**📍 Station 2: Monkey-Repelling Motor Trap**

**NGSS: 4-PS3-4**
**Objective:** Build a working **motor-powered scare trap** to protect your jungle base from sneaky monkeys using a spinning fan!

**Materials:**

 1 **small motor**

 1 **battery** + **battery holder**

 **Wire leads** (or foil strips)

 **Paper fan or pinwheel**

 **Straw** (for fan support or motor mount)

 **Tape**

 **Paper cup** or **cardboard base**

**Student Directions:**

**Step 1: Test Your Motor**

* Connect one wire from the **positive battery terminal** to one motor terminal.
* Connect another wire from the **negative terminal** to the other side of the motor.
* ✅ **Does the motor spin?** If not, double-check your connections or try switching wires.

**Step 2: Build the Spinner**

* Tape a **paper pinwheel** or **cut paper blades** to the motor shaft (the part that spins).
* Make sure the fan is **balanced** and can spin freely. You may need to adjust where you place it.

**Step 3: Create Your Trap Setup**

* Tape the motor securely to your **cardboard base** or inside a **paper cup**.
* Angle it so the fan is visible and facing outward like a real scare device.
* Test it again by connecting the circuit — does the **fan spin rapidly**?

**Observe & Record:**

**What kind of energy is being created (from → to)?**
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
→ (Hint: Is it going from battery power to motion?)

**What happens when the wires are connected and disconnected?**
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**🐒 Jungle Survival Connection:**

**How could this “spinning scare trap” help the rescue mission?**
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
→ (Hint: Think about motion, noise, or flashing movement.)

**How could you improve your monkey-repelling fan trap?**
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### 📍 **Station 2: Monkey-Repelling Motor Trap**

**NGSS Alignment:**
**4-PS3-4** – Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
(In this case: Electrical energy → Mechanical energy)

### ✅ **ITEEA STEL Standards – Elementary Level**

**STEL 1A** – The study of technology uses knowledge and skills from other subject areas.
→ Students apply concepts from science and math to build a mechanical system.

**STEL 2A** – Technological systems are designed to meet needs and wants.
→ The activity simulates a real-world jungle survival need: protecting resources using a motion-activated deterrent.

**STEL 4A** – Break systems into parts to see how they work together.
→ Students explore how the battery, wires, motor, and fan all interact as a system.

**STEL 5A** – Technology can be used to communicate or cause an effect.
→ The motor-powered fan mimics sound or motion to scare off animals—demonstrating purposeful design.

**STEL 6A** – Creativity and innovation improve technology.
→ Students are encouraged to improve the trap through iterative design and testing.

**STEL 7A** – The engineering design process helps people solve problems.
→ Students follow the design process: test, build, modify, and refine based on performance.

**STEL 8A** – Design is a creative process for meeting needs and wants.
→ The scare device is developed based on imaginative thinking and functionality.

### ✅ **Common Core Math Standards – Elementary Level**

**CCSS.MATH.CONTENT.3.MD.A.2** – Measure and estimate capacities and apply to real-world problems.
→ Students might estimate how far the fan blows or what size blades produce stronger motion.

**CCSS.MATH.CONTENT.4.MD.A.1** – Solve measurement problems involving lengths, angles, and mass.
→ Measuring straw or motor placement helps with fan balance and build stability.

**CCSS.MATH.CONTENT.4.MD.B.4** – Make a line plot to display measurement data.
→ Extension: Students could record spin speed or fan size vs. performance.

**CCSS.MATH.PRACTICE.MP2** – Reason abstractly and quantitatively.
→ Students consider how motor voltage or blade size affects motion and energy output.

**CCSS.MATH.PRACTICE.MP4** – Model with mathematics.
→ Students build and test physical systems and could model energy transformation pathways.

**CCSS.MATH.PRACTICE.MP5** – Use appropriate tools strategically.
→ Students use wires, battery holders, motors, and measurement tools effectively in problem-solving.

### ✅ Summary

This activity builds essential STEM skills by integrating **mechanical systems**, **energy transformation**, and **design-based learning**. It aligns with **ITEEA STEL standards** by encouraging systems thinking, creativity, and engineering design. It supports **Common Core Math** through measurement, reasoning, and modeling in a hands-on, applied context.