Spin it in a Minute

A new startup technology company has a plan to compete with Google Maps and has begun building a proprietary database of video footage of streets and addresses all over the United States. To accomplish this enormous task they have decided to use drone technology that will make the image collection much more efficient.

Because of your reputation for precision drone piloting you have been hired by this company to be one of the first pilots gathering imagery in which you will fly a camera drone down streets, stop at address intervals, and rotate to capture the video imagery. You will be partnered with a data scientist who will monitor your **angular velocity** which must be a very precise rate for the company's image processing software to process correctly.

What is Angular Velocity?

In physics, **angular velocity**, usually expressed in radians per second (r/s), describes the speed of a rotating object along with its direction and position relative to an axis of motion. This can be quite complex! For purposes of this activity, you will be calculating a simple **rotational speed** of your drone measured in revolutions per minute (RPM).
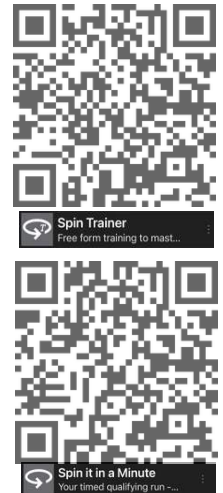
Grades: 4 & Up
Time: 15 Minutes
Subject: Math, Physics, Technology, Drones
Topics: Angular Velocity, Rotational Speed, RPM

What You Will Need/Prep

- databot™ 2.0 & Vizeey™
- IOS/Android Smart Device
- Drone (Tello or larger)
- A method to top mount databot™ on the drone.
- Read the Vizeey™ Fast Start Guide and install Vizeey™ if you haven't already.
- Use Vizeey™ to scan these QR codes and get started.

Spin Trainer
Free form training to mast...

Spin it in a Minute
Your timed qualifying run -...

RPM

Revolutions **P**er **M**inute

For Tello Users, download the free 3D printable mount for databot™. Download the zip file here.

PDQ: Spin it in a Minute

Do this activity as a team of two. One teammate will be the spotter, watching and calling out the data to guide the pilot to adjust the drone's **rotational speed**. The pilot is responsible for flying with precision based on the cues provided by the data scientist. Use the "Spin Trainer" and "Spin it in a Minute" Vizeey™ experiments to practice for actual field work. You must achieve a qualifying score of 90% or higher before you will be ready to conduct real world image collection. Good luck!

1. Carefully mount your databot™ on your drone. Use the 3D printable mount provided if you are using a Tello.

2. Tap on **"Spin Trainer"** in Vizeey™ to load the experiment. Use the ▶️⏸️ icons to start and pause the experiment. Clear your data before each measurement run.

3. **Practice:** Pilot: take off and hover in place and begin to practice rotating your drone in place. Your target **rotational speed** is six revolutions per minute (6 **RPM**) which is a full rotation every 10 seconds.
   Data Scientist: Using the commands "faster" and "slower" coach the pilot carefully through hitting the rotation speed using the data display in the Spin Trainer.

4. **Final Run:** After practicing, exit the Spin Trainer and tap on the Spin it in a Minute experiment to qualify. Once you achieve 80% or greater you are ready!

Code Challenge: Use DroneBlocks or other coding environment to auto-pilot your drone to rotate at a perfect 6 RPM. Human vs. Machine! Which is superior!

Spin Trainer

Z

Values (RPM)
5.00
0.00
-5.00

14.0   16.0   18.0
Time (S)

Z **7.67** RPM

Target **6.00** RPM

Average **5.12** RPM

*Use the **Spin Trainer** to practice your perfect 6 RPM, then go for the win with a qualifying score of 80% or higher in **Spin it in a Minute**!*