Grades Middle School and Up
Journey to NYC Parks

Round and Round

Thinking about the Ferris wheel at Coney Island, we will discuss the function and structure of this ride. In order to understand how the Ferris wheel is powered, we will use popsicle sticks and glue to build our own Ferris wheels.

What Will You Learn?

- The functionality of a Ferris wheel
- Force of gravity
- Centripetal acceleration

Materials:

- Craft sticks
- Straw or skewer
- Masking tape or glue

Instructions:

To make the wheel spokes

1. Take 2 craft sticks and overlap them ½ an inch at the tip. Use a long strip of masking tape to wrap around and secure that connection. Repeat this 2 more times.
2. Now that you have 3 elongated craft sticks, stack them to create a cross pattern leaving a small hole in the middle of them. Just enough to pass a straw through.
3. Tape the 3 long pieces in place.
4. Repeat steps 1–3.

**To make the wheel circumference**
5. Take craft sticks and connect the outer points of the shape you just made. This should leave you with a hexagon.
6. Repeat step 5 for the second spoke. Now you should have 2 hexagons. These will be connected to become the wheel of your Ferris wheel.

**To make the base of the ride**
7. Make the first base triangle.
   a. Take 2 craft sticks and overlap them ½ an inch at the tip, and tape them securely together. Repeat this 2 more times creating a total of 3 long craft sticks.
   b. Take two of your long craft sticks and cross them over so that they have a 1 inch protrusion past their connection (an uneven X). This will be where the axle of the wheel will sit.
   c. Use the 3rd long craft stick to connect the two bottom points of the crossed craft sticks so that they create a sturdy triangle.
8. Repeat step 7 so that you have 2 base triangles.
9. Connect the base triangles at the bottom with 3 craft sticks as shown in the photo.

**To complete your ride**
10. Attach both sides of the wheel together.
    a. Take 6 craft sticks and cut off their rounded ends.
    b. You will use these to attach the wheels together at the center of each side of the hexagon.
    c. Tape 1 unrounded craft stick perpendicularly to the hexagon edge of one wheel.
    d. Repeat this for the other 5 sides of the hexagon wheel.
    e. Attach the second wheel, making sure the perpendicular craft sticks are centered on the sides.
11. Thread the straw or skewer through both hexagon wheels and place on the base.
12. Give it a spin!

**Reflection Questions:**

- Have you ever been on a Ferris wheel? How did you feel?
- What would you do differently next time?
- What other materials would you like to use if you could do this activity again?

**Explanation:**

- When riding a Ferris wheel, you experience centripetal acceleration. Centripetal acceleration is the acceleration directed towards the center of a circular path.
- As the Ferris wheel rotates, the seats or gondolas attached to the rim move in a circular motion, and the centripetal acceleration keeps them moving in a curved path. The feeling of weightlessness or heaviness on a Ferris wheel is due to the interplay between gravity and centripetal acceleration.
- At the top of the ride, when you are farthest from the center, the centripetal acceleration is greater than the force of gravity, making you feel lighter. Conversely, at the bottom of the ride, when you are closest to the center, the centripetal acceleration is less than the force of gravity, making you feel heavier.
- The size of the wheel and the angular velocity (how quickly the Ferris wheel goes around), determine the forces experienced by the riders.
- Angular momentum contributes to its smooth and continuous motion. Think of a figure skater doing spins: the angular momentum is what helps propel the spinning in the same circle pattern.
Further Reading Recommendations:

The Fantastic Ferris Wheel: The Story of Inventor George Ferris

Monster Club

The Cursed Carnival and Other Calamities: New Stories about Mythic Heroes

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