Trolley Language

Explain to your audience that trolley operators use bells, horns (or whistles), and hand signals to communicate with other operators and conductors so that everyone can stay safe. This activity will teach visitors how to use the trolley bell and hand signals to say what your trolley is going to do.

For the hand signal portion, invite your audience to repeat the hand motions as you teach them. If your audience contains older children, you might want to quiz them on these motions. You could either A) perform the motions and ask what they mean or B) shout out different signal names, and challenge them to follow along with their motions.

105c. Hand, flag or lamp:

	**Swung across track – Stop**
	**Raised and lowered vertically – Proceed forward**
	**Swung in circle across track – Proceed in reverse**

Anything waved vigorously near the tracks – Stop immediately

[Picture Summary: A cartoon man demonstrates three hand signals. Hands swung across track means stop, a hand raised and lowered vertically means proceed forward, and a hand swung in a circle across the track means proceed in reverse. The picture also notes that anything waved vigorously near the tracks means stop immediately.]

During the bell portion, you can either demonstrate yourself with the bell box and then invite each child up to try, or you can call up volunteers to demonstrate each signal for you. If you choose this second option, make sure each child has a turn to try it out afterwards.

Bell Signals:
1 ding - stop
2 dings - go forward/proceed
3 dings - back up
lots of short whistles/dings = watch out!

Horn Signals:
long long short long - grade crossing (crossing a public road)
lots of short whistles/dings = watch out!

Trolley Pole Demonstration
During this short demonstration, you will connect the trolley pole to the overhead wire and explain how trolleys are powered. Depending on the age and interest level of the group, you may choose to explain this in less or more depth. Below are two different versions of how you might word this explanation. Feel free to come up with a different explanation that makes sense to you!

For a younger audience:
Electricity is a type of energy that can build up in one spot or flow from one place to another. It comes from electrons moving around and jumping from one atom to another. When electricity stays in one place, it is called static electricity, when it moves, it is current electricity. A circuit is a loop around which an electric current flows. If there is a break anywhere in the circuit, the electricity cannot flow.

Trolleys are powered by electricity flowing through a circuit. Electricity flows from a substation through the overhead wire. As the trolley pole connects to the wire above the trolley, and the wheels are touching the rails under a trolley, it completes the circuit, allowing the electricity to flow through the electrical equipment on the trolley to light the lights and help it move. The operator uses a handle called a controller that lets the operator choose how much electricity to let through to power the motor.

For an older audience that is interested in learning more, you may want to include some facts from the "How Does it Work?" Diagram- view picture here.

1) Electricity forms a direct current source that is distributed along the trolley line through the overhead wire above each track.
2) The trolley pole draws an electric current through a grooved wheel or shoe that runs under the wire. The electricity travels down the pole, connecting to the car's control wiring.
3) The operator adjusts or switches the amount of current that gets to the motors with a controller, which has a handle the operator turns to different "points." Each successive point removes resistance, which allows more current to flow to the motor- making it go faster.
4) As the operator turns the controller to higher points, what actually happens is that there are fewer resistors in use. Resistors slow the flow of current, and on a trolley, they are arranged in iron grids. When the controller is set to the first, or lowest, point, the most grids are used, so that the car starts slowly and smoothly.
5) Electric current passes through the controller and grids to the motors, which drive the car. The motor has large, powerful electromagnets which exert force against the magnetic field of another set of magnets on the shaft. This causes the shaft to rotate. It turns gears, which then drive the axles and the wheels.