

Patterns of Motion

Patterns of Motions

*The path that an object follows when it moves is called its **path of motion**.
An object's future path of motion can be predicted by a pattern of its previous path of motion.*

There are different types of motion. An object might slide, roll, spin, swing, or fall. The path of motion depends on the type of movement and the reason the object is moving. If an object is moving with the same type of motion, the future path of motion of the object can be predicted by following a pattern of its previous path of motion.

Sliding

Sliding is when two things rub against each other as they move. A flat block could slide down a steep ramp. The ramp and the block would rub against each other as the block moved. Objects usually slide in a straight line unless they are pushed or bumped in a different direction.



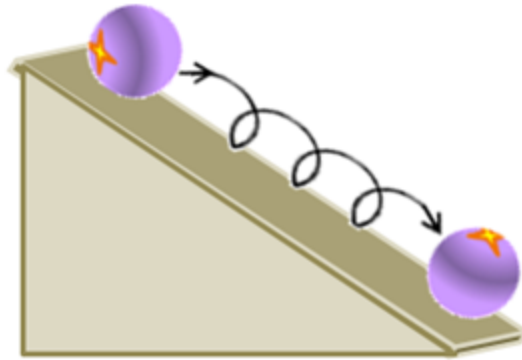
A sled slides down a snowy hill in a straight line. The path of the sled can be shown with an arrow. At the bottom of the hill, the sled will keep going for a short distance.

An object sliding on a slanted surface, like a ramp, will slide downward. This is because Earth's gravity pulls everything on or near the Earth's surface down toward the planet's center.

Rolling

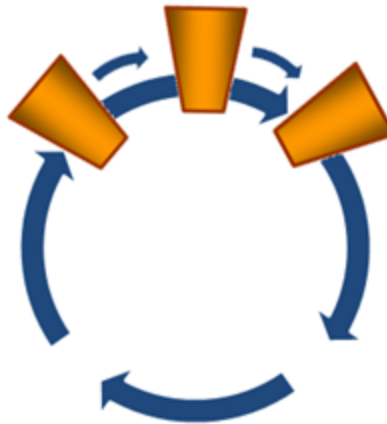
Things that are round, such as balls and wheels, can move by rolling. When a wheel is rolling, a different part of the wheel touches the ground at different times. This happens because the wheel turns as it rolls.

A ball rolling down a ramp does not change direction. It moves in a straight line. The ball also turns in a circle as it moves down the ramp.



A curly arrow shows the path taken by one point on the surface of the ball as it rolls.

Some shapes do not roll in a straight line. The cup in the picture below is wider at the top than at the bottom, so this cup will roll in a circle.



Spinning

A wheel can also move by spinning. If the edge of the wheel is not touching the ground, the wheel can turn, but it does not travel along the ground. This motion is called spinning.



view from above

A merry-go-round moves by spinning. If you look down at a merry-go-round from up above it, the path of the merry-go-round is a circle.

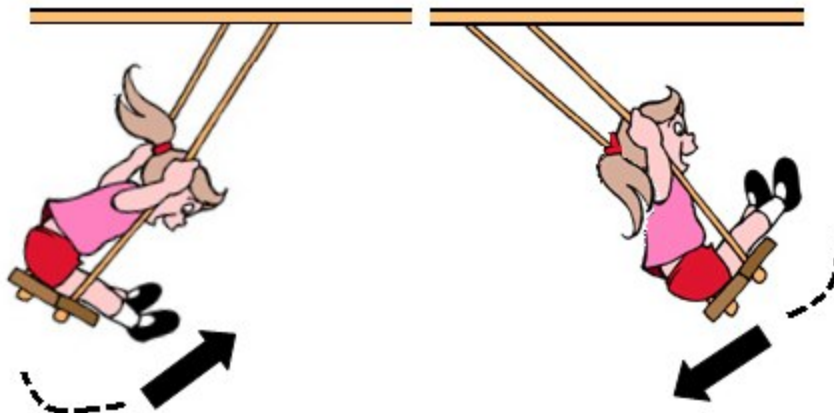
A toy top is another example of an object that spins. When a person turns a top and lets go of it, the top stands on its tip and moves in a circle.



These tops are spinning in a circle.

Swinging

Some objects move back-and-forth, which creates a swinging motion. With this kind of motion, the object moves first in one direction, and then it moves back the other way along the same path. A person on a swing has this kind of motion.



A person swinging in a swing is moving back-and-forth. The swing first travels up in one direction. Then, it changes directions and travels in the opposite direction.

A ball rolling in a bowl can also show a swinging type of motion. It may move up one side of the bowl, then down toward the bottom of the bowl, and then up the other side of the bowl until gravity brings the ball to rest at the bottom of the bowl.

There is a pattern to the motion of swinging objects or objects that are moving back-and-forth. For example, look at the metronome below. The arm on the metronome is swinging back and forth in a pattern.

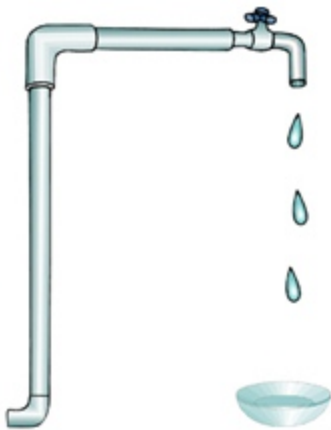


Metronomes are tools that musicians use to make sure they are playing at the right speed.

The pattern is that the arm moves from one side to the center, then over to the other side and back again. This pattern lets us predict what the metronome arm will do next. The pattern can even be measured. It is possible to time how long it takes for the metronome arm to move from one side to the other or from one side to the other and back again. Then, this measurement can be used to predict how long the next movement will take.

Falling or Being Thrown

Objects dropped or thrown into the air will eventually fall down to Earth. An object that is dropped may fall in a straight line. But an object that is thrown or kicked into the air travels in a curved path.



Objects that are dropped from a fixed position fall straight down toward the Earth.



Objects that are thrown, kicked, or propelled into the air will return to Earth's surface along a curved path.

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