

## Design Challenge 1: The Cookie Crane



### 1 Goal

The goal of this design challenge is to experiment with speed, force, and torque with LEGO gears. You will need to build a transmission to get power from the motor to the crane arm. The goal is to lift your bag of cookies off of the ground. Once your cookies leave the ground, you win! And yes, you get to keep the cookies. Yum.

### 2 The Rules:

1. You can't eat any cookies until you lift them all from the ground, in their bag.
2. You can only attach the string for the cookie bag to the end of the crane arm, *i.e.* you can't untie the string and move it closer to the axle, or wrap it around the axle, or any other silliness. You need to build a *crane*, just like the one pictured above, but designed for a smaller bag of cookies.
3. A member of the course staff needs to be able to slide their foot under your cookies to count as a good lift. Hint: not all staff members wear the same size shoe.
4. Your crane needs to stay together by itself during the lift. No "structural support" from your hands.
5. If you are LEGO expert, you can only work with other LEGO experts. And be prepared for us to make the challenge harder for you.

### 3 Hints:

Clueless? I would start with the gears – see how they mesh, and look at the motor output to see why it cannot lift the cookies by itself. These are LEGO bricks, not granite, feel free to build something, then take it apart if it doesn't work. Talk to your teammates, because there is nothing sadder than seeing a team where one person is off building by themselves and another has a good idea, but they can't succeed because they aren't working together.