

EPro8 Challenge

Engineer Problem Solve Innovate

The Rope Swing

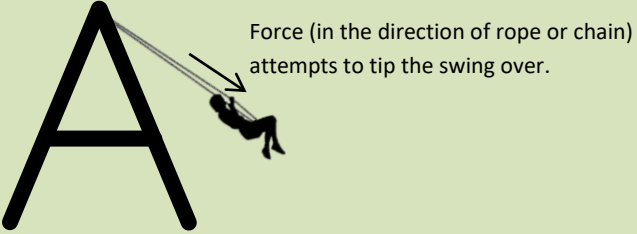
You are building a playground, and you want to build a very fast swing, that can swing back and forward once every second.

That will be an awesome swing that will make everyone want to come to your playground.

Experiment to figure out what will make a swing go faster.



Swing Construction

Criteria	Build a swing at least 1.8 metres high that can swing a 1kg weight.
Hint	<p>When a swing is at its highest point the force of the swing will attempt to tip the frame over. This is why a swing requires a strong wide base.</p>  <p>The "A Frame", often used in swings (shaped like the letter "A"), makes good use of a strong rigid triangle.</p>

Guessing Game

Criteria	Using your imagination, think of at least three things that might affect how long it takes the swing to swing back and forth.
Hint	Scientists call a "guess" hypothesis. The guesses can't be right or wrong. They are something to be tested.

Varying Weight

Criteria	Use the 1kg weight to make a 1.5m long swing. Write down how long it takes to swing back and forward ten times.
	Use the 500g weight to make a 1.5m long swing. Write down how long it takes to swing back and forward ten times.
	Use the 200g weight to make a 1.5m long swing. Write down how long it takes to swing back and forward ten times.
	What is the effect of changing the weight on the speed of the swing?

Varying Length

Criteria	Use the 1kg weight to make a 1.5m long swing. Write down how long it takes to swing back and forward ten times.
	Use the 1kg weight to make a 1m long swing. Write down how long it takes to swing back and forward ten times.
	Use the 1kg weight to make a 0.5m long swing. Write down how long it takes to swing back and forward ten times.
	What is the effect of changing the length on the speed of the swing?

Varying Angle

Criteria	Use the 1kg weight to make a 1.5m long swing. Pull this back a medium amount . Write down how long it takes to swing back and forward ten times.
	Use the 1kg weight to make a 1.5m long swing. Pull this back a long way . Write down how long it takes to swing back and forward ten times.
	Use the 1kg weight to make a 1.5m long swing. Pull this back a small amount . Write down how long it takes to swing back and forward ten times.
	What is the effect of changing the angle on the speed of the swing?

Pretty Picture

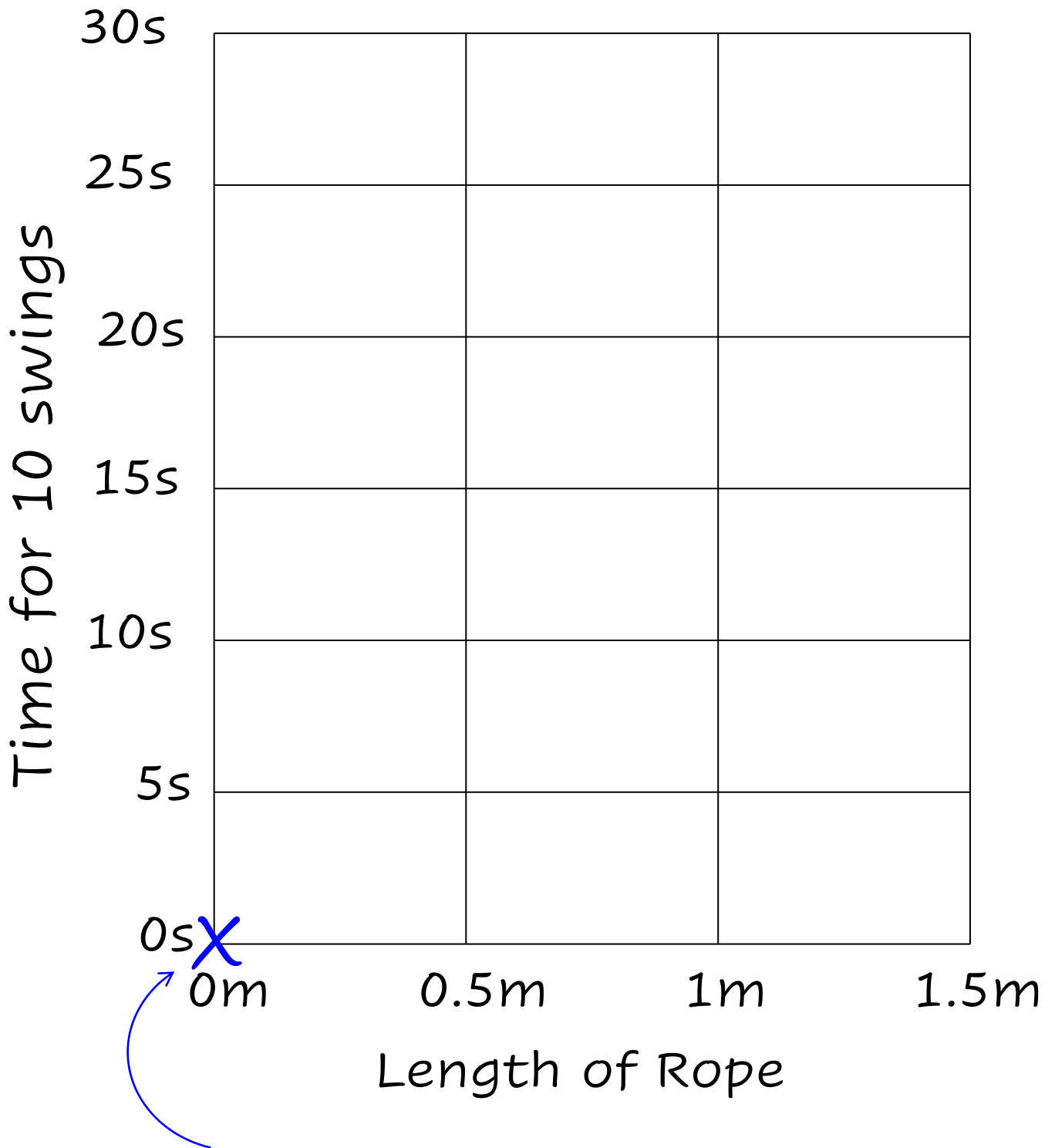
Criteria	Use the data for when you varied the length. Put an "X" on the graph for every length and its time. Draw a curve that goes through the three "X"s. We have added an X in for you. When the rope is 0m long it will take 0s as it can't move.
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1 Second Swing

Criteria	Using the data on the graph, figure out how long the swing needs to be to make the swing take 10 seconds to do 10 swings. Adjust the swing to this length and test your answer.
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After you have attempted this challenge, watch the tutorial to see our solution at www.EPro8Challenge.co.nz/Tutorial and enter the Challenge Code **RPSW**.

Changing the Length of Rope



If the rope is 0m long, it will take 0s to swing (as it can't move)