Grades 3–5
Go, Go, Go Around New York
Paper Tram

Have you ever been on a tram before? Did you know about the Roosevelt Island Tram? How can we build one out of everyday objects like paper and straws?

What Will You Learn?

- How a pulley works
- What a tram is, and specifically about the one on Roosevelt Island
- What simple machines are

Materials:

- Cardboard tubes
- Bendy straws
- String
- Paper clip
- Tape
- Chip board

Instructions:

1. Take one bendy straw and bend it to a 90 degree angle. Do the same with a second straw. Now take your first straw and fit it into the short end of the second straw. This leaves you with a U shaped straw.
2. Repeat Step 1 so that you have two U's.
3. On the long leg of the straw U, cut 4 slits that are about 1 inch long. Open up those flaps so the straw can stand vertically.
4. Repeat this on the other 3 straw ends.
5. Take a short cardboard tube and cut it in half vertically to get 2 half pipes.
6. Place each of the cardboard tube halves on the shortest side of the straw U’s and tape them into place.
7. Turn the straw U’s upside down and secure them to the chipboard base by taping down the flaps.
8. Take a straight straw and cut both ends of it into slits, open these up to be able to tape the straw into place. Tape the first end onto one of the cardboard tube halves. Then do the same on the other side. This will make sure that the two sides stay at that distance and cannot be pushed together.
9. Take a piece of string and wrap it around both of the cardboard tubes so that it runs across them. This will act as the wire that the tram sits on.
10. Make the tram out of a small cardboard tube
11. Hook your tram onto the string. Now you can pull the string in one direction to make the tram move across.

**Reflection Questions:**

- What makes the tram move?
- What other things can you think of that use pulleys to move?
- What are the other simple machines? Have we seen them before?
- What other devices could we make with these materials?
Explanation:

- Simple machines are devices with few or no moving parts that are used to modify motion and force to perform work. The Roosevelt Tram incorporates several simple machines in its design:
  - The tramway utilizes **inclined planes** in the form of the track system. By spreading the work of lifting the cabins over a longer distance, the inclined plane reduces the amount of force required to move the cabins vertically.
  - **Pulleys** are used in the tram system to guide and support the cables that carry the cabins.
- The tram cabins are equipped with **wheels and axles**. The wheels reduce friction between the cabins and the track, and the axles provide stability and support for the cabins as they travel along the track.

Further Reading Recommendations:

- **Trams**
- **Crafty Science**
- **Recycled Paper Projects**

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