Name: _____ Date: _____

Why a Falling Raindrop Stops Speeding Up

Circle group

A raindrop can fall from a cloud that is far above the tallest buildings. If nothing slowed it down, gravity would keep making it faster and faster. A drop reaching the ground would hit like a tiny bullet. But real raindrops tap gently on umbrellas. The reason is air. Air pushes back on anything moving through it.

When a drop starts to fall, it moves slowly, and the air barely notices it. Gravity pulls it down, and it speeds up. As its speed grows, the air pushes back harder. The drop has to shove more air out of its way every second. This push is called air resistance, or drag. It points upward, against the motion.

Soon the drop reaches a speed where the upward push of the air equals the downward pull of gravity. The forces are balanced. The drop stops gaining speed and falls at a steady rate. This steady speed is called terminal velocity.

Different objects have different terminal velocities. A large raindrop falls faster than a small drizzle drop. That is why heavy rain falls faster than mist. A skydiver can change it too. Spreading out the arms and legs gives the air more to push on. A parachute gives it far more. This lowers the steady speed for a safe, gentle landing. Air resistance is a kind of built-in brake.

Questions

1. What would happen to a raindrop if nothing slowed it down?

_____

_____

2. Which way does air resistance push on a falling drop?

_____

_____

3. Why does the air push back harder as the drop speeds up?

_____

_____

4. What is true about the forces at terminal velocity?

_____

_____

5. How does a parachute help a skydiver land gently?

_____

_____

6. Which falls faster, a large raindrop or a small drizzle drop?

_____

_____

Words to know

gravity: the pull that draws objects toward the earth
resistance: a force that works against motion
balanced: equal in strength, so neither side wins
terminal: final, or the last stage reached
drizzle: very light, fine rain

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: _____

Why a Falling Raindrop Stops Speeding Up

Triangle group

A raindrop can fall from a cloud that sits well above the tops of the tallest buildings. If nothing slowed it down, gravity would keep making it go faster and faster, and a drop arriving at the ground would hit like a tiny bullet, but in real life, raindrops tap against umbrellas gently. The reason is air, which pushes back against anything that moves through it.

When the drop first begins to fall, it moves slowly, and the air barely notices it, but gravity pulls it downward, and the drop speeds up. As its speed grows, the air pushes back harder, because the drop has to shove more air out of its way every second. This opposing push is called air resistance, or drag, and it points upward, against the direction of the motion.

Soon the drop reaches a speed where the upward push of the air equals the downward pull of gravity, and because the forces are balanced, the drop stops gaining speed and falls at a steady rate. This steady speed is called terminal velocity.

Terminal velocity is different for different objects. A larger raindrop falls faster than a small drizzle drop, which is why heavy rain falls faster than mist. A skydiver can change it too. Spreading out the arms and legs gives the air more to push against, and a parachute gives it far more, which brings the steady speed down to a safe, gentle landing. Air resistance is not just an obstacle. It is a kind of built-in brake.

Questions

1. What would happen to a raindrop if nothing slowed it down?

_____

_____

2. In which direction does air resistance push on a falling drop?

_____

_____

3. Why does the air push back harder as the drop speeds up?

_____

_____

4. What is true about the forces when a drop reaches terminal velocity?

_____

_____

5. How does a parachute help a skydiver land gently?

_____

_____

6. Which falls faster, a large raindrop or a small drizzle drop?

_____

_____

Words to know

gravity: the pull that draws objects toward the earth
resistance: a force that works against motion
balanced: equal in strength, so neither side wins
terminal: final, or the last stage reached
drizzle: very light, fine rain

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: _____

Why a Falling Raindrop Stops Speeding Up

Square group

A single raindrop may begin its journey in a cloud that hangs far above the tops of the tallest buildings. If nothing resisted its descent, gravity would keep accelerating it faster and faster, and a drop arriving at the ground would strike with the force of a tiny bullet. In reality, raindrops tap gently against umbrellas. The explanation is air, which pushes back against anything that moves through it.

When the drop first begins to fall, it travels slowly, and the air barely notices it. Gravity pulls the drop downward, and it accelerates. As its speed increases, however, the air pushes back with growing strength, because the drop must shove aside more air every second. This opposing push is called air resistance, or drag, and it acts upward, against the direction of motion.

Before long, the drop reaches a speed at which the upward push of the air exactly equals the downward pull of gravity. The forces are then balanced, so the drop stops gaining speed and falls at a steady rate, known as terminal velocity.

Terminal velocity differs from one object to another. A large raindrop falls faster than a fine drizzle drop, which is why a downpour descends more quickly than mist. A skydiver can alter it as well. Spreading the arms and legs gives the air more to push against, and a parachute gives it vastly more, reducing the steady speed to one that permits a safe, gentle landing. Air resistance is not merely an obstacle. It is a kind of built-in brake.

Questions

1. What would happen to a raindrop if nothing resisted its descent?

_____

_____

2. In which direction does air resistance act on a falling drop?

_____

_____

3. Why does the air push back with growing strength as the drop speeds up?

_____

_____

4. What is true of the forces when a drop reaches terminal velocity?

_____

_____

5. How does a parachute allow a skydiver to land gently?

_____

_____

6. Which falls faster, a large raindrop or a fine drizzle drop?

_____

_____

Words to know

gravity: the pull that draws objects toward the earth
resistance: a force that works against motion
balanced: equal in strength, so neither side wins
terminal: final, or the last stage reached
drizzle: very light, fine rain

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: Why a Falling Raindrop Stops Speeding Up

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

Circle: Why a Falling Raindrop Stops Speeding Up

Easier · 226 words · Flesch-Kincaid grade 4.2

1. Gravity would keep making it faster and faster.
2. Upward, against the motion.
3. The drop has to shove more air out of its way every second.
4. The upward push of the air equals the downward pull of gravity.
5. It gives the air much more to push on, which lowers the steady speed.
6. The large raindrop.

Triangle: Why a Falling Raindrop Stops Speeding Up

This passage · 255 words · Flesch-Kincaid grade 7.7

1. Gravity would keep making it go faster and faster.
2. Upward, against the motion.
3. The drop has to shove more air out of its way every second.
4. The upward push of the air equals the downward pull of gravity.
5. It gives the air much more to push against, lowering the steady speed.
6. The large raindrop.

Square: Why a Falling Raindrop Stops Speeding Up

Harder · 257 words · Flesch-Kincaid grade 8.2

1. Gravity would keep accelerating it faster and faster.
2. Upward, against the direction of motion.
3. The drop must shove aside more air every second.
4. The upward push of the air exactly equals the downward pull of gravity.
5. It gives the air vastly more to push against, reducing the steady speed.
6. The large raindrop.