

Grade 4: Exercise

Lesson 7: Building Strong Muscles with Exercise

Objectives:

- ✓ Students will identify exercise that supports a strong Muscular System.
- ✓ Students will make a plan for including more exercise for strong and healthy muscles each day.
- ✓ Students will track their daily exercise to record change.

Materials:

- Labels for the board that say: **Strength**, **Endurance**, and **Flexibility**
- Action pictures
- Triathlon score sheet (**See Figure 1**)
- Stop watches or watches with a second hand--one for each pair of students. (May need assistance/supervision—use parents or aides if available.)

Activity Summary:

In this lesson students will explore different kinds of exercise that support a strong and healthy Muscular System.

Background Information for the Teacher:

Developing a strong and healthy Muscular System requires more than doing a few exercises to develop large biceps. **Strength**, like we see in weight lifters and body builders, is only one part of a strong Muscular System. **Endurance** and **flexibility** are equally important—a person must have strength, endurance and flexibility in order to have a strong and health Muscular System.

Some examples of **activities that develop muscle strength** are doing push-ups, sit-ups, leg lifts and other strength building exercises. **Endurance is developed** with activities such as walking, bicycling and jogging. **Flexibility is developed** with activities that stretch the muscles such as yoga. Activities such as swimming and dancing are good for strength, endurance and flexibility.

You may wish to explore information on physical fitness offered by the Centers for Disease Control and the President's Challenge. These and other resources are listed in the Links section of this curriculum.

Vocabulary:

Muscles
Strength
Endurance
Flexibility

Engage (5-7 minutes):

Create labels entitled **Strength**, **Endurance**, and **Flexibility** and put them at the top of a bulletin board or large poster board, then cut out magazine pictures of children and adults doing a variety of exercises and physical activities.

Hold up a picture and ask a student to come forward and tape or pin it under the appropriate category. Continue this process with all of the pictures.

Explore (15 minutes):

Ask the students to look at all the pictures under the “Strength” label and think about how those activities develop strong muscles. Ask them to consider what kind of action or movement those activities have in common. Write all student answers under the pictures or on the board under the heading “Strength.”

Repeat for the Endurance and Flexibility pictures.

After all three headings are done, ask the students to look at the information they have compiled for each category and have them create **definitions** for Strength, Endurance, and Flexibility.

Next, have students compare their word definitions and the pictures. Ask them if they want to move any of the pictures to a different activity heading. (If they do, they should come up with valid reasons why the category should be changed.) This process should foster good debate, particularly about exercises such as swimming, which could conceivably fit into more than one category.

Explain (15 minutes):

1. Discuss the concepts of **strength**, **endurance** and **flexibility**.
 - **Strength** measures how much force or power your muscles have. Push-ups, pull-ups, sit-ups, and lifting heavy objects are examples of strength-building activities.
 - **Endurance** measures how long your muscles can perform an activity. Walking, bicycling, swimming and dancing are all activities that increase endurance.
 - **Flexibility** measures how well your muscles stretch. (The opposite of flexibility would be stiffness.) Any kind of stretching activity helps flexibility.
2. With this information, check with students to see if they are satisfied that the pictures are properly categorized.
3. Ask students to share information regarding what causes muscles to move and how to benefit from activities that promote flexibility, endurance, and strength.

4. Ask: **“How do muscles contract?”** Find out what students know about this process.
5. The following is a basic description of the muscle contraction process:
 - Muscle contraction occurs at the microscopic level.
 - The sarcomere (a small contracting unit within a muscle) contains thick (myosin) and thin (actin) filaments.
 - Calcium is released into the muscle at the beginning of the contraction sequence.
 - The myosin filaments (fibrous globulins of muscle) attach to the actin (a cellular protein active in muscle contraction.)
 - The actin is pulled to the center of the sarcomere (repeating structural units of striated muscle fibrils) and so the muscle is shortened.
 - ATP (adenosine triphosphate), which is an energy-storing unit found in all cells, is released. This causes the myosin to release the actin filaments.
 - The muscle is restored to its normal length.

Whenever we exercise, the action of these small units within our muscles provides many benefits. Discuss these benefits with the students, then ask the following questions:

1. **“What does the repetition of rapid movement in endurance activities do?”** (*It increases blood and heart activity.*)
2. **“What does the warming and lengthening of muscles in flexibility activities do?”** (*Helps improve balance and keeps joints open and in maximum range of motion.*)
3. **“What does muscle resistance activity do?”** (*Makes muscles bigger and stronger.*)

Extend:

Ask: **“What is a triathlon?”** (*An athletic contest that is a long-distance race consisting of three phases, such as swimming, bicycling, and running.*)

Tell students they will be participating in a **personal triathlon**. The triathlon will **include strength, endurance, and flexibility “events.”** They will participate in these events once a week for the next four weeks. They will record their performance each time, noting where they improve and where they may need to focus more attention. **(See Figure 1)**

1. Organize students into pairs. Explain that one person will do an activity while the other records the performance. Then they will switch. Show students the score sheet they will use to record their performance. Hand out the score sheets to the partner teams.
2. Model the following activities. (Use a student to model each activity and show how the score sheet should be filled in.)

Strength:

- Push-ups: Record # the student can do
- Sit-ups: Record # the student can do

Flexibility:

- Standing, bending at waist: record for fingers touching ankles, fingers touching toes, and hands flat on floor.
- Sitting on floor, spread legs in a V, bending forward: record hands wrapped around each ankle, hands touching toes on each foot, and both hands wrapped around each foot.

Endurance:

- Jogging around playground or field: record time or number of laps. Students should run at a steady, moderate pace, not full-out. Students who can't jog can walk. (Note: If you record time, students will probably need help with this.)

3. Ask: ***“Which activities contribute to strength, flexibility and endurance?”*** (*Push-ups and sit-ups contribute to strength; toe-touches contribute to flexibility; jogging contributes to endurance and flexibility.*)
4. Monitor the class as they do each activity. Have all students begin each activity at the same time and have them wait until others are finished before they begin the next activity. As soon as both partners finish an activity, have the partners sit down in place to wait for the next activity.
5. Repeat this activity once a week for four weeks. Collect the score sheets after each session and hand them out again for the next session.

(Note: To increase overall improvement you may want to ask the physical education teacher to have the students do the activities in their physical education classes. Also, this class activity may also be used in conjunction with the Personal Activity Plan that students are doing individually as part of the Grade 4 Self-Esteem lesson.)

Evaluate (20-25 minutes):

After four weeks, have students compare their performances and have the students prepare a report that evaluates the following activities:

1. The number of push-ups I did . . . increased (or decreased) by (change in time, number or repetitions.)
2. The amount of sit-ups I did . . . increased (or decreased) by (change in time, number or repetitions.)
3. Repeat for each category.
4. Have each student graph the data on their performance, then have students work together to create an overall graph for the entire class.

(Note: The class can also make comparisons in their performance relating changes in this activity to the consistency of their daily personal activity in the Self-Esteem lesson.)

5. Have the students draw conclusions about their results. Ask: ***“What happened when you participated in the triathlon?”*** Have them consider increased endurance, flexibility, and strength.

Additional Web Resources:

- Centers for Disease Control: www.cdc.gov
- President’s Challenge: www.fitness.gov

Figure 1

Name: _____

<u>Events</u>	<u>Scores</u>	<u>Improvement/Change</u> (Increase/Decrease/Same)
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STRENGTH:

- Pushups

- Week

1 _____

- Week

2 _____

- Week

3 _____

- Week

4 _____

- Sit-ups

- Week

1 _____

- Week

2 _____

- Week

3 _____

- Week

4 _____

FLEXIBILITY:

- Stand/Bend

- Week

1 _____

- Week

2 _____

- Week

3 _____

- Week

4 _____

- Sit/Bend
 - Week 1 _____
 - Week 2 _____
 - Week 3 _____
 - Week 4 _____

ENDURANCE:

- Jog
 - Week 1 _____
 - Week 2 _____
 - Week 3 _____
 - Week 4 _____