?

_____

_____

3. Why do passengers lurch forward when a driver brakes abruptly?

_____

_____

4. What function does a seat belt serve?

_____

_____

5. Why does a more gradual stop reduce the force on your body?

_____

_____

6. Evaluate the claim that something hurls you forward when a car stops suddenly.

_____

_____

7. Account for the sensation of being pressed backward when a bus accelerates.

_____

_____

Words to know

inertia: the tendency of an object to keep doing what it is already doing
force: a push or a pull on an object
motion: the act of moving from one place to another
lurch: to move suddenly and unsteadily
webbing: strong woven strips of fabric, such as in a seat belt

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Inertia and Seat Belts

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Inertia and Seat Belts

Easier · 286 words · Flesch-Kincaid grade 2.4

1. A thing keeps doing what it is already doing. It stays at rest, or keeps moving in a straight line at the same speed, unless a force acts on it.
2. A thing at rest stays at rest, and a moving thing keeps moving in a straight line at the same speed, unless a force acts on it.
3. The brakes slow the car, but no force has acted on their bodies yet, so their bodies keep going at the old speed.
4. It gives the missing force. It pulls you back and slows you down with the car.
5. Slowing down over more time and distance means a smaller force on your body at each moment.
6. No. Nothing throws you. Your body just keeps moving at the speed it already had.
7. Your body tends to stay at rest while the bus starts to move forward.

Triangle: Inertia and Seat Belts

This passage · 315 words · Flesch-Kincaid grade 5.6

1. The tendency of an object to keep doing what it is already doing: staying at rest, or moving in a straight line at the same speed, unless a force acts on it.
2. An object at rest stays at rest, and an object in motion keeps moving in a straight line at the same speed, unless a force acts on it.
3. The brakes act on the car and slow it down, but no force has yet acted on the passengers, so their bodies keep moving forward at the old speed.
4. It supplies the missing force, pulling you back and slowing you down along with the car.
5. Slowing down over more time and distance spreads the force out, so the force at any moment is smaller.
6. No. Nothing throws you. Your body is simply continuing to move at the speed it already had.
7. Your body tends to stay at rest while the bus starts moving forward.

Square: Inertia and Seat Belts

Harder · 317 words · Flesch-Kincaid grade 9.9

1. The tendency of an object to continue doing what it is already doing: remaining at rest, or moving in a straight line at a constant speed, unless a force acts on it.
2. An object at rest remains at rest, and an object in motion continues in a straight line at a constant speed, unless a force acts upon it.
3. The brakes decelerate the car, but no force has yet acted on the passengers, so their bodies continue forward at the original speed.

4. It supplies the missing force, restraining you and slowing you along with the vehicle.
5. Spreading the slowing over more time and distance means a smaller force acts on the body at any particular moment.
6. It is incorrect. Nothing hurls you; your body is simply continuing at the speed it already had.
7. Your body tends to remain at rest while the bus begins moving forward.