Third Grade: Forces and Interaction

Classifying Forces

#1 Activity: Duration: 2 days
Concept: Push or pull
  - Introduce the activity
  - Let staff know about the walk activity
  - Prepare science journals by numbering and gluing the glossary in the back and SWH template in the front.

Materials: Science journals, pencils, magazines, glue or glue sticks, construction paper.

Focus question: Is all movement the same?
Discussion: Elicit discussion that forces can be either a push or a pull. Start the Concept map on the whiteboard. Students transfer to their journals.

![Diagram showing forces can be a push or a pull]

Assessment: Collect and check journals.
PROBE 1: How far did it go? Measurement check.

#2 Activity: Duration: 2 days
Concept: Pushes or pulls can be different strengths and/or directions
  - Go back to the student journals and highlight all of the pushes observed in one color. Highlight pulls in another. Make a key. Magazine activity could be used at this time if the journals reveal the need for it.

Pendulum Activity
  - Introduce the activity- Pushes and pulls vary in strength and direction.
Continue adding on to the C-map in their journals.

**PUSH** or **PULL**

can have different

**STRENGTHS** and or **DIRECTIONS**

**Materials:** String, rulers, washers, 2” balls, masking tape, scissors.

**Focus question:** Is all movement the same?

**Discussion:** Pushes and pulls vary in strength and direction. Journal final thoughts.

**PROBE:** The Swinging Pendulum #44

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**#3 Activity:** Duration: 2 days

**Using balloons to show balanced and unbalanced forces**

**Concept:** Balanced and unbalanced forces

Introduce the concept of unbalanced motion using a video clip found at: [http://scicast.org.uk/films/2008/01/balanced-forces.html](http://scicast.org.uk/films/2008/01/balanced-forces.html)

**Materials:** Hair dryer, balloons of various sizes, paper clips

**Focus question:** Why does an object move? Why doesn't an object move?

**Discussion:** Elicit discussion about what causes the balloons to become more balanced in its movement as the paper clips are added.

Review: A force has strength and/or direction.

Unbalanced force = movement and balanced force = no movement.

**Assessment:** Collect and check journals.

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**FORCES**

can be

**UNBALANCED** **BALANCED**
#4 Activity: Day 4 Duration: 1 day

**Raceway to Science**

**Concept:** Movement depends on the amount of force applied.

Cooperative procedures.

**Materials:** Toy car, pencil, raceway push sheet, data sheet, meter tape or ruler

**Focus question:** How is movement the same?

**Discussion:** Provide opportunities to become familiar with the process skills that will enable Lesson 5 to run more smoothly tomorrow. Provide free playtime to figure out which car to use.

**Assessment:** Collect data sheets.

![Diagram of push and pull forces resulting in different strengths](image)

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#5 Activity: Duration: 2 days

**Rules of Force and Motion**

**Concept:** Movement depends on the amount of force applied.

Cooperative procedures.

**Materials:** Nascar video clips, books to create an incline plane, toy cars, wood for ramps, washers or pennies for weights, tape, recording sheets to collect data.

**Focus question:** How is movement the same? How can we predict movement?

**Discussion:** **What forces affect the car? How could you make a car better?** Change one variable to see how you can make the car perform better. Teach the procedures that will allow for smooth running experimentation time. Discuss what went well, what problems did you have?

**Assessment:** Collect data sheets.
#6 Activity: Duration: 1 day

**The Marble Challenge**

**Concept:** Objects in contact exert forces on each other.

**Materials:** 5 small marbles, 1 shooting marble, launching pad, 1 piece of construction paper, metric measuring tape

**Focus question:** How do objects that touch exert force?

**Discussion:** Elicit discussion about questions 3&4 on the recording sheet.

**Assessment:** Collect data sheets and teacher observation.

FORCE leads to INTERACTIONS

may be

OBJECTS IN CONTACT exert FORCE ON EACH OTHER
#7 Activity: Duration: 1 day

**Magnets on a Pencil**

**Concept:** Objects that are not in contact exert forces on each other.

**Materials:** Magnets and other classroom supplies (see attached lesson), Magnets and Materials recording page

**Focus question:** How do forces work on objects even when they are not touching?

**Discussion:** Elicit discussion following the experimentation on how are these objects exerting force? Is there a strength to the object’s forces?

**Assessment:** Collect data sheets and teacher observation.

INTERACTIONS

may be

OBJECTS NOT IN CONTACT — exert

FORCE ON EACH OTHER

#8 Activity: Duration: 1 day

**Strange Attractor**

**Concept:** Objects that are not in contact exert forces on each other. How can we predict movement?

**Materials:** A ring stand and clamp, 4-6 ceramic magnets, paint, masking tape or correction fluid, fishing line or string.

**Focus question:** How do forces work on objects even when they are not touching? How can we predict movement?

**Discussion:** Elicit discussion following the experimentation on how are these objects exerting the forces of attraction and repulsion?

**Assessment:** Allow students to change a variable and record the results.

OBJECTS NOT IN CONTACT — exert

FORCE ON EACH OTHER

such as ELECTRIC or MAGNETIC