SCIENCE CAREER ADVENTURES

# Urban Planner: Using Kinetic Energy

## NGSS Standard: MS-PS3-5

## Adventure Description:

In this adventure, students will think like an urban planner and create a device that can generate electricity for a city using kinetic energy.

## Activity

### Step 1: Background Information on Urban Planning, Kinetic Energy, and Electricity (5–10 minutes)

- Show Video: Using Kinetic Energy.
- Remind students that kinetic energy is any energy from movement. Any object that has mass and is moving has kinetic energy. The faster an object is moving or the heavier it is, the more kinetic energy it has. When the kinetic energy of an object changes, it goes faster or slower. For example, when a driver hits the breaks, some of the kinetic energy becomes heat energy and the car slows down.
- Next, show Handout: Turning Kinetic Energy Into Electricity. As a class, review how kinetic energy can be turned into electricity.
- Explain to students that urban planners have begun searching for ways to turn unused kinetic energy into electricity so they can have new ways to provide power to cities. In the video, old roads in a city were replaced with a new kind of road that will convert kinetic energy from moving vehicles into electricity to power the city. Show Handout: Examples of Ways Kinetic Energy is Converted into Electricity in Cities.

### Step 2: Creating a Device (30+ minutes)

- Explain to students that they will create a device that turns kinetic energy into electricity.
- Show Handout: Creating a Device. As a class, review the steps that students will take.
- Next, divide students into pairs or small groups.
- Have groups complete the steps to design their device. Provide groups with an assortment of art supplies and building materials. Examples of materials include: cardboard, construction paper, pipe cleaners, recycled containers.

**Please contact Allison Bischoff, Director of Customer Service, at allison@rozzylearningcompany.com or 314-272-2560 with questions.**

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- While students are working, ask them the following questions:
  - What is your source of kinetic energy?
  - How does your device capture the kinetic energy?
  - How will collecting kinetic energy affect the way the object is working or moving? Did it need that energy for something else? (For example, if students were designing a device that captures kinetic energy from people, they would have to consider the fact that the people used the stored energy from the food they eat so that they could move and have kinetic energy. If you capture all of their kinetic energy, they will stop moving.)

**Step 3: Discussion (5–10 minutes)**

- Have students showcase their design to the class. Ask them to explain their energy source and how the device captures kinetic energy from the source.
- Have a concluding discussion about how kinetic energy is transformed inside of student's devices. The kinetic energy, or energy from motion, of their source is transferred to the turbine causing it to turn. Then, the energy is transformed into electrical energy that can be used to power the business and homes in the city.

## Materials List

### Provided online:

- Video: Using Kinetic Energy
- Handout: Turning Kinetic Energy Into Electricity
- Handout: Examples of Ways Kinetic Energy is Converted into Electricity in Cities
- Handout: Creating a Device

### Not Provided online (each student or group needs):

- Art supplies and building materials (Examples: cardboard, construction paper, pipe cleaners, recycled containers)

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