Exploring the Energy Grid
Grades 3-5

Exploration 1

☐ Rapidly turn the handles clockwise on all three generators.
☐ Watch the System Voltage meter needle and number:

1. Draw the needle when the light is GREEN!

2. Write the number when the light is GREEN!

3. Draw a line to connect the parts of a generator to its name using the diagram on the side of the grid table:

   Hand crank
   Drive belt
   Rotor
   Brushes
   Output terminals
Discussion 1

1. What is the part of the generator that spins rapidly on the inside of the generator?

2. What is around the outside of the spinning rotor?

3. What is the system voltage meter measuring?

4. How does it change as you crank faster or slower?

Exploration 2

☐ **Turn off the SmartGrid Enable Switch**

☐ Use the **SmartGrid Table Wiring Directions** on the table to connect the power companies to the customers.

☐ Crank the three generators and watch the voltmeter. What happens to the voltmeter and buildings?

☐ **Flip the Smart Grid Enable Switch ON**

☐ Crank the generators rapidly and watch what happens to the buildings and the Smart Grid display.

☐ Disconnect any one wire and crank the generators. What happens?
Discussion 2

1. What do the green lights indicate?

2. What do the red lights indicate?

3. What happened to the city when you got all the wires connected and turned the hand crank generators?

Apply It!

Sometimes electricity goes off because of storm damage to transmission lines. Has the electricity ever gone off at your home? How long was it off?

1. **SmartGrid Switch OFF**

2. A storm hit your area causing the power to go out in your neighborhood. Ask your teacher to cause a problem in your grid then fix it with your team!

3. Explain how you found the problem and what you did to fix it.

4. **SmartGrid Switch ON**

5. Another storm hit your area causing the power to go out in your neighborhood. Ask your teacher to cause a problem in your grid. Then, fix it with your team!

6. Use the SmartGrid panel to find the problem. Explain how you found the problem and what you did to fix it.

7. How does the SmartGrid help customers?