



15-minute Family STEAM Spinning Tops



Supplies Provided

Spinning Top template
Cocktail Toothpicks/Skewers

Supplies From Home

Colored pencils, Markers or Crayons
Scissors
Stopwatch (optional)
Paper and pencil to record experiment and observations (optional)

1. Use colored markers or pencils to add designs to each spinning top. Try to think of a different design for each spinning top. You might use stripes, zigzags, dots, concentric patterns or blocks of color. (How do you think each different design will appear once the top is spinning?)
2. Cut out each spinning top using scissors.
3. Poke a toothpick into the center of each spinning top. You will notice that each top has a dot printed at its center to help you.
4. Give your spinning top a twist and see how it spins

TIP--If your spinning top gets a little loose during play, you can add a little tape around the hole to help hold the toothpick in place.

THINGS TO CONSIDER

- What do you notice about how the spinning tops work?
- Which size spinning top works best?
- How does your art design look as the top spins?
- Does the way you use your hand to spin the top make a difference to how well it spins?
- What do you think makes the tops spin and not fall over?
- What makes them stop spinning?
- What happens if the top of the tooth pick gets blunt?
- Time how long the spinning tops spin. Does one spinning top consistently spin longer?
- Test out spinning tops of different sizes. Make predictions about whether a bigger or smaller spinning top will work best.
- Do you think it's better to place the card near the top or bottom of the tooth pick? Try out the different variations and see if you can explain why the different designs spin differently.

THE SCIENCE

When we use our fingers to set a top spinning, we are giving the top a force that converts its potential (stored) energy into kinetic energy (the energy of motion). The law of the conservation of angular momentum states that if there are no other influences, something that is spinning will keep on spinning.

When the spinning top is spinning, it's balancing on the fine point of the tooth pick. This tiny tip minimizes the amount of friction generated by its contact with the surface it is spinning on. With only a tiny amount a friction influencing the spinning top it keeps on spinning for much longer.

After a while, friction does slow the spinning. The spinning top will start to wobble and eventually stop spinning on the axis of the tooth pick and it will fall to one side. When the spinning top begins to tip, the force of gravity exerts a torque on the top. This makes it swing out more. The slower the top spins, the faster it tips. This is why you see it lurch outwards just as friction finally makes the top stop spinning.



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