Newtons Cannon

Find a launch that travels around the planet

Name _____ Period _____ Date _____

Change launch speed, observe the paths, and explain why an orbiting object is still falling.

About 15 to 25 minutes | buildphysics.com/?experiment=newtons-cannon

Find an orbit

Keep Aim from horizontal at 0° and leave the planet unchanged. Start with Launch speed = 2.0 m/s.

1. Predict how a faster shot will change the path. What force acts on the ball after it leaves the cannon?

Press Run, then Fire in Explore this setup. Observe until the shot hits the planet or completes one full trip around it. Use Clear projectiles between shots. Increase launch speed by 0.5 to 1.0 m/s until you find an orbit. You can speed up playback or zoom out.

Launch speed (m/s)	Hits the planet or completes an orbit	Path description

2. Record the highest speed you tested that hit the planet and the lowest speed that completed an orbit. Try one speed between them to narrow the transition.

Explain the paths

Sketch one impact path and one successful orbit. Mark the planet's center. At two points on the orbit, draw and label the velocity and gravitational-force arrows.

3. Explain how the ball can keep falling toward the planet without reaching the ground. Refer to its sideways motion and the direction of gravity.

4. A student says, "The cannonball is in orbit because gravity has become zero." Use your observations and force arrows to respond.

5. Did your successful orbit have constant speed and constant distance from the planet? Describe what you observed. Does a complete orbit have to be a circle?