



# Newton's Park

Ideas using physical science and physics concepts

**Zero Gravity**

**Adjustable Gravity**

- Zero gravity is included as an option.
- **Pro tip:** Use Activity Builder to define your own gravity.

**Adjustable Force**

- The force applied by a force area, horizontal launcher, or projectile launcher is adjustable.
- **Pro tip:** Combine force areas to sum the forces.

**Adjustable Dimensions**

- The straight ramp, curved ramp, platform, deflector, drop launcher, projectile launcher, and force area have adjustable dimensions.
- **Pro tip:** Increase the number of snap points to add and compare more objects.

**Adjustable Mass**

- zBalls and zBlocks have adjustable masses.

zBall #3  
m = 1.0kg  
Height = 5.09m

Height = 4.5m  
Force = 10.0N  
Angle = -25°

Height = 1.0m  
Force = 10.0N

Height = 0.5m

**zBall**

Mass (1.0 - 10.0kg)

Apply Cancel

\*After you select an adjustable object, a panel similar to the one above will appear and you can enter new values for dimensions, forces, and masses.

**Adjustable Friction**

**Blocks exhibit friction**

- Different blocks act differently due to mass, friction, and different characteristics of the materials.
- **Pro tip:** Blocks can be used with kinematic equations.

**Surface materials impact friction**

- Minimize friction by making the surface material ice.
- **Pro tip:** Use a platform to create a large surface and then add materials.

Sandbox

Note: Velocity and acceleration shown include magnitude only, no direction.



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## Energy



### Introduce

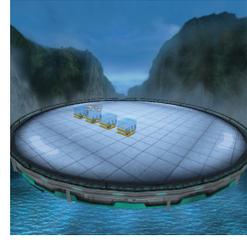
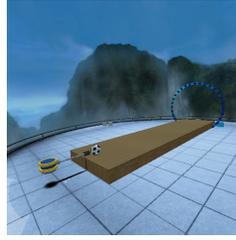
*Chain Reaction (A398)*  
*Chain Reaction Demo (A414)*  
*Sandbox (AP23)*

- Use curved ramp with blocks or balls
- Calculate potential energy and kinetic energy at any point

### Dive Deeper

*Chain Reaction Advanced (A470)*  
*Conservation of Energy (A480)*  
*Energy Skee Ball (A473)*  
*Basketball Dribble (A471)*  
*Shuffleboard (A431)*

## Forces



### Introduce

*Friction Exploration (A430)*  
*Sandbox (AP23)*

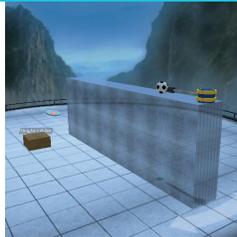
- Use straight ramp with blocks
- Experiment using different blocks on the same surface
- Change materials to observe the impact of friction for the same blocks on different surfaces

### Dive Deeper

(including Newton's Laws)  
*Motion Depends on Force and Mass (A402)*  
*Motion Depends on Force and Mass Demo (A403)*  
*Gravitational Force Calculations (A452)*  
*Sandbox (AP23)*

- Combine force areas

## Projectile Motion



### Introduce

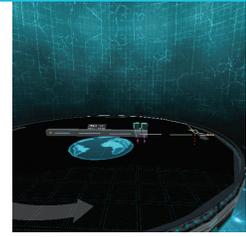
*Parabolic Trajectories (A458)*  
*Games around the Solar System (A474)*

### Dive Deeper

(including 2D kinematic equations)  
*Motorcycle Stunts (A416)*  
*Sandbox (AP23)*

- Use projectile launcher and balls

## Motion in a Straight Line



### Introduce

*Graphing Speed vs Time: Part 1 (A486)*  
*Graphing Speed vs Time: Part 2 (A487)*

### Dive Deeper

(including free-fall and 1D kinematic equations)  
*Speeding Ticket (A409)*  
*Sandbox (AP23)*

- Apply Constant Acceleration over a Defined Distance
  - Use force area and blocks
- Apply a Force
  - Use horizontal launcher and blocks
  - Free-fall
  - Use drop launcher and balls
- Change gravity

## Momentum



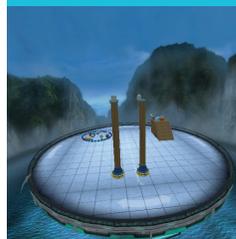
### Introduce

*How Collisions Affect Energy (A464)*

### Dive Deeper

*Conservation of Momentum (A457)*  
*Accident Investigator (A466)*

## Scientific Method



### Introduce

*Developing a Research Question and Hypothesis (A432)*