UNIT: Electrical Circuits

Motion Defense Spinner

Objective:

Use electrical energy to create movement and defend your base!

Materials:

* Small DC motor
* Battery + holder (AA or 9V)
* Paper fan blades or spinner
* Cardboard or jungle platform (your mount)
* Tape, straw, and scissors
* Jumper wires or foil strips
* Optional: different battery sizes or weights

STUDENT DIRECTIONS:

**Step 1:** Assemble the Power Core

* Connect your motor terminals to the battery using jumper wires or foil strips.
* Make sure your connections are secure and wires aren’t crossing.

**Step 2:** Build the Jungle Fan

* Cut out a paper fan or spinner with large “blades.”
* Use tape to attach it firmly to the shaft of the motor (centered!).
* Add a straw if needed to elevate or extend your motor mount.

**Step 3:** Construct the Mount

* Mount the motor to cardboard (this is your Base Defense Platform).
* Tilt it slightly, or make it upright, depending on your defense style.

**Step 4:** Test + Troubleshoot

* Power it up!
* What happens when you reverse the wires? What direction does it spin now?
* Try tilting the fan, or making the blades bigger. Does the speed change?
* Add more weight or try a different battery. What happens?

**Test & Record:**

|  |  |  |
| --- | --- | --- |
| **Test Variable** | **What You Changed** | **What Happened?** |
| Default Setup |  |  |
| Reversed Wires | Changed polarity |  |
| Increased Fan Size | Larger blades |  |
| Battery Type | Swapped voltage |  |
| Tilted Base | Changed angle |  |

**Mission Reflection:**

* What type of energy is stored in your battery?   
  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What kind of energy did it turn into?   
  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What helped your fan spin faster or better? Why?   
  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* If you added one more feature to improve defense, what would it be?   
  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Bonus Mission (Optional):**

* **Design a Jungle Alert System** — Add a light or buzzer that activates when the motor is running! You’ll combine motion + sound/light for ultimate base defense.

Standards Alignment

NGSS: MS-PS3-5 STEL: STEL 1B, STEL 2B, STEL 3B, STEL 4B, STEL 5B, STEL 7B, STEL 8B CCSS: CCSS.MATH.CONTENT.6.RP.A.3, CCSS.MATH.CONTENT.7.EE.B.3, CCSS.MATH.CONTENT.6.SP.B.4–5, CCSS.MATH.PRACTICE.MP2, CCSS.MATH.PRACTICE.MP4, CCSS.MATH.PRACTICE.MP5