

Yo-yo

Apparatus

one or more yo-yos

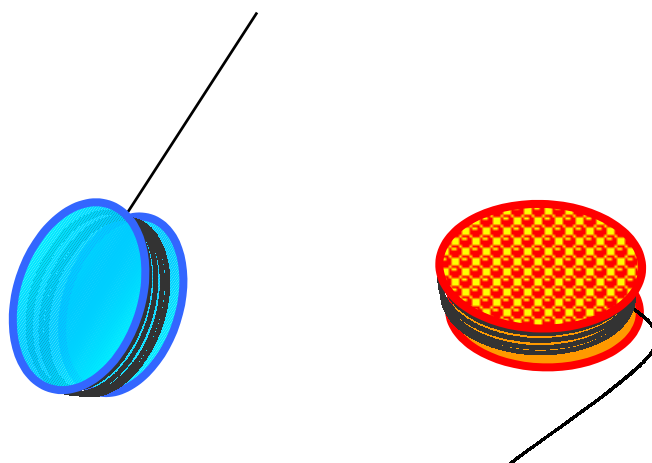
Action

The students experiment with making the yo-yos go up and down. They should examine the yo-yos carefully and try to explain why they go up again, and what force is responsible for accelerating them upwards against gravity.

The Physics

As it falls, the yo-yo loses gravitational potential energy and gains both translational kinetic and rotational kinetic energy. At the end of the fall the yo-yo continues to spin as it has angular momentum. If the string is looped loosely around the central axis then the yo-yo will stay spinning at the bottom of its fall for a reasonably long time.

The yo-yo comes up again if the yo-yoist tugs on the string. The friction between the string and the yo-yo provides an upward force on the yo-yo. Since the yo-yo is spinning, it will continue to rotate as it moves upwards again.



Accompanying sheet

Yo-yo

Experiment with the yo-yo.

Describe the energy conversions that occur as a yoyo falls.

Why does a yo-yo come up again?

What provides the force to accelerate it back up?