

3rd Grade

Lesson Plan Overview

Grade Level: 3rd Grade

Duration: 60 minutes

Subject: Science

Topic: Forces and Motion

Standards Addressed:

- **3-PS2-2:** Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- **3-PS2-4:** Define a simple design problem that can be solved by applying scientific ideas about magnets and forces.

Objective:

By the end of this lesson, students will:

- Understand the concept of forces (pushes and pulls).
- Identify and apply balanced and unbalanced forces in simple activities.
- Work in pairs or small groups to build and test models using Legos that demonstrate forces in motion.

Materials Needed:

- Lego sets (enough for pairs or small groups)
 - Paper and pencils for recording observations
 - A ramp (could be a book or small piece of wood)
 - A variety of small objects (balls, cars, etc.) for testing motion
 - Science journals (for drawing and writing)
 - Timer
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Lesson Structure:

1. Introduction (10 minutes):

- **Activate Prior Knowledge:** Ask students if they know what happens when they push or pull on objects. Have they ever seen something move because of a force (e.g., a toy car moving when pushed)?
- **Introduce Vocabulary:**
 - **Force:** A push or pull that can change an object's motion.
 - **Push:** To move something away from you.
 - **Pull:** To move something toward you.
 - **Balanced Forces:** Forces that are equal in size but opposite in direction, causing no movement.
 - **Unbalanced Forces:** Forces that are not equal and cause an object to move.
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2. Guided Exploration (10 minutes):

- **Demonstration:** Use a toy car and a ramp to demonstrate both balanced and unbalanced forces. For example, if two people push a toy car with equal force in opposite directions, it won't move (balanced). If one person pushes harder, it will move (unbalanced).
- **Class Discussion:** Ask students, "What do you think happens when forces are unbalanced?"

3. Hands-on Activity (30 minutes):

- **Building with Legos:**
 - Divide students into pairs or small groups.
 - Assign each group the task of building a simple ramp and an object that can move on it using Legos (e.g., a Lego car).
 - Provide a scenario where students must use the ramp and Lego objects to explore how forces work. For example, how can they make their object move faster or slower using only pushes and pulls?
 - Have them test their ramps by releasing objects from different heights and observing the motion. Ask them to record how the height affects the speed of the object.
- **Discussion and Reflection:** After the activity, ask the students to discuss what they built and how the forces affected the motion of their objects. Were the forces balanced or unbalanced?

4. Closing (10 minutes):

- **Share Findings:** Have each group share their observations. Encourage them to describe how they applied the forces and how their Lego models demonstrated those forces.
- **Review Key Concepts:** Quickly review the vocabulary and the difference between balanced and unbalanced forces.
- **Exit Ticket:** Give each student a prompt: "Draw a picture of a balanced force and an unbalanced force. Label your drawing with the terms you learned."

Assessment:

- **Formative:** Observation during group work, listening to student discussions, and checking for understanding during the closing.
- **Summative:** The exit ticket and the drawings of balanced and unbalanced forces.

What to Include in the Plan:

- **Engagement:** Struggling readers often benefit from visual and tactile learning, which is why the use of Legos, ramps, and physical movement will help students engage.
- **Differentiation:** Consider using visuals or simplified sentences when introducing vocabulary for struggling readers. Pair them with stronger readers during group activities.

- **Accommodations:** Provide sentence starters or a vocabulary list for students to reference. Allow them to use drawings to explain concepts.

6th Grade

Lesson Plan Overview

Grade Level: 6th Grade

Duration: 60 minutes

Subject: Science

Topic: Forces and Motion

Standards Addressed:

- **MS-PS2-1:** Apply Newton's Third Law to design a solution to a problem involving the motion of objects.
- **MS-PS2-4:** Conduct an investigation and analyze data to provide evidence of the relationship between force and motion.

Objective:

By the end of this lesson, students will:

- Understand and apply the concepts of forces (pushes and pulls), balanced and unbalanced forces.
- Observe and demonstrate the effects of different forces on the motion of objects through hands-on activities using Legos.
- Use simple design principles to create models that demonstrate force and motion concepts.

Materials Needed:

- Lego sets (enough for pairs or small groups)
 - Paper and pencils for recording observations
 - A ramp (e.g., books or small piece of wood)
 - Small objects (balls, toy cars, etc.) for testing motion
 - Science journals for drawing and writing
 - Timer
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Lesson Structure:

1. Introduction (10 minutes):

- **Activate Prior Knowledge:** Ask students what they know about how objects move. Have they ever pushed or pulled something to make it move? Discuss the effects of forces on everyday objects.
- **Introduce Vocabulary:**
 - **Force:** A push or pull that can change an object's motion.
 - **Push:** To move something away from you.
 - **Pull:** To move something toward you.
 - **Balanced Forces:** Forces that are equal and opposite, causing no movement.
 - **Unbalanced Forces:** Forces that are not equal, causing the object to move.

- **Newton's Third Law:** For every action, there is an equal and opposite reaction.

2. Guided Exploration (10 minutes):

- **Demonstration:** Use a toy car and a ramp to demonstrate balanced and unbalanced forces. Show how balanced forces prevent movement and how unbalanced forces make the object move.
- **Class Discussion:** Ask, "What do you think would happen if we added more force? How does the object move differently?"

3. Hands-on Activity (30 minutes):

- **Building with Legos:**
 - Divide students into pairs or small groups.
 - Assign each group the task of building a simple ramp and an object that can move on it using Legos (e.g., a Lego car).
 - Provide a scenario where students will use their ramp and Lego objects to explore the effects of forces. They will need to test how varying the force (e.g., height of the ramp, different pushes) affects the motion of their Lego car.
 - Students will conduct a series of experiments by releasing their Lego car from different ramp heights and recording the motion, including how the force applied changes the car's speed.
- **Application of Newton's Third Law:** Students will be asked to consider how the push (action) they apply on their Lego object leads to a reaction (the movement of the object) and to think about how they can change the force applied to modify the motion.

4. Closing (10 minutes):

- **Class Share:** Have each group share their findings and explain how the forces they applied affected their objects. Ask them to relate this to Newton's Third Law.
- **Review Key Concepts:** Briefly revisit the concepts of balanced and unbalanced forces and Newton's Third Law. Reinforce the idea that forces can change an object's motion.
- **Exit Ticket:** Have students draw a diagram of a force acting on an object. Label the force as a push or pull and identify whether it is balanced or unbalanced.

Assessment:

- **Formative:** Observation during group work, listening to student discussions, and checking for understanding during the closing.
- **Summative:** The exit ticket and the drawings of forces on objects.

Modifications for Struggling Learners:

- Use simple sentence structures and visual aids to introduce vocabulary.
- Pair struggling readers with more confident readers for group work and discussions.
- Allow students to draw their explanations instead of writing when needed.
- Provide sentence starters or prompts to guide discussions and reflections.

What to Include in the Plan:

- **Engagement:** Use Legos and ramps to engage students through tactile, hands-on learning.
- **Differentiation:** Simplify the language used to explain the concepts, providing visual aids and additional support for students who need it.
- **Accommodations:** Allow extra time for activities and verbal explanations where necessary.