GUIDING QUESTIONS AND CONCEPTS

1. The heart is a muscle in our body which must be trained and exercised in order to ensure it is healthy.
   - What type of exercise strengthens the heart?
   - How many minutes of exercise does PHS suggest each week?

2. Depending on our level of physical activity, our heart rate changes accordingly.
   - Does someone with a very fit heart have a lower or higher resting heart rate than someone less fit?

3. Doing cardiovascular exercise consistently keeps your heart strong over the course of your life.
   - How can I tell if I am doing the right amount of exercise to strengthen my heart?

LESSON GOALS

Students will be able to...

1. Understand the concept of beats per minute as a measure of aerobic activity.

2. Evaluate different physical activities to determine which ones strengthen the heart muscle.

3. Understand the importance of getting at least 60 minutes of physical activity on most days.
Lesson #5  Get the Beat

BACKGROUND INFORMATION

Spending mindless time in front of a screen—watching television, playing video games, surfing the web on the computer or texting—occupy a large portion of children’s leisure time. It is estimated that children in the United States are spending 25 percent of their waking hours watching television. Statistically, children who watch the most hours of television have the highest incidence of obesity.1 “In 2011, only 29% percent of high school students had participated in at least 60 minutes per day of physical activity on each of the 7 days before the survey.”2 In middle school and even upper elementary grades, recess and gym occur less frequently or not at all. Youth with fewer resources and challenges to their built environment tend to report less physical activity. This lesson seeks to explain to youth how and why getting sufficient cardiovascular exercise is vital to a happy healthy life.

LESSON RATIONALE AND PURPOSE

This lesson begins by teaching students that their heart is made up of muscle tissue that needs to be conditioned for good health. Students will practice calculating the number of times their own heart beats in a single day and then learn how to measure heart rate in order to evaluate the effectiveness of specific activities on heart health. Students will understand how aerobic activities are necessary to elevate the heart to a rate that promotes cardiovascular health.

COMMON CORE STANDARDS ADDRESSED

CCSS.ELA-Literacy.L.6.4b Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., audience, auditory, audible).

CCSS.Math.Content.6.EE.B.8 Write an inequality of the form \( x > c \) or \( x < c \) to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form \( x > c \) or \( x < c \) have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

RESOURCES

1. Increasing Opportunities for Physical Activity  

2. Measuring Physical Activity Intensity  
   http://www.cdc.gov/nccdphp/dnpa/physical/measuring/target_heart_rate.htm

3. Classroom Energizers  
   http://www.ncpe4me.com/energizers.html#ld

4. Kid Health’s Heart Health Info  
   http://kidshealth.org/kid/htbw/heart.html

LESSON EXTENSIONS

Available at the end of the lesson:

1. Discussion Questions
2. Additional Activities
WARM-UP/REFLECT (2 min.)
- Welcome, Wellness Warriors! Last time we met we discussed our make better beverage choices step to focus on for the week. Who can tell me what that step was?
  - Answer: See Healthy Habits activity from Lesson 1, and the small step that was set for make better beverage choices.

- Stand up and stretch your arms high to the sky if you achieved our class step around making better beverage choices. Allow students to stretch for 15 seconds.

- Everyone else stand up and join in. Now everyone reach over and touch your toes.

- Let’s take our seats. It seems like many of you are working hard on our steps to reach the PHS goals. We are going to talk about another small step at the end of today’s class, and I hope you continue to work towards achieving each one.

- Who can tell me what we talked about last time we met?
  - Answer: beverages contain a lot of sugar that provides no energy or nutrients; beverages have calories; how to identify serving size, ingredients, sugar, and calories on a beverage; sampled a healthy pop

- Give me a thumb’s up if you shared something you learned last lesson with someone. Allow students to show thumbs up.

- Choosing healthy beverages and eating healthy are important things we can do to keep our bodies healthy, but we also need to be active. Today we are talking about the importance of heart health.

ALL ABOUT THE HEART Discussion (2 min.)
CCSS.ELA-Literacy.L.6.4b
CCSS.Math.Content.6.EE.B.8
(Note: for shorter class periods, you may choose to use the questions in this section as statements rather than questions in order to shorten discussion time. For classes with more than 25 min., PHS encourages you to use the open-ended questions below to engage youth).

Using your hand, make the sound of a heart beat against your chest.

- Does anyone know what type of tissue your heart is made up of? Some examples of types of tissue
are skin, bone, and fat.

- Answer: Your heart is made up of muscle tissue. It’s located a little to the left of the middle of your chest and is about the size of your fist.

- There are lots of muscles all over your body - in your arms, in your legs, in your back and more.

- Our foot muscles keep us standing up, our arm muscles are used to carry things and to hug people. What do you think our heart muscle helps us do?
  - Answer: Our heart is the organ that is responsible for pumping blood all over our body. It is the center of your body’s transit system that sends blood filled with oxygen and nutrients from our fingers to our toes. With every pump it refreshes our cells with oxygen and energy and takes away waste and carbon dioxide.

*(Note: See heart diagram in additional resources if you have more time and wish to describe the anatomy of the heart and the cardiovascular system).*

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<th>Optional Math Problem</th>
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<td>• The heart generally beats 60 to 100 times per minute, but can go much faster when it needs to. How would we figure out how many times our heart beats in a single day?</td>
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<td>- Answer: Allow students to construct the formula to figure this out. One example: if there are 60 minutes in one hour and 24 hours in one day we know that there are 1440 minutes in a day. Since we know that for every minute the heart beats 60 times, we can calculate 60x1440 which equals 86,400. SO our heart beats between 86,400 and 144,000 times per day</td>
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- The heart is one hard and important worker. How can you take care of it?
  - Answer: Your heart muscle isn’t like the muscles in your arms where you can lift weights to make them work and get stronger, but we must make our heart work in order to strengthen it. Activities that make us breathe hard and our heart beat fast for 10 minutes or more challenges our heart and makes it stronger. Examples include running, swimming, dancing, and basketball.

- Because physical activity is so important for our heart, we are going to do several different physical activities in an experiment to find out how they change our heart rate.
HEART RATE CALCULATOR Activity (18 min.)
(Materials: Get the Beat poster, dry erase marker, sticky notes/scrap paper)

Put the Get the Beat poster up on the board.

Does anyone know what a heart rate or a pulse is?

Heart rate or Pulse: a measure of how many beats per minute our heart pumps

- What is a hypothesis?

Hypothesis is an educated guess about what you think will happen, based on your observations

- Before we begin our experiment, let’s first make a hypothesis as to what activity will cause your heart rate to go up the most.

Let class decide by show of hands which activity (sitting in front of a screen, walking, jumping jacks, high knees) will cause their heart rate to go up the most. The activity that the majority of the class agrees on will be the class hypothesis. Circle the activity on the Get the Beat poster. (Note: For longer class periods, you can take classes outside for activity, use the gym, or other open areas at the school)

- Now that we have a hypothesis, we can begin an experiment to see if our hypothesis is correct!

- Give each student one sticky note to record their heart rate for each activity.

- On your sticky note, please write down each activity like this: (Refer to what you wrote on the board)
  - Sitting in front of a screen:
  - Walking:
  - Jumping jacks:
  - High knees:

- We can measure our heart rate, or pulse, on our wrists or neck. Here’s how:
  - Turn your left hand so that the palm faces up.
  - Now with your right hand, use your middle and index finger to trace a line from the base of the thumb on your left hand, up toward your arm.
  - Stay along the outer part of your wrist.
LESSON OUTLINE

- When your fingers have just passed over your wrist bones, press down gently until you feel your heart beat, the pulse.

Have students find their pulse but do not spend too much time on this. Help those who need it but some may have a very hard time and you might need to move on. Encourage them to use their necks if they can’t find it on their wrists.

- We are going to take our heart rate for each activity. We will start by taking our heart rate for sitting in front of a screen. We will just sit at our desks for this, but imagine you are in front of a screen watching TV or a movie at home, or playing on the computer and we will find out what your heart rate does.

- I’m going to time you for one minute while you feel how many times your heart beats. When I say “STOP”, you need to stop the activity right away, find your pulse and start counting the beats for one minute. I will time you. When you are done counting, please write down your number on your sticky note next to where you wrote “sitting in front of a screen”. When I say “GO”, start counting!

Say “Go” and time for one minute, then say “Stop.” Have them write down their heart rate next to where they wrote “sitting in front of a screen”.

- This is your resting heart rate.

**Resting heart rate:** the rate at which your heart beats when you are inactive, such as when you are engaged in screen time.

- Now you are going to stand up and walk for one minute. Remember, after one minute you will stop and measure your heart rate again for one minute. Before we get up, let’s make sure the floor is clear of any items that will get in our way and that your shoes are tied.

Repeat this process with jumping jacks and high knees (or other aerobic activities if you want to let the class pick different ones). If you are short on time, just do three activities instead of four. If you have extra time, you may add additional activities.

- Now we’ve completed our experiment and it’s time to share.

Ask for five kids to share their heart rate from when they were sitting in front of a screen and plot these numbers on the Get the Beat chart with the dry erase marker. Ask five more kids for their heart rates from
walking and plot these numbers on the chart. Repeat this with the other activities so that you have a chart with data points for all activities. There should be a trend of the heart rates rising with each activity. Discuss with the class what was found:

- Which activity made your heart rate change the most?
  - Answer: probably jumping jacks or high knees

- Was the class hypothesis correct? (Yes/No)

- What conclusions can we draw from the chart?
  - Answer: The more intense the activity is, the more the heart rate increases

- Why does your heart have to beat harder when you are doing more activity?
  - Answer: Your body is doing more activity and therefore needs more oxygen. Your heart must pump faster to deliver it.

### IMPORTANCE OF PHYSICAL ACTIVITY Discussion (3 min.)

- Getting exercise is important for our health in many ways. Does anyone know the name for exercise that makes us out of breath?
  - Answer: Aerobic exercise

- Look at the word “aerobic”. Is there a clue in the word that can help us figure out what it means?
  - Answer: “Aero” (students may need help with this; try circling “aero” first and ask if they have seen this prefix anywhere else—i.e., “aerodynamic”).

- The first part of the word “aero” means air, so it’s exercise that requires air. Of course all exercise requires that we breath but activities such as weight training and stretching do not work our heart as much as aerobic activities.

**Aerobic exercise**: any activity that keeps your body in motion for an extended period of time (10 minutes or more) and causes your heart and lungs to circulate blood and oxygen more quickly. This includes activities that use large muscle groups such as soccer, jump roping and running.

- Do you think one minute of running is enough to make your heart stronger? Why or Why not?
  - Answer: No. We need to stay active and keep our heart beating hard for at least 10 minutes to make your heart more fit—remember one of the PHS goals is to be active eve-
LESSON OUTLINE

- If you can sing a song or carry on a conversation easily, you aren’t exercising hard enough. If you can sing just a couple words or can only get a couple of words spoken and then need to take a big breath, your heart is beating hard enough.

- What would happen to your resting heart if you increased the amount of aerobic exercise you did regularly?
  - Answer: Your resting heart rate would decrease. Your heart muscle gets stronger and more efficient so it pumps less often but pushes the same amount of blood. Also, your heart rate returns to its normal resting rate faster.

FAT AND MUSCLE MODELS Demonstration (2 min.)
(Materials: fat and muscle models)

Show the models of 5 lbs. of fat and muscle.
- Which weighs more: 5 pounds of muscle or 5 pounds of fat?
  - Answer: It’s a trick question. Five pounds of fat and five pounds of muscle weigh 5 pounds each.

- When you become more fit, you strengthen your heart muscle and build more muscle on your body. We say your lean body mass increases. Often, the amount of body fat decreases. Notice the difference in these two models. The muscle is dense and tightly bound so it occupies less space than fat. The muscle takes up less space than the fat but they both weigh five pounds.

WRAP-UP (1 min.)
- What is something you learned today that you will take home and share with others?
  - Answer: The heart is a muscle that we can make stronger through exercise to keep us healthy; heart rate measures how fast our heart beats; the faster our heart beats the stronger we make our heart; get 30 minutes of activity per day; heart rate is a measurement of aerobic activity

- This week we are going to focus on our small step towards be active every day. What is the small step our class set?
  - Answer: See Healthy Habits activity from Lesson 1, and the small step that was set for be active every day.

- Good luck, Wellness Warriors! We will check in next time on our progress.
DISCUSSION QUESTIONS

• Now that we know what our heart rate is and how exercise affects it, do you think that _______________ (insert name of professional athlete) has a low or a high resting heart rate?
  - Answer: They have a low resting heart rate because they exercise their heart so frequently that it is very strong and doesn’t have to beat very often when the athlete is at rest. When our heart becomes stronger, it can pump more blood in a single beat. This means that someone who does a lot of aerobic activity’s heart needs to beat fewer times to send the same amount of blood around the body as someone who does not do as much aerobic exercise.

• What are some examples of aerobic exercise that you like to do?
  - Examples: Running, dancing, skating, swimming, etc.

ADDITIONAL ACTIVITIES

*If you have extra time, you can take the students outside to complete this lesson. You may also add additional activities for them to do to test their heart rate.*

*If the class can go outside, you can incorporate a cardiovascular activity such as a jump contest, a game of tag, or soccer.*