Super Spinners!

What’s Torque?

Torque is the effort it takes to make something spin! Can you describe the torque seen in the following images?

a)

b)

c)

Terrific Torque

Materials:

• CD
• Pencils
• Cardboard
• Scissors
• Rubber band
• String

Instructions:

1. Trace the CD on cardboard and cut it out.

2. Poke a pencil through the cardboard centre, and hold in place by winding the rubber bands around the pencil above and below the cardboard.
**Talk About It!**
1. What purpose do you think the handle has in getting the top to spin?
2. Can you list some other situations where torque is useful?
3. Describe how a teeter-totter is an example of torque.

**Did You Know?**
A torque (torc) is also a piece of jewellery made from metals strands that have been intertwined. This torc was found in Scotland, along with three others. It has 8 gold wires twisted together with decorated ends and a safety chain. They were discovered in 2010 by a David Booth with a metal detector, who was rewarded $740,000 as a reward! These torcs were likely buried within a religious building, dating back to 300-100 BC.

**Test Your Top!**
1. Give your top a long handle and short tip by pushing just a little of the pencil through the hole. How well does it spin?
2. Now push most of the pencil through a cardboard circle to make a long-tipped spinner with a short handle. Does the spin change?
3. Try spinning a triangle or square-shaped disk instead. Does it work any better?

**Pay for a Better Spin**
Tape six pennies on the rim of a cardboard disk, and tape 6 close to the centre of another. Compare their spins.

A property called **rotational inertia** keeps things spinning long after we set them down. More mass near the outer edge of a spinning object increases this inertia and gives us an even better spin.

Let's use this property to improve our tops!
3. Space 8 pennies around the edge of the cardboard. Glue them in place. Put a dab of glue on top as well, and add another cardboard disk. Put this double-disk under a book overnight.
4. Poke a pencil through your disk, giving it the right amount of tip/handle to make it spin for a long time.

**Winner Spinner**
- A disk with weight spread around it evenly.
- A long handle and short tip.
- Weight spread evenly along the outer edge.
- The greater the torque, the longer the spin.

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