Name: _____ Date: _____

Why a Skater Spins Faster With Arms Pulled In

Circle group

A skater starts a spin on the ice with her arms stretched out wide. She turns slowly at first. Then she pulls her arms in close, and she spins much faster. Nobody pushes her. So where does the extra speed come from?

It comes from the shape of her body. A spinning thing has a kind of turning motion. Scientists call it angular momentum. If nothing pushes or drags on the spin, the amount of turning stays the same. The ice is slippery, so very little drag takes her spin away.

The amount of turning depends on two things. One is how fast she spins. The other is how far her weight is spread from the middle. When she pulls in her arms, her weight moves closer to the middle. The spread gets smaller, so her speed gets bigger. This keeps the total the same. When she stretches her arms out, the spread grows, and she slows down.

Divers use this trick too. A diver tucks into a tight ball to spin fast in the air. Then the diver stretches out straight to spin slowly before going into the water.

Questions

1. How does the skater start her spin?

_____

_____

2. What happens when she pulls her arms in?

_____

_____

3. Why does the slippery ice help her keep spinning?

_____

_____

4. What two things does the amount of turning depend on?

_____

_____

5. Why does she slow down when she stretches her arms out?

_____

_____

6. How do divers use the same trick?

_____

_____

Words to know

momentum: the amount of motion that something has
drag: a force that slows something down
tuck: to pull your body into a small, tight shape

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 Skater Spins Faster With Arms Pulled In

Triangle group

On the ice, a skater begins a spin with her arms stretched wide. She turns slowly at first. Then she pulls her arms in close to her body, and she whirls much faster. Nobody pushes her, and she does not kick off again. So where does the extra speed come from?

The answer has to do with how a spinning body is shaped. A spinning object has a kind of turning motion that scientists call angular momentum. As long as nothing pushes or drags on the spin, the amount of this turning stays the same. The skater's blades glide on a thin, slippery layer of ice, so very little drag is there to take her spin away.

The amount of turning depends on two things. One is how fast the body spins. The other is how far its weight is spread out from the center. When the skater pulls in her arms, her weight moves closer to the middle. The spread gets smaller, so the speed must get bigger to keep the total the same. When she stretches her arms out again, the spread grows and she slows down.

Divers use the same trick. A diver tucks into a tight ball to spin quickly in the air, and then stretches out straight to slow the spin before slipping into the water.

Questions

1. How does the skater begin her spin?

_____

_____

2. What happens when she pulls her arms in close?

_____

_____

3. Why does slippery ice matter to her spin?

_____

_____

4. What two things does the amount of turning depend on?

_____

_____

5. Why does she slow down when she stretches her arms out?

_____

_____

6. How do divers use the same trick?

_____

_____

Words to know

momentum: the amount of motion that something has
drag: a force that slows something down
glide: to move along smoothly and easily
center: the middle point of something
tuck: to pull your body into a small, tight shape

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 Skater Spins Faster With Arms Pulled In

Square group

On the ice, a figure skater begins a spin with her arms extended as wide as they will go. At first she rotates slowly. Then she draws her arms tightly against her body, and she suddenly whirls far more quickly. Nobody pushes her, and she does not kick off again, so the source of her extra speed seems like a mystery.

The explanation lies in the way a spinning body is shaped. Any spinning object possesses a quantity of turning motion that scientists call angular momentum. As long as nothing pushes or drags on the spin, that quantity remains exactly the same. The skater's blades glide on a thin, slippery layer of ice, so there is almost no drag to rob her of her spin.

The amount of turning depends on two factors. One is how fast the body rotates, and the other is how far its weight is spread out from the center. When the skater pulls in her arms, her weight moves closer to the middle. Because the spread has become smaller, her speed must grow to keep the total unchanged. When she stretches her arms outward once more, the spread widens and she slows down.

Divers rely on the same principle. A diver curls into a tight ball to rotate quickly through the air, and then stretches out straight to slow the spin just before slipping into the water.

Questions

1. How does the skater position her arms at the beginning of the spin?

_____

_____

2. What happens when she draws her arms against her body?

_____

_____

3. Why does the slippery ice make it easier for her to keep her spin?

_____

_____

4. Which two factors does the amount of turning depend on?

_____

_____

5. Why does her speed drop when she stretches her arms outward again?

_____

_____

6. How do divers rely on the same principle?

_____

_____

Words to know

momentum: the amount of motion that something has
drag: a force that slows something down
glide: to move along smoothly and easily
center: the middle point of something

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 Skater Spins Faster With Arms Pulled In

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

Circle: Why a Skater Spins Faster With Arms Pulled In

Easier · 190 words · Flesch-Kincaid grade 2.7

1. With her arms stretched out wide.
2. She spins much faster.
3. There is very little drag to take her spin away.
4. How fast she spins and how far her weight is spread from the middle.
5. Her weight moves farther from the middle, so her speed gets smaller.
6. They tuck to spin fast and stretch out to spin slowly.

Triangle: Why a Skater Spins Faster With Arms Pulled In

This passage · 221 words · Flesch-Kincaid grade 4.2

1. With her arms stretched wide.
2. She spins much faster.
3. There is very little drag to take her spin away.
4. How fast the body spins and how far its weight is spread from the center.
5. Her weight moves farther from the center, so the speed must drop.
6. They tuck to spin fast and stretch out to spin slowly.

Square: Why a Skater Spins Faster With Arms Pulled In

Harder · 232 words · Flesch-Kincaid grade 6.5

1. They are extended as wide as they will go.
2. She whirls far more quickly.
3. There is almost no drag to rob her of her spin.
4. How fast the body rotates and how far its weight is spread from the center.
5. Her weight spreads farther from the center, so the speed must shrink.
6. They curl into a ball to spin quickly and stretch out to slow the spin.