**🚨 Final Challenge: Build Your Rescue Base System!**

**NGSS Standard:** 4-PS3-2, 4-PS3-4 – Energy transfer & conversion in designed systems  
**🎯 Objective:** Design and build a **rescue system** that uses **at least two types of energy** (light, sound, or motion) to keep people or animals safe in the jungle!

**Materials Needed:**

** LED lights**

** Buzzers or motors**

** Battery packs**

** Alligator clips, wire, foil strips**

** Switches, mirrors, pressure plates, fans, or paper sensors**

** Green paper, cardboard, foam, tape**

**Student Directions:**

**Step 1: Plan It Out**

* Think about what you learned from the other stations:
  + Lights can signal or light a path.
  + Buzzers can alert or warn others.
  + Motors or fans can cause motion to scare or signal.
* Decide what your rescue base will do:
  + Help people find their way?
  + Warn animals to stay away?
  + Send a sound or light signal when someone arrives?

**Step 2: Choose Your Energy Types**

Pick at least TWO types of energy for your system:

* 💡 Light (LEDs or reflected mirrors)
* 🔊 Sound (buzzers or alarms)
* 🔄 Motion (motors, fans, moving parts)

**Step 3: Build It**

* Sketch your system first on the template below. Label each part.
* Then, using your materials, connect your components with batteries and switches.
* Test each part. Does it light up, buzz, or move when activated?

**Step 4: Test & Improve**

* Does everything turn on at the right time?
* Can you combine switches (like a pressure plate + button)?
* Is the system clear and safe?

**Draw Your Jungle Rescue Base System Below:**

Label where energy moves (example: “Battery → Wire → LED = Light!”) **✏️ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
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**Answer These Reflection Prompts:**

How does your system help keep people or animals safe?  
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What did you learn about energy and circuits today?  
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If you could add one more feature to your jungle system, what would it be?  
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
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**NGSS Standards:**

* **4-PS3-2:** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
* **4-PS3-4:** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.  
  → This culminating activity involves designing a multi-component system where students integrate what they learned from all prior stations to demonstrate energy transfer and conversion in a real-world jungle rescue scenario.

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

**STEL 1A** – Technology uses and builds on knowledge from other subject areas.  
→ Students combine knowledge from science, engineering, math, and art to plan and build a rescue system.

**STEL 2A** – Technological systems are created to meet needs and wants.  
→ The system meets survival needs such as communication, protection, and signaling in a jungle environment.

**STEL 3A** – Technological systems are influenced by environment and culture.  
→ The design is inspired by a jungle context and addresses specific environmental challenges.

**STEL 4A** – Systems are made of interacting parts that work together.  
→ Light, sound, and motion systems interact to form one unified rescue base solution.

**STEL 5A** – Technological tools help solve problems and communicate ideas.  
→ LEDs, buzzers, switches, and other tools are used to create meaningful signals and movement.

**STEL 6A** – Creativity and innovation improve technology.  
→ Students are encouraged to go beyond the basic build and add features or combine mechanisms creatively.

**STEL 7A** – The engineering design process is a method for problem-solving.  
→ This challenge includes clear steps: ask, imagine, plan, create, test, and improve.

**STEL 8A** – Design is a creative process used to develop solutions.  
→ Students use design thinking to develop functional, safety-oriented systems using available materials.

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

**CCSS.MATH.CONTENT.3.MD.D.8** – Solve real-world problems involving perimeter.  
→ Students may measure materials or outline paths using specific dimensions.

**CCSS.MATH.CONTENT.4.G.A.1** – Draw and identify lines and angles.  
→ When sketching their system design, students use geometry to layout paths and connections.

**CCSS.MATH.CONTENT.4.MD.A.3** – Apply measurement concepts to real-world problems.  
→ Measuring distances for foil or wire length in circuits supports hands-on math applications.

**CCSS.MATH.PRACTICE.MP1** – Make sense of problems and persevere in solving them.  
→ Students troubleshoot circuit issues and refine their designs.

**CCSS.MATH.PRACTICE.MP4** – Model with mathematics.  
→ Sketches of their rescue base system require spatial reasoning and proportional planning.

**CCSS.MATH.PRACTICE.MP5** – Use appropriate tools strategically.  
→ Students decide which components (LEDs, buzzers, motors) to use for optimal functionality.

**CCSS.MATH.PRACTICE.MP7** – Look for and make use of structure.  
→ Recognizing energy flow and system layout reinforces structured, logical thinking.

### ✅ Summary

This **Final Challenge** is an excellent integration of **engineering design**, **energy science**, **creative problem-solving**, and **math modeling**. It aligns perfectly with **NGSS 4-PS3**, **ITEEA STEL** systems/design standards, and **Common Core Math Practices** for elementary learners.