

**Program Description:**

Students discuss forces and how forces influence the motion of objects. They analyze the ways that the motion of marbles can be controlled by the application of force. They are shown complex machines created by Leonardo DaVinci and Pitagora Suiichi, a Japanese children's show. They then use tracks, marbles, and other parts to build their own machines, developing a working understanding of forces, motion, and precision.

**Learning Objectives:**

1. Students will understand how various forces, including gravity and friction, influence an object's motion.
2. Students will develop design and building skills as they construct a complex machine with interdependent parts.
3. Students will invent ways to apply force, exploring different strategies and styles of invention.

**Alignment with Connecticut Core Science Curriculum**

- 4.1** *The position and motion of objects can be changed by pushing or pulling*
- The size of the change in an object's motion is related to the strength of the push or pull.

**Key Vocabulary:** *force, motion, speed, gravity, friction, energy*

**Preparation for Visit:**

This project is appropriate at the beginning of a unit, to provide some experience with force and motion and initiate investigation, or near the end of the unit, when students can apply what they have learned to analyze components of their machine.

Before the visit it is useful for students to have discussed or learned:

- A force is a push or pull.
- Forces can put objects in motion – examples include the force of gravity or a force applied by a person or other object.
- Forces can prevent objects from moving or slow them down – examples include friction or a force applied by an object that prevents or stops motion.