COLLABORATIVE ACADEMIC RESOURCE LIBRARY
UNIT & LESSON PLAN

Forces in Motion: Balanced and Unbalanced Forces in Daily Activities

GRADE	SUBJECT	DURATION	DATE
6	Science	3 days - 60 min each	2026-06-28

Unit Overview

Day 1	Introduce balanced and unbalanced forces by analyzing static positions like standing still or balancing on one foot, and practice drawing basic force arrows.	60 min
Day 2	Explore unbalanced forces in motion by observing classmates running, stopping, and kicking a ball, focusing on how friction and gravity change speed and direction.	60 min
Day 3	Apply force concepts to design and present a visual force poster illustrating the balanced and unbalanced forces at play in a chosen daily physical activity.	60 min

STAGE 1 Learning Standards

KEY CONCEPTS

- Balanced forces keep an object at rest or moving at a constant speed in a straight line, meaning the net force is zero.
- Unbalanced forces cause a change in an object's speed, direction, or state of motion, resulting in acceleration or deceleration.
- Daily physical activities, such as running, jumping, and stopping, are direct results of the continuous interplay between balanced and unbalanced forces.

ESSENTIAL SKILLS

- Observe and describe the physical effects of forces acting on bodies during common playground and sports activities.
- Collaborate with peers to analyze how friction, gravity, and applied forces work together to change motion.
- Reflect on how understanding forces can help prevent injuries or improve performance in sports and games.
- Communicate scientific observations clearly using simple diagrams, force arrows, and everyday vocabulary.

LEARNING OBJECTIVES

- Identify and label the forces acting on an object in a static position, such as standing still or balancing a book.
- Compare the motion of an object under balanced forces with its motion when acted upon by unbalanced forces.
- Draw force diagram arrows to show the direction and relative size of forces acting on a person during physical activities.
- Create a visual poster that explains how forces change during a specific physical activity, like kicking a soccer ball or running.

CORE CONTENT

- Definition of force as a push or pull, measured in Newtons, and how it acts on objects.
- The difference between balanced forces (equal size, opposite direction, no change in motion) and unbalanced forces (unequal size, change in motion).
- Common contact and non-contact forces in daily life, including gravity, friction, air resistance, and applied force.
- The role of inertia and force changes in starting, stopping, and changing direction during physical exercise.
- How friction acts as a resistive force that opposes motion and helps us grip the ground when running or walking.

INQUIRY QUESTIONS

- What keeps us from sliding all over the place when we try to run and stop on the playground?
- How do the forces acting on you change the exact moment you transition from standing still to sprinting?
- Why does a kicked soccer ball eventually slow down and stop even if no one touches it?

STAGE 2 Assessment Evidence

SUMMATIVE TASKS

- The 'Forces in Action' Poster Project: Students choose one specific daily physical activity (such as running and stopping, kicking a soccer ball, or jumping off a playground step). On a large sheet of paper, they draw a three-panel sequence showing the activity: 1) standing still (balanced forces), 2) the moment of action or acceleration (unbalanced forces), and 3) slowing down or stopping (unbalanced forces due to friction or gravity). For each panel, students must draw clear force arrows showing the direction and relative size of all acting forces (applied force, gravity, friction, and normal force). Below each panel, they write a brief 2-3 sentence explanation using key terms (balanced, unbalanced, net force, friction, and inertia) to explain how the forces are changing the person's motion.

FORMATIVE CHECKS

- Balanced vs. Unbalanced Exit Ticket: At the end of Day 1, the teacher collects a quick exit ticket where students look at two simple cartoon scenarios (a student sitting still on a swing and a student pushing off the ground to start swinging) and must draw the force arrows and state whether the net force is zero or non-zero. The teacher reviews these to identify students who confuse equal/opposite forces with motion changes before they start their poster drafts.
- Drafting and Peer Feedback Conference: During Day 2, while students are sketching their poster layouts, the teacher uses a clipboard checklist to observe and conference with pairs. The teacher asks students to point to their force arrows and explain: 'Which force is larger here, and how does that explain why the person is speeding up or slowing down?' The teacher records who can correctly match arrow size to the direction of acceleration.
- The 'Friction Check' Sticky Note: Before finalizing their posters on Day 3, students write down one specific way friction is acting in their chosen physical activity on a sticky note and place it on the whiteboard under 'Helpful Friction' or 'Resistive Friction'. The teacher reviews the board mid-class to address any misconceptions about friction opposing motion before students write their final poster explanations.

SUCCESS CRITERIA (PROFICIENCY SCALE)

BEG	I can identify that forces are acting on a person during an activity, but my force arrows may be equal in size when the person is moving, or I might miss key forces like friction or gravity.
DEV	I can draw force arrows showing the correct direction of forces acting on a person, and I can identify whether the forces are balanced or unbalanced, though my arrow sizes might not accurately show which force is stronger during acceleration or deceleration.
PRO	I can draw force diagrams with arrows that accurately show both the direction and relative size of forces (like gravity, friction, and applied force) to explain how balanced forces keep a person still and unbalanced forces cause them to speed up, slow down, or change direction.
ADV	I can draw highly accurate force diagrams and explain how changes in the net force (such as a sudden increase in friction or a change in applied force) directly cause specific changes in motion, predicting exactly what would happen if one of those forces were removed or reduced.

STAGE 3 Learning Experiences & Instruction

Day 1 of 3 Day 1: Static Positions and Force Arrows

60 min

THE DELICATE ROBOTIC GRIP

Modern robotic arms in factories use special sensors to hold fragile items like eggs or glass bottles. If the robot squeezes too hard, the item breaks, but if it grips too loosely, the item slips and falls.

How does the machine keep the object perfectly still?

THE ULTIMATE BLOCK TOWER

During a game of stacking wooden blocks, the tower stands perfectly still for several minutes as players carefully add to the top. Suddenly, one tiny touch makes the entire structure wobble and crash to the table.

What changed to make the still blocks suddenly move?

ENGAGE The Human Statue Challenge

Students try to stand perfectly still for one minute and notice which muscles tighten to keep them from falling over.

Recommended Worksheets: Identifying Variables - Grades 6-8; Variables & Experiment Design - Grades 6-8

EXPLORE One-Foot Balance Test

Pairs observe each other balancing on one foot and describe the tiny wobbles and adjustments their bodies make to stay upright.

Recommended Worksheets: Process Flowchart & Practice - Grades 6-8

EXPLAIN Introducing Force Arrows

Teacher demonstrates how to draw arrows representing gravity pulling down and the floor pushing up with equal size.

Recommended Worksheets: Exit Ticket: 3-2-1 - Grades 6-8; Exit Ticket: Clearest and Muddiest Point - Grades 6-8

I DO

Teacher models standing still on a sturdy box, drawing a stick figure on the board with equal-sized arrows pointing up and down to show balanced forces.

WE DO

Teacher guides students to stand on one foot, helping them identify the upward push of the floor and the downward pull of gravity as they sketch arrows together.

YOU DO

Students work independently to draw force diagrams for three different static classroom objects, ensuring arrow lengths match the balance of forces.

APPLY Desk Object Diagrams

Students choose a stationary object on their desk and draw its force diagram with equal and opposite arrows.

Recommended Worksheets: Cross-Cutting Concepts Analysis - Grades 6-8; Laboratory Investigation Report - Grades 6-8

REFLECT

Balanced vs. Unbalanced Exit Ticket

Students complete a quick check-in identifying if a sitting student has balanced or unbalanced forces acting on them.

Recommended Worksheets: Feature Comparison Table - Grades 6-8

Day 2 of 3

Day 2: Unbalanced Forces in Motion

60 min

RECONNECT FROM DAY 1

Yesterday, we looked at how equal forces keep us still, and today we will build on that by exploring what happens when those forces become unequal during movement.

THE SMART HOVERBOARD BRAKE

Electric hoverboards use automatic sensors to detect when a rider leans forward to speed up or backward to slow down. When the rider leans, the motor adjusts the wheel speed to prevent them from tipping over.

What causes the rider to change speed so quickly?

THE ROUGH SIDEWALK ROLL

A skateboarder glides smoothly across a polished concrete park but suddenly slows down the moment they roll onto a rough asphalt street. They have to push much harder to keep going at the same speed.

Why does the ground surface change how far they glide?

ENGAGE

The Hallway Sprint and Stop

Students watch a volunteer run down the hallway and try to stop instantly on a line, noticing how their body leans.

Recommended Worksheets: Sportsmanship Self-Reflection - Grades 3-5; Gratitude Journal - Grades 6-8

EXPLORE

Shoe Slide Investigation

Groups test different shoe soles on the classroom floor to see which ones grip best and which ones slide easily.

Recommended Worksheets: Reference Table & Analysis - Grades 6-8

EXPLAIN

Friction and Gravity Breakdown

Teacher explains how friction opposes motion and how gravity pulls a kicked ball back to the ground.

Recommended Worksheets: Concept Review - Grades 6-8; Daily Agenda - Grades 6-8

I DO	WE DO	YOU DO

Teacher demonstrates how a rolling tennis ball slows down on carpet versus tile, drawing unequal force arrows on the board to show friction opposing the ball's motion.

Teacher guides students in analyzing a video of a runner stopping, helping them identify and draw the large friction arrow pointing opposite to the runner's movement.

Students work in pairs to analyze a diagram of a basketball player jumping, labeling the unbalanced forces of gravity and the floor push during the jump.

APPLY The Kicked Ball Sequence

Students sketch a three-step sequence of a soccer ball being kicked, flying through the air, and rolling to a stop.

Recommended Worksheets: Ball Motion Sequence Sheet

REFLECT The Friction Check Sticky Note

Students write down one way friction helps them play their favorite sport and stick it on the board.

Recommended Worksheets: Friction Sticky Notes

Day 3 of 3 Day 3: Force Poster Project

60 min

RECONNECT FROM DAY 2

We have practiced drawing static forces and analyzing how friction and gravity change motion, and now we will combine these skills to create our physical activity posters.

VIDEO GAME MOTION CAPTURE

Game developers put suits with glowing sensors on athletes to track their exact movements when jumping or running. This data helps animators make virtual characters move realistically on screen.

How do animators know how big to make the jumps?

THE HIGH TRAMPOLINE BOUNCE

Jumping on a trampoline feels effortless as the stretchy mat pushes you high into the air. However, you always reach a peak height where you stop rising and start falling back down.

What forces are fighting each other at that highest point?

ENGAGE Poster Gallery Walkthrough

Students look at sample force posters to identify what makes a diagram clear, focusing on arrow sizes and labels.

Recommended Worksheets: Poster Rubric and Samples

EXPLORE Activity Selection and Brainstorming

Students select a daily physical activity, like jumping rope or riding a bike, and list the forces involved.

Recommended Worksheets: Activity Brainstorming Guide

EXPLAIN Drafting the Three Panels

Teacher explains how to structure the poster into three panels showing standing still, accelerating, and stopping.

Recommended Worksheets: Three-Panel Poster Template

I DO

Teacher models how to draft the first panel of a poster for a skateboarder, showing how to write a clear explanation of balanced forces while standing still.

WE DO

Teacher guides students as they sketch their second panel (the action phase), checking their arrow sizes to ensure the applied force is larger than friction.

YOU DO

Students independently complete their third panel showing deceleration, write their final explanations, and present their completed posters to a small group.

APPLY Poster Creation and Labeling

Students draw their chosen activity, adding precise force arrows and short written explanations of the net forces.

Recommended Worksheets: Force Poster Art Supplies

REFLECT Peer Review and Share

Students swap posters with a partner to check if the arrow directions and sizes accurately match the described motion.

UNIT-LEVEL Learning Enhancements

EQUITY

- Ensure physical activity examples represent a wide range of physical abilities, including adaptive sports and non-athletic daily movements, so all students see their own physical realities reflected.
- Avoid assuming access to specialized sports equipment or private training spaces by centering common playground, park, and household movements in all force examples.
- Provide multilingual visual guides for force terms like friction and gravity to support English language learners in connecting everyday physical sensations to scientific vocabulary.

SOCIAL-EMOTIONAL LEARNING

- Normalize the frustration of drawing abstract force arrows by framing initial drafts as experiments that are meant to be revised based on peer feedback.
- Encourage supportive peer collaboration during physical tests, ensuring students focus on observing force interactions rather than comparing athletic performance or speed.
- Build confidence in scientific communication by celebrating diverse artistic styles and layout choices in the final poster project, emphasizing clear ideas over perfect drawing skills.

TRAUMA-INFORMED

- Offer alternative options for physical demonstrations, allowing students to observe videos or use small toy figures instead of performing movements in front of the class.
- Maintain a safe classroom environment by ensuring physical activities like running or balancing are optional and structured to prevent accidental falls or public embarrassment.
- Allow students to choose familiar, comfortable daily activities for their posters, avoiding prompts that require sharing personal home routines or private family spaces.

STAGE 4 Reflect & Revise

Unit Reflection & Communication

Reflection Questions

1. What evidence showed students were getting it across the unit?
2. Where did students get stuck or need more support across the unit?
3. What would I change next time?

Success Criteria Check

- Check whether students can draw force arrows that show the correct direction and relative size of forces during physical activities.
- Observe whether students can explain how balanced forces keep an object still while unbalanced forces cause a change in motion.

- Look for whether students can identify the role of friction and gravity in slowing down or stopping a moving object.