

PowerPlay

PRE-VISIT Body Strength

Students discover that muscles need to work to stay strong.

TIME

- 50 minutes on Day 1
- 5 minutes every other day for two weeks
- 50 minutes on the final day to conduct the activity

M A T E R I A L S

PER CLASS

- Clock with a second hand or timer

PER STUDENT

- Notebook
- Spring-hinged clothespin
- Student sheet

The Children's Museum of Houston's PowerPlay exhibit is designed to help young people discover new ways to be physically active and reinforce healthy behaviors. Students will have opportunities to track their heart rates, measure strength, and examine performance levels.

Students should complete this activity before visiting the Museum. It will help them to focus on ways to 1) measure their performance on different physical activities, and 2) chart their improvement over time.

Exercise includes any activity that requires physical effort, such as walking, running, riding a bike or jumping rope. Our bodies need regular physical activity to be healthy.

Exercise can improve muscle strength and/or stamina (the length of time one can

perform an activity without becoming tired). Low-intensity, long-duration activities, such as running and swimming, increase muscle stamina. High intensity, short-duration exercises, like weight lifting, increase muscle strength.

E N G A G E

Write the word "strength" on the board. Ask students to create an acrostic for "strength" in their notebooks, using words related to fitness and exercise (see "Acrostics," below). Have students share their acrostics during a class discussion.

Acrostics

An acrostic is a paragraph, poem or other text in which the first letter, syllable or word of each line spells out a word or message. For example, an acrostic for the directions of the compass is given to the right.

Never
Eat
Sour
Watermelons

E X P L O R E

1. Explain to students that they will learn about one way to improve hand strength. Mention that even in the hands and arms, there are small muscles responsible for movement.
2. Tell students that they will test the strength and stamina of their hand muscles by squeezing a clothespin with their non-dominant hand (left or right) for one minute.
3. Have students predict the number of times they can squeeze the clothespin in one minute.

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TEXAS ESSENTIAL KNOWLEDGE AND SKILLS (TEKS) OBJECTIVES

SCIENCE

3.2.A-F; 4.2.A-F; 5.2.A-F

Student uses scientific inquiry methods during laboratory and outdoor investigations.

3.4.A-B; 4.4.A-B; 5.4.A-B

Students know how to use a variety of tools, materials, equipment, and models to conduct science inquiry.

HEALTH

3.1.A; 4.1.F; 5.1.E

Students will recognize and explain ways to enhance and maintain health and recognize and perform behaviors that reduce health risks throughout their lifespan.

DATE	TRIAL 1		TRIAL 2		TRIAL 3	
	Prediction	Actual	Prediction	Actual	Prediction	Actual

- Instruct students to create a table on which to record their predictions and actual results (see example, page 2).
- Time students for one minute as they squeeze and count silently. They should count only the times they are able to squeeze the clothespin completely (so that the ends are touching). Have them record the results.
- Tell students to rest for a few minutes and then repeat the clothespin "squeeze." Repeat the test at least two more times, and have students record each count on their data tables.
- Instruct students to examine their data. Ask, *How did your hand feel after all three trials? What happened after each trial? How did the number of squeezes change over the three trials?*
- For the next two weeks, have students repeat the exercise at least every other day. During this "conditioning period," students' hand muscles should strengthen, enabling students to squeeze the clothespin more times during each trial. Students should record their results each day.

EXPLAIN

- Ask students if the number of squeezes per minute changed during the two-week period. Ask, *Why do you think this happened?*
- Discuss how exercise increases muscle strength and performance over time.

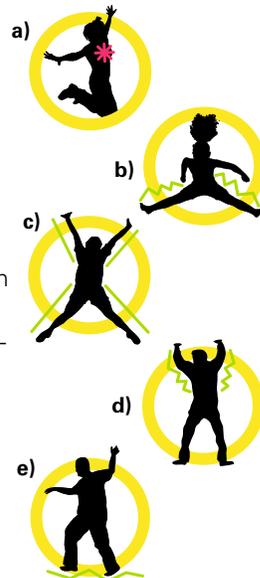
ELABORATE

- To promote deeper understanding of how their strength and endurance increased, have students graph and analyze their results. Have students graph their results to produce a visual representation of changes that occurred in the trials over the course of two weeks.

- They should create separate graphs for each one-minute period and record how the number of clothespin clicks changed over time. This will help students understand how their strength and endurance increased.

EVALUATE

- Explain to students that different physical activities can benefit the body in different ways. Go to the Children's Museum of Houston's PowerPlay website (www.cmhouston.org/powerplay) and show students the symbols on the site for a) Cardiovascular, b) Lower Body Strength, c) Flexibility, d) Upper Body Strength, and e) Balance (see symbols, right).
- Divide students into groups, and have each group create a daily exercise plan focusing on one of the four areas high-lighted on the PowerPlay site. For example, a group might choose to focus on improving upper body strength. That group should be sure to mention the part of the body they are working to improve and how often/ how long a person should exercise to achieve the desired improvement.
- Have each group explain its plan to the class. Then, lead all students in a class effort to develop an exercise plan that benefits the entire body.
- Finally, have each student create a new acrostic for the word, "strength," using the same criteria as before. Have students compare their "before" and "after" acrostics, and discuss whether students incorporated more information about fitness and exercise into their "after" acrostics.



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The activities described herein are intended for school-age children under direct supervision of adults. The authors, Baylor College of Medicine, the Children's Museum of Houston and funders cannot be responsible for any accidents or injuries that may result from conduct of the activities, from not specifically following directions, or from ignoring cautions contained in the text.

Teacher Tips

Follow these guidelines when your students visit the PowerPlay exhibit at the Children's Museum of Houston (CMH).

- Students must wear tennis shoes.
 - The CMH's PowerPlay exhibit is on three levels, connected by the Power Tower. Level 2 of the Power Tower is on the main entry level of the Museum. It is suggested that teachers have a chaperone on each level of the Power Tower or have a chaperone accompany each group.
 - An elevator for handicapped children is available (CMH guide will have key). It is suggested that you inform CMH officials about any special needs your students may have before you arrive at the museum.
 - Before your visit, help students understand the difference between heart rate while resting and after exertion, (see "Activity 3. Heart Rate and Exercise").
 - Also before your visit, explain to students that they will rate (on a 1–10 scale) the amount of effort they expend during some of the activities in the exhibit. This is known as "perceived exertion rate."
 - Ask the CMH guide for a "Kid Card" (Power Tracker) for each student. To set up a card, each student will need the information below before visiting the Museum (see "Kid Card" video). Please make sure your students are ready to enter the following information (or have a chaperone assist).
 - Username (numbers and letters only)
 - Password
 - Male or female
 - Birthday (numerical date)
 - E-mail (optional)
- As a final step, have students measure their baseline heart rates.

IDEAS FOR TEACHERS WITHOUT ACCESS TO THE CHILDREN'S MUSEUM OF HOUSTON

- Incorporate any of the lessons into your regular curriculum.
- Plan a special "field day" at your school. Prior to the event, conduct the Pre-visit lessons. After the event, use the Post-visit lessons.
- Create a classroom fitness plan that provides one month of activities. Help students plan a calendar with different fitness activities for each day.
- Participate in the President's Challenge for fitness (www.presidentschallenge.org).

Exhibit Key

	Cardiovascular	Strength	Flexibility	Balance
Power Tower: Climb, leap and jump in a 3-story climbing structure that takes you to other parts of PowerPlay.				
Dance Mania: Listen to music and follow along with different dance moves. Record your heart rate after you play.				
Match My Moves: Capture images of your own body in action and follow the poses you've set through a sequence of quick movements, testing your endurance and raising your heart rate.				
Light Chase: Race around an interactive game board, while increasing your speed and raising your heart rate.				
Jump It Up: Get your heart pumping as you jump over a glowing, virtual rope, which gets faster and faster the more you jump!				
Blast Off: Crank hand pedals as fast as you can to race flying superheroes across the exhibit.				
Adventure Course: Run through a course of climbing and crawling activities along padded, sloping surfaces! Slap each hand whacker along the way and record the level you achieve.				
Mt. Boulder: Face three challenges on a climbing wall and measure how far you've climbed, your grip strength, reach, flexibility and coordination.				
Grip It: Measure your grip strength and record this measurement using your Kid Card.				
Power Course: Grab a scoot and use your upper body strength to push or pull yourself along this wheelchair accessible course.				

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