



## Curiosity Guide #301

### Wheel and Axle

Accompanies Curious Crew, Season 3, Episode 1 (#301)

#### Wagon Wheels

Investigation #3

#### Description

Show how wheels make a job easier!

#### Materials

- Wagon or wheeled cart
- A couple of friends

#### Procedure

- 1) Flip the wagon upside down with the wheels facing up.
- 2) Ask a friend to sit on the wagon.
- 3) Ask another friend to try to push the friend and wagon.
- 4) Is pushing the wagon with the friend on it difficult?
- 5) Now flip the wagon over. Have the friend sit on the wagon again.
- 6) Try pushing or pulling the friend now.
- 7) Why is the job so much easier?

#### My Results

## Explanation

Work is when a force is applied to an object over a certain distance. The math formula is  $W = F \times D$ . Any time something is being moved, or pushed, or pulled, you are doing work. Moving the upside-down wagon is difficult because there is so much friction on the ground that the task requires a lot of force (or work) to move the object. The benefit of using wheels and axles is that the wheels and axles reduce the amount of friction against the ground. Because wheels are round, only a small surface actually contacts the ground. The smaller surface means that much less force is required to get the wagon and load to move.

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