

# Big Gears

## Demonstrator

for STEM in the Gym™

**User Guide**



**PITSCO**  
EDUCATION

59998 V1211

## ***Materials Included***

- Pitsco Big Gears Demonstrator

## ***Items Required (not included)***

- 18" to 24" scooter with hole or handle
- Cones
- Rope

## ***Safety***

- This is for demonstration purposes only and is not to be used for anything other than educational demonstrations.
- Use only with adult supervision – do not leave students unattended while this equipment is accessible.
- Use this device only in the manner discussed and illustrated in this guide.
- Do not use the gears to pull loads vertically.
- Keep hands and fingers away from the rotating edges of the gears.
- Students should rotate the gears only by using the handle provided – and should take care to place their other hand on the open area of the base – away from the gears.
- Remove ropes from the demonstrator before storing.

## ***Using the Demonstrator***

Use the device to show how gear trains can make pulling a person on a scooter easier than pulling him or her without the gears. It can also be used to demonstrate the difference between gearing up and gearing down.

## **Gearing Up**

1. Attach one end of the rope to the outside of the large gear (Figures 1 and 2)
2. Run the rope over the top of the gear and down between the two gears (Figure 3).



*Figure 1*



*Figure 2*



*Figure 3*

3. Tie the loose end of the rope to the scooter and position the scooter the rope's length from the demonstrator (Figure 4).



4. Student 1 sits on the scooter. Student 2 cranks the small gear clockwise to pull in the scooter (Figure 5). Note how much effort is required to do this.

Figure 4



Figure 5

### **Gearing Down**

1. Attach one end of the rope to the inside of the small gear (Figure 6) and run the rope over the top of the gear and down the outside of the small gear (Figure 7).



Figure 6

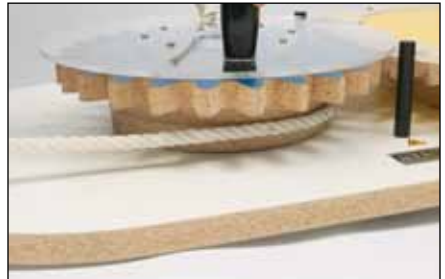


Figure 7

2. Tie the loose end of the rope to the scooter (Figure 8) and position the scooter the rope's length from the demonstrator.
3. Remove the handle from the blue gear and move it to an outside hole on the yellow gear (Figure 9).



Figure 8



Figure 9

*continued on next page*

- Student 1 sits on the scooter. Student 2 cranks the large gear clockwise to pull in the scooter (Figure 10). Note how much effort is required to do this. How did it differ from the gearing up configuration?

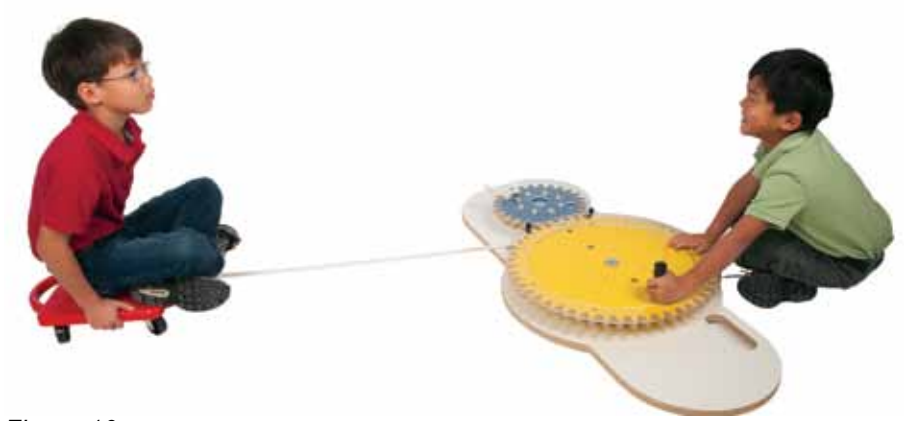


Figure 10

## **Curriculum**

For curriculum to lead a more in-depth activity with the Big Gears Demonstrator, consider the *STEM in the Gym – Simple Machines* book available at [shop.pitsco.com/STEMnGym](http://shop.pitsco.com/STEMnGym).





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