Name: _____ Date: _____

Pushing a Swing at Just the Right Moment

Circle group

At the park, Dev pushed his little sister Lila on a swing. At first he pushed when he felt like it. The swing wobbled and hardly rose. Then Dev saw something. Each trip back and forth took about the same time. When he waited until Lila floated back to the top of her arc and then gave a gentle shove, she went much higher.

Dev had found the swing's natural rhythm. A swing is a kind of pendulum. A pendulum keeps nearly the same beat when it moves in small arcs. The beat depends mostly on the length of the chains, not on how high the swing goes. Long chains give a slow beat. Short chains give a quick beat.

If you push at the same beat as the swing, each push adds to the motion that is already there. A push at the wrong moment works against the swing and slows it down. Small pushes in rhythm pile up, like coins dropping into a jar.

Scientists call this idea resonance. It is why a few well-timed pushes can do more than one giant shove. Timing matters as much as strength.

Questions

1. Who is Lila?

_____

_____

2. What did Dev see about each trip back and forth?

_____

_____

3. What does the beat of a swing depend on most?

_____

_____

4. Which swing has a quicker beat, one with short chains or long chains?

_____

_____

5. What happens when a push comes at the wrong moment?

_____

_____

6. Why are small pushes like coins in a jar?

_____

_____

Words to know

pendulum: a weight that swings back and forth from a fixed point
rhythm: a steady, repeating beat
arc: a curved path, like part of a circle
resonance: a big motion built up by pushes that match a natural beat
wobble: to move unsteadily from side to side

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: _____

Pushing a Swing at Just the Right Moment

Triangle group

At the park, Dev pushed his little sister Lila on a swing. For a while he pushed whenever he felt like it, and the swing wobbled and barely rose. Then Dev noticed something. Each trip back and forth took about the same amount of time. When he waited until Lila had floated back to the top of her arc and then gave a gentle shove, she soared higher with almost no effort.

Dev had found the swing's natural rhythm. A swing is a kind of pendulum. A pendulum keeps nearly the same beat as long as it moves in small arcs. The beat depends mostly on the length of the chains, not on how high the swing goes. Long chains give a slow beat, and short chains give a quick one.

When you push at the same beat as the swing's own, each push adds to the motion that is already there. A push at the wrong moment works against the swing and slows it down. Small pushes that come in rhythm pile up, a little like coins dropping one by one into a jar.

Scientists call this idea resonance. It is why a few well-timed pushes can do more than one giant shove. Timing matters just as much as strength.

Questions

1. Who is Lila?

_____

_____

2. What did Dev notice about each trip back and forth?

_____

_____

3. What does the beat of a swing depend on most?

_____

_____

4. Which swing has a quicker beat, one with short chains or one with long chains?

_____

_____

5. What happens when a push comes at the wrong moment?

_____

_____

6. Why does the passage compare small pushes to coins in a jar?

_____

_____

Words to know

pendulum: a weight that swings back and forth from a fixed point
rhythm: a steady, repeating beat
arc: a curved path, like part of a circle
resonance: a big motion built up by pushes that match a natural beat
wobble: to move unsteadily from side to side

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: _____

Pushing a Swing at Just the Right Moment

Square group

At the park one afternoon, Dev was pushing his little sister Lila on a swing. For a while he pushed whenever the mood struck him, and the swing merely wobbled and scarcely climbed. Then Dev noticed something curious. Every trip back and forth consumed roughly the same amount of time. When he waited until Lila had drifted back to the very top of her arc and only then delivered a gentle shove, she soared considerably higher with almost no effort.

Dev had discovered the swing's natural rhythm. A swing is a type of pendulum, and a pendulum maintains nearly the same beat so long as it travels in small arcs. That beat depends chiefly on the length of the chains rather than on how high the swing rises. Long chains produce a slow beat, whereas short chains produce a quick one.

When you push in step with the swing's own beat, each push adds to the motion that already exists. A push delivered at the wrong moment, however, works against the swing and slows it down. Small pushes that arrive in rhythm accumulate, a little like coins dropping one at a time into a jar.

Scientists call this principle resonance. It explains why a few well-timed pushes can accomplish more than a single enormous shove. Timing matters every bit as much as strength.

Questions

1. Who is Lila to Dev?

_____

_____

2. What did Dev notice about every trip back and forth?

_____

_____

3. What does the beat of a swing depend on chiefly?

_____

_____

4. Which type of chains produces a quick beat, long chains or short chains?

_____

_____

5. What happens when a push is delivered at the wrong moment?

_____

_____

6. What does the comparison to coins dropping into a jar suggest about small pushes?

_____

_____

Words to know

pendulum: a weight that swings back and forth from a fixed point
rhythm: a steady, repeating beat
arc: a curved path, like part of a circle
resonance: a big motion built up by pushes that match a natural beat
wobble: to move unsteadily from side to side

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: Pushing a Swing at Just the Right Moment

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

Circle: Pushing a Swing at Just the Right Moment

Easier · 192 words · Flesch-Kincaid grade 2.8

1. Dev's little sister.
2. Each one took about the same time.
3. The length of the chains.
4. One with short chains.
5. It works against the swing and slows it down.
6. Pushes in rhythm add up over time.

Triangle: Pushing a Swing at Just the Right Moment

This passage · 212 words · Flesch-Kincaid grade 4.1

1. Dev's little sister.
2. Each one took about the same amount of time.
3. The length of the chains.
4. One with short chains.
5. It works against the swing and slows it down.
6. Pushes in rhythm add up and pile up over time.

Square: Pushing a Swing at Just the Right Moment

Harder · 224 words · Flesch-Kincaid grade 6.8

1. His little sister.
2. Each one took roughly the same amount of time.
3. The length of the chains.
4. Short chains.
5. It works against the swing and slows it down.
6. They accumulate when they arrive in rhythm.