Fan, Color Spinners, Top

Parts:

2	models
1	Motor
1	Tongue depressor
1	Battery, C
1	Clothes pin
	Aluminum foil
3	Wires, thin connection
½	Cork
1	Cup, salsa with lid
	Plastic from 2-liter bottle
	Tacks
	Push pins
	Paper, white

Extra Tools:

Black tape
Wire strippers
Drill, nail bit

Fans and propellers push on air molecules. You can imagine the molecules are tiny balls standing in the circle of rotation of the prop. The prop blade swings into the balls, and they get hit away according to the angle of the blade. If the angle is just right, they'll be propelled mostly straight forward. Other balls will move into take their places and then be hit by the next blade to come around.

If the blade is at a severe angle, it will encounter a "thick circle" of air molecules and hit them all forward. The motor will have to work harder to push them all. If the blade is at a low angle, it will encounter a thin circle of balls and the motor will not have to work so hard. The prop will be able to go faster, but not push as much air with each rotation.

Color mixing in this project is quite interesting. You'll notice that when the circle stops, the colors are still separate. You may ask yourself then, where did the colors mix? It was *in your eye!* This kind of mixing is fundamentally different than when you mix colors on paper. Try it: put two colors on a color spinner and mix them by spinning it, and then try mixing these two together straight on paper. You should get two entirely different results. If you want to read more about this fascination phenomenon, look up color mixing by addition and subtraction, and the difference between mixing colors of light and pigment (paint).

The top is just a top like any other. If you get the top hole and the bottom pushpin exactly spot-on centered, it will spin steady for more than one minute.

Concepts:

1. Spinning things are both useful and interesting; we encounter many spinning things in our day to day life. Motors make this spinning possible.
2. Fans push air. The larger the blades, the more air they can scoop up and push
3. Tops gain stability by spinning, just like many projectiles and satellites.
4. Colors on a wheel mix in our eyes when it is moving too fast.

Questions:

1. What is necessary to make the top stand up?
2. Why do the colors mix together when the color disc spins?
3. How could you make the fan blow more air?
4. How could you make these things spin faster?