

# Living Above the Clouds: Describing the Motion of a Satellite

PHYSICS

FOUNDATION  
SCIENCE

2001-2012



## What's the Story? THE INTERNATIONAL SPACE STATION

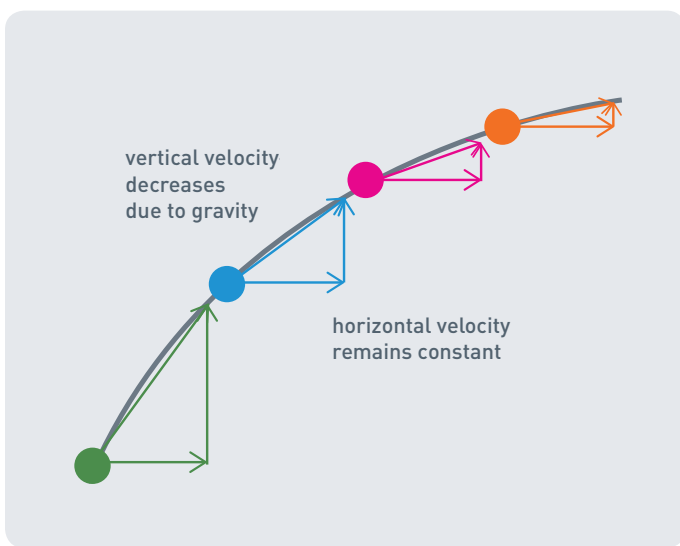
You may have seen the International Space Station orbiting Earth at night—a small bright dot moving rapidly across the sky. The station was assembled in orbit, its parts launched separately and joined together by astronauts living on the station. The parts of the station that are launched into orbit are called projectiles.



**How can a part of the space station be launched so that it achieves a stable orbit around Earth?**

HOW DO PROJECTILES MOVE?

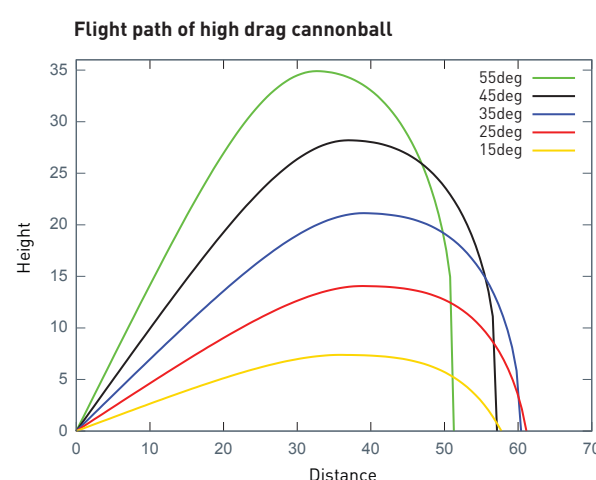
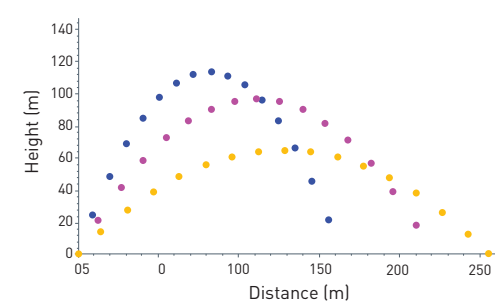
CAN YOU PREDICT THE MOTION OF A PROJECTILE?



HANDS-ON ACTIVITY →

### How Does the Launch Angle Affect the Motion of a Projectile?

Students use a launcher to collect data on the range that projectiles travel when launched at the same velocity but at different angles. Students use their projectile motion data to launch a projectile at a target.



### Questions for YOU to think about:

- 1 What keeps a satellite up?
- 2 If a spacecraft is launched with a speed greater than the speed necessary to stay in a stable circular orbit, what might its motion be?
- 3 Astronauts experience microgravity in the space station, even though they are relatively close to Earth's surface. What feature of a satellite's motion causes microgravity?

READING →

### Analyzing Projectile Motion

Students analyze the motion of a projectile by separating the ball's velocity into two components—vertical velocity (up and down motion) and horizontal velocity (forward motion). The velocity of a projectile is the sum of its vertical and horizontal velocities at each instant in time.