

Spolling & Hula Hoops

Teacher Notes for Years 7-10



In video **Spolling Part 1**, we see hoops and rings combining both spinning and rolling motions to move about a shaft.

Video Summary

We are introduced to a new word: 'spolling' - a combination of spinning and rolling.

Spolling describes the motion of a hoop moving around a central shaft, like a hula hoop around a performer's body, or the coloured loops on a gyro ring (figure 1).

The central shaft could be seen as rolling around the inside of the hoop like a wheel over the ground. In the meantime, the hoop is spinning around the central shaft.

This movement can be better visualised if we choose a point on the hoop and follow it. The path that the point takes is described by the purple line in figure 2.

The speed of the spin depends on the size of the inside circumference of the hoop. The smaller the circumference, the faster the hoop goes!

The "Vogrig Rod" that Mitch makes in the video was invented by Darren Vogrig, who works for CSIRO.



Figure 1: A Gyro Ring.

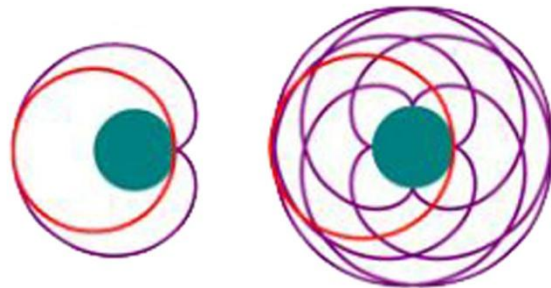


Image: Rough Science

Figure 2: The path taken by a point on the hoop. The red circle is the size of the hoop. The green circle is the central shaft the hoop is 'spolling' around. The path depends on the size of the hoop relative to the rod.

Science Understanding (Year 7, 8, & 10)

Physical sciences

Change to an object's motion is caused by unbalanced forces acting on the object. (Year 7)

The hula hoop is changing motion around the performer. The performer provides a force by oscillating their body to throw the hoop in a circular motion.

Energy appears in different forms including kinetic and potential energy, and causes change within systems. (Year 8)

Energy conservation in a system can be explained by describing energy transfers and transformations. (Year 10)

Energy is lost though friction as the hoop spolls around the shaft. More energy needs to be provided to keep the hoop moving. In the case of hula hooping, the performer provides energy by 'nudging' the hoop. By comparison, a loop on the Vogrig Rod or Gyro Ring has gravitational potential energy which transforms to kinetic energy as the loop falls.

The motion of objects can be described and predicted using the laws of physics. (Year 10)

As complicated as the motion of spolling seems to be, it can be thought of as a combination of several physical laws. The spinning hoop has circular motion, while friction against the central shaft causes hoop to slow down. To keep the hoop moving, a torque force need to be provided, like the hula hoop performer slinging the hoop around their body.

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