Mars Rover Rocket

EAA eActivities

Name: _____ Date: _____

Lesson Focus

This lesson focuses on the force (thrust) needed to propel the Mars rover.

This lesson also covers Newton's third law of motion, which is for every action there is an equal and opposite reaction.

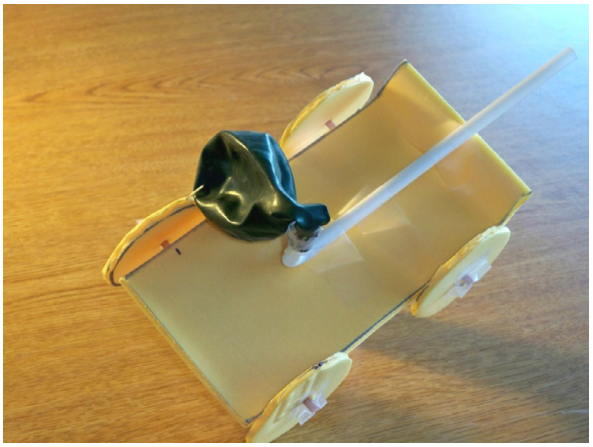
Materials

1. Scotch tape
2. 2 drinking straws, one with a flexible bend
3. 2 coffee stirrers
4. Rocket car template and wheel template
5. Styrofoam, foam core, or cardboard to cut out body and wheels
6. Scissors
7. Balloon
8. Piece of sandpaper
9. Pencil

Procedure

1. Use the car template to cut the body of the vehicle out of Styrofoam.
2. Cut four wheels out of the Styrofoam using the template.
3. Lightly sand the edges of the vehicle.
4. Holding two wheels together, lightly sand the edges. Repeat with other two wheels.
5. Mark 2.5 cm from each end of the car template for the wheel location.
6. Cut two straws 7 cm long and tape them as axle mounts on the marks on the bottom of the car. They should not extend over the edge.
7. Place the wheel template over each wheel and push the pencil through to mark the center for the axle.

8. Push coffee stirrer through the end of the wheel and tape it on one side.
9. Slide the stirrer through the larger straw, put on the other wheel, and attach with tape.
10. Repeat with second set of wheels.
11. Put balloon over the flexible end of the straw and tape tightly.
12. Position the straw in the center of the car and tape it to secure.
13. Straw should extend over the end.
14. Blow up the balloon and measure the circumference (around the center).
15. Do several trials with different circumferences.

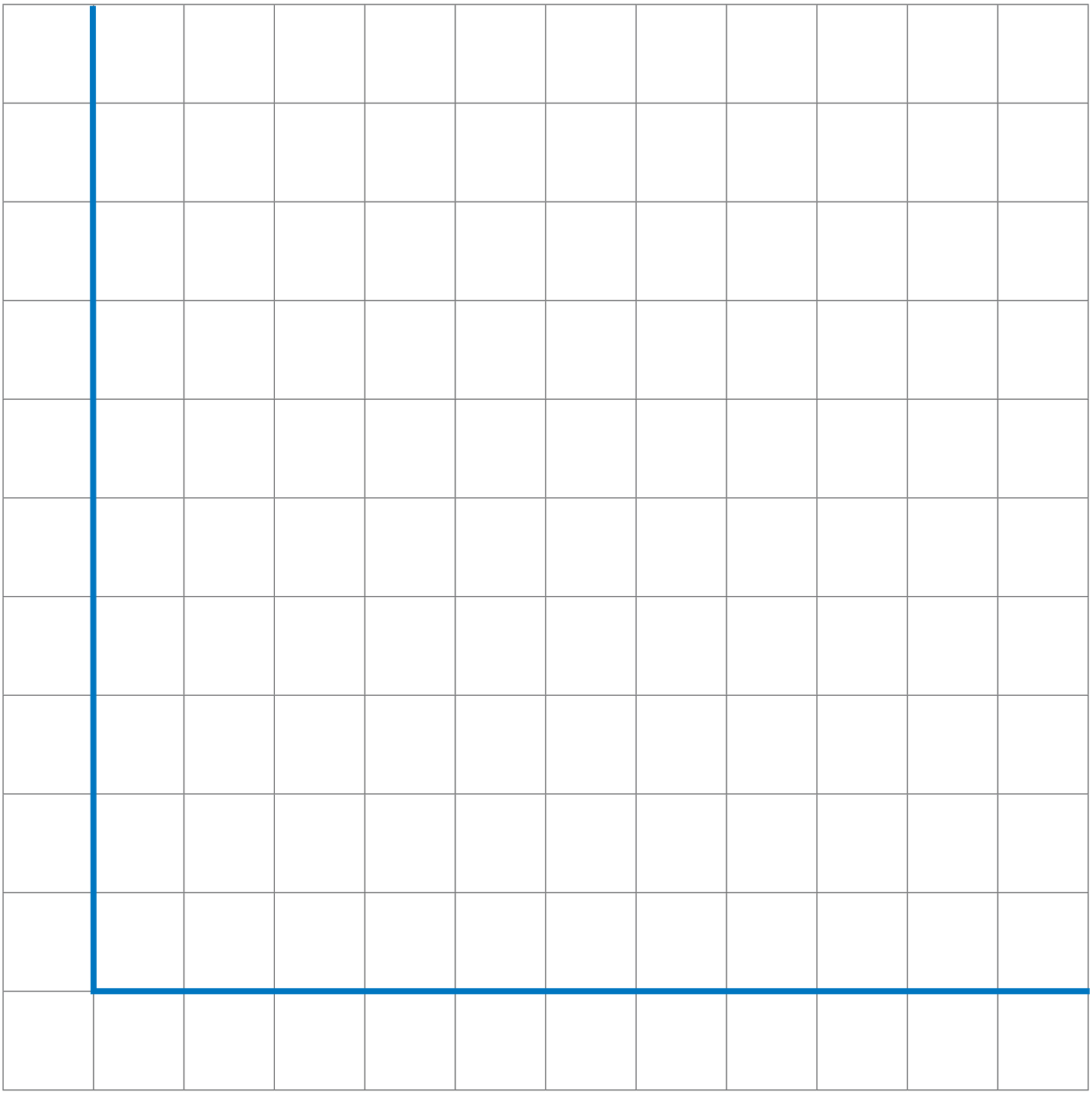


Data

Sample Data Table: The Effect of Air Thrust on Mars Rover

Trial	Circumference (cm)	Distance (cm)	Observations
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Graph



On the X-axis, graph the circumference of the balloon (independent variable).

On the Y-axis, graph the cm for how far the rover traveled (dependent variable).

Questions

Grades 6-8

1. Did your graph make a straight line? What do you theorize the result would be if you blew up the balloon to a circumference of 80 cm?

2. What amount of air made your rover easiest to control? Go the farthest distance?

3. What other variables could introduce errors into your experiment?

4. How would you improve the design of this lab? What part of it gave you the most problems? How would you fix it?

Grades 9-12

1. Did your graph make a straight line? What can you theorize from your limited data?

2. Is the rover system open or closed? Why?

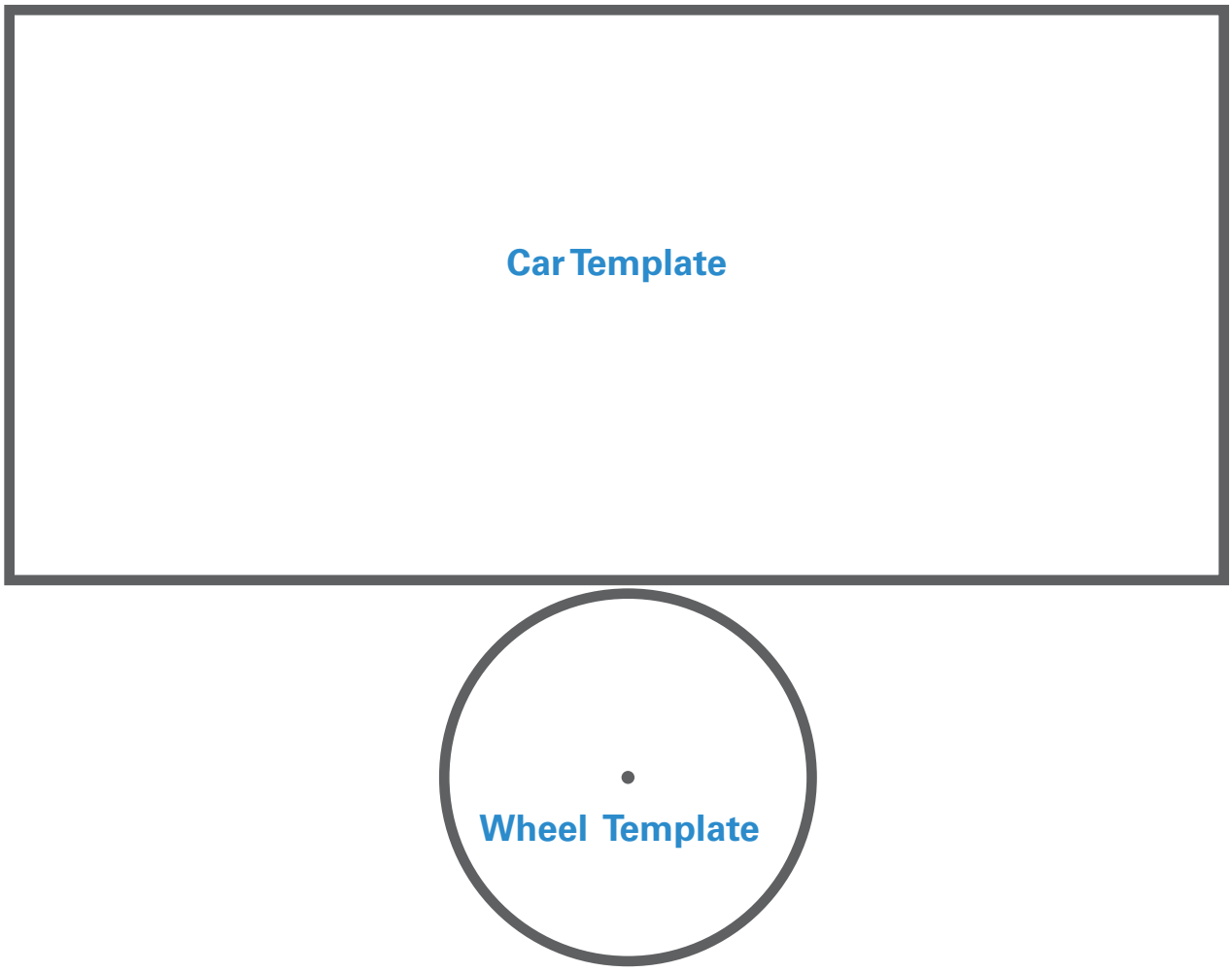
3. What is the independent variable and the dependent variable?

4. Which goes on the x-axis and which on the y-axis?

5. How does this lab illustrate Newton's third law of motion?

6. What factors could give you a different graph than your fellow students?

7. How would you improve the design of this lab? What gave you the most problems? How would you fix it?


Car Template

Wheel Template