K – 6 Cardiovascular Concepts for SPARK
Based on WV Content Standards & Objectives (CSOs)

Anatomy and Physiology

**Kindergarten** - Students will know that their heart works harder when they are doing physical activities because they can touch their chest and feel it beat faster.

**First** - Students will understand that in addition to their heart, their lungs help them keep playing during their activities. Students will be informed that when they sweat, that their body is trying to cool down.

**Second** - Students will understand that when they work harder in their activities their heart and lungs work together pumping oxygenated blood to the body. They are briefly introduced to the role their lungs play in first grade.

**Third** - Students will understand that when you work harder your heart pumps faster to get more oxygen to the rest of the body faster.

**Fourth** - Students will know that the chambers of the heart pump blood to the body and the lungs with oxygen. Students will know the names of the 4 different chambers.

**Fifth** - Students will know the names of the vessels that carry blood in and out of the heart (aorta, vena cava).

**Sixth** - Students will be able to label a diagram of the heart and describe the blood flow through the chambers and the vessels.

**Oxygen Consumption**

**Kindergarten:** Students will place hand on chest, feel chest rise and fall back down, understand that the rise and fall is oxygen entering and exiting the body.

**First:** Students will understand the harder they work the more oxygen the body will need. Students will place their hand on their chest; their chest will rise and fall at a higher rate due to higher workload.

**Second:** Students will understand that when they participate in regular physical activity, their oxygen consumption becomes more efficient.

**Third:** During activity, students become aware that the more they breathe, the more oxygen enters the body. This increased oxygen level is needed to fuel the muscles.

**Fourth:** Students will understand that increased activity may lead to shortness of breath, and short rest period and increased breathing will return them back to normal breathing levels.

**Fifth:** Students will understand two of the concepts of oxygen consumption (such as, carbon dioxide production, heart rate). Students will learn that maintaining a sufficient supply of oxygen by increasing aerobic endurance will make it easier to for them to engage in muscular activities for a longer period of time.

**Sixth:** Students will understand all five of the concepts of oxygen consumption (oxygen uptake, carbon dioxide production, heart rate, respiratory quotient and pulmonary ventilation). Students will be able to link heart rate, to oxygen uptake and exercising muscles. They will understand that physical activity that increases the heart rate will increase the cardiac output, or the amount of blood expelled by the heart. The higher the cardiac output, the more oxygen delivery there will be to the exercising muscles.

**Physiological Responses / Value and Benefits of Cardiovascular Fitness**

**Kindergarten:** (PE. K.4.1) Students will be able to identify the physiological things that occur in their body during exercise such as faster breathing and sweating. (PE. K.3.1.) They will also understand that is important to be physically active and learn fun games they can participate in and out of class.

**First:** (PE. 1.4.1) Students will be able to understand the physiological differences between inactivity and activity (when active, increased heart rate and sweating; when inactive, no physiological changes occur). Students will be able participate in fitness-related activities and understand they are important to their future.

**Second:** Students will begin to understand why some of the physiological occurrences happen. (PE. 2.4.2) Students will also be able to explain a few basic cardiovascular benefits of regular participation in physical activity such as reducing the risk of disease by increasing energy, and strengthening heart.
Third: (PE. 3.4.2) Students will be able to determine the difference between moderate (just enough activity to get your heart rate up) and vigorous (high levels of physical activity) activities and participate in both. Students will learn about the more complex physiological signs of activity (e.g., increased heart rate and increased oxygen intake). (PE.3.4.5) Students will be able to determine more complex benefits of cardiovascular fitness (e.g., more disease prevention- and increased flexibility-related issues). (PE. 3.4.1) Students will meet the gender and age-appropriate health-related fitness standards defined in a selected program (P.P.F.T., FITNESSGRAM).

Fourth: Students will be able to put together the concepts relating cardiovascular fitness and vigorous/moderate physical activity. (PE. 4.4.4) Students will be able to identify specific characteristics of a healthy cardiovascular fitness plan such as how vigorous an activity should be, how much time should be spent on an activity, and how often to participate in the activity. (PE. 4.3.1) Students will identify moderate and vigorous physical activities that can be done outside of the school environment. (PE. 4.4.1) Students will meet the gender and age-appropriate health-related fitness standards defined in a selected program (P.P.F.T., FITNESSGRAM). (PE. 4.4.2) Students will define cardiovascular fitness.

Fifth: (PE. 5.4.4.) Students will be able to participate in warm-up and cool-down activities each day during and after activities. (PE. 5.4.1) Students will meet the gender and age-appropriate health-related fitness standards defined in a selected program (P.P.F.T., FITNESSGRAM). (PE. 5.4.2) Students will demonstrate knowledge of the five fitness components: cardiovascular fitness, muscular strength, muscular endurance, body composition, and flexibility.

Sixth: Students will be to explain many different benefits of cardiovascular fitness including healthy living throughout one’s life and decrease risk of disease. Students will be able to participate in many fitness activities that are related to better fitness overall and understand the importance of doing physical activities in and outside of school. (PE. 6.3.3) Students will exercise at home to improve performance and fitness. (PE.6.4.1) Students will meet the gender and age-appropriate health-related fitness standards defined in a selected program (P.P.F.T., FITNESSGRAM). (PE. 6.4.2) Students will define the five components of fitness.

Heart Rate and Track / Changes

Kindergarten: students should know where their hearts are. Students are to get concept that heart rate increases with physical activity. Students can show how their heart beat changes throughout the activity by pumping their hand. Students will be able to identify physiological effects of physical activity (sweating, faster heart rate, heavy breathing, etc.). In addition to just heart rate, students can begin to understand concepts of why their heart rate changes and what causes those changes. 1st grade: Students point out the changes in their bodies as they work out. (HR will increase and breathing will shorten and become more rapid) They should know that this happens because their body needs more oxygen to keep up the activity. Students will participate in activities that measure and improve fitness (PPFT). FITNESSGRAM does not recommend CV testing before age 10

2nd grade: Students should be aware of the term pulse and what it is (a: a regular throbbing caused in the arteries by the contractions of the heart b: the palpable beat resulting from such pulse as detected in a superficial artery; also: the number of individual beats in a specified time). They should understand differences in people’s pulses and some reasons for these differences. Students will understand that not everyone will have the same pulse, but that does not mean that they are not health. Some factors that contribute are, size, age, activity level, and genetics. Students should identify different activities that effect their cardiovascular system. Students will identify the benefits of regular physical activity. Students should begin to understand how regular physical activity should benefit a healthy lifestyle.

3rd grade: Students will identify one site to get their pulse, easiest is the brachial artery in the arm and more advanced is the carotid artery in the neck. They should know how physical activity impacts their body and works out their heart to condition it to be stronger and healthier, and how it makes their body work more efficiently by pumping more oxygen rich blood through their arteries and through out the rest of their body. Students should be able to recall each health related fitness component. Students should be able to identify each health related fitness component so they understand how and what they can do to help benefit a healthy lifestyle.
4th grade: students should know the acronym FITT and what each letter means. They should be aware of regular exercise, and what it is. They should have an idea of how often they should participate in cardiovascular activity. (An accumulation of 60 minutes, in three bouts or more most days a week). Students should be able to name activities that help maintain cardiovascular fitness. Like the health related fitness area, students should now understand which activities help to impact each area to benefit health.

5th grade: I.D. the brachial, carotid, and radial sites to get heart rate. Be aware of the benefits of the cardiovascular activity. They should know how physical activity impacts their body ad works out their heart to condition it to be stronger and healthier, and how it makes their body work more efficient by pumping more oxygen rich blood through their arteries and through out the rest of their body. Know about oxygen consumption and how it is related to working out and daily activities. Students should be able to recognize and understand the benefits of warm-up and cool-down procedures. Students should recognize these concepts so they understand about how to work out and to what types of limits they can push themselves.

6th grade: Students should be able to calculate their maximum and resting heart rate. They should know what a health zone for their age and size that reflect physical activity level and how to calculate it. They should be able to calculate what fitness level they are working out by using the equation 220-age. Oxygen consumption and stroke volume should be familiar terms. Students should be able to relate physical activities to specific fitness components. Students should participate in activity that affects all areas of fitness components.

Warm Up / Cool Down – Progression and Overload

Kindergarten – Warming up and cooling down will begin in Kindergarten so students will form these habits at an early age and will become second nature for the remainder of their lives. Warm up students by playing a quick game of tag. During the game, inform the students that they are warming up. Warming up includes increasing the students’ heart rate by having them participate in a short, but rigorous activity. Have them place their hand on their heart and feel how fast it is beating. Let them know that this is a good thing during physical activity. Students can cool down in numerous ways. They can walk around the gym or students can cool down by performing movements to a song. During either of these activities, inform the students that they are cooling down. Cooling down involves reducing the students’ rapid heart rate by participating in less vigorous activities. Once they are cooled down, let them feel their heart again to see how much slower it is beating.

First – Warm up by playing a quick game that involves a lot of running. During the warm-up, ask students various questions (Who is sweating? Breathing heavy? etc.). Let them know that it is important to warm up before they start an activity. Cool students down by having them perform various movements to a song. During the song, ask the students various questions (Are you still sweating a lot? Breathing heavy? Do you feel different than before? How? Etc.). Explain that it is important to bring the heart rate back down when they are done.

Second – Warm students up by having them play a quick game. Any type of tag game that keeps them all as active as possible is good. Ask various questions about how they feel. Ask them why they feel that way (Sweating, why? Breathing hard, why?). Let them know that this gets their heart rate up and that is the goal of a warm up activity. For cool down have the students engaged in the earth ball or parachute. Ask questions about how they feel, and why they feel that way (Is your heartbeat slowing down, why?).

Third – Students will participate in varied activities and will be taught the importance of warming up. These activities can be anything that involves plenty of moving around for a short period of time (5-7 min.). Posting information dealing with the benefits of warming up can do this. Stretches will also be added to increase the students’ flexibility. Tell them that it is always important to warm up before stretching. WHY? In a random activity, students will cool down. These activities should include slowed down movements such as walking. During cool down, the students will be taught about the importance of cooling down (Returns the body to normal resting conditions. Prepares them for the next class.).

Fourth - Begin to increase the student’s level of participation in health and skill related activities. In order to ensure proper physical activity preparation, warm –up should increase in intensity. During the
lessons, challenge the students to develop their optimal performance level by introducing various activities that call for a higher level of intensity. Remind students that when they are trying to reach their optimal performance levels it is a gradual increase in intensity. Cooling down may take more consideration and time due to the increased level of intensity.

**Fifth** - Warm up activities progress to a more vigorous level. This can be done at an independent level by exercise and stretching or by activities that will allow students to develop socially (team, partner activities, etc.). When partners are used try to give student a partner with same physical size and closely related in skill level. Cool Down activities can be with partners or groups as well. When doing this the same principles apply that were set forth in warm-ups, size being that major factor. Independent activities are still welcome and should be used at least 50% of the time. Progression and overload should begin to show up in some lessons in your teaching. Extending times and doing more in less time such as run a mile in 8 minutes instead of 8 ½ minutes is an example of this.

**Sixth** - Students should work more independently, yet productively, participate in warm up and cooling down. Having 2 students (one male and one female) lead in certain exercises and stretches to warm up is a good way to help establish leadership. Progression and overload should be acted upon on a regular basis. Raising levels of activity in intensity and lowering in time a little bit at a time insures that your students progress and overload safely and effectively. THESE TWO CONCEPTS WERE NOT DEVELOPED FROM K-6.

**FITT Principles**

**Kindergarten** – have students begin to understand the concepts of frequency. The more often they do an activity the better it is for them to a certain extent. Too much exercise can cause injuries. They also need to understand that not all exercise needs to be vigorous. This is in accordance with PE.K.3.1 – participate in physical activity in addition to physical education class. In addition, the students will be able to identify signs of increased intensity such as increased heart rate, faster breathing, and sweating in accordance with PE.K.4.1. Students will also participate in and identify types of activities that measure and improve cardiovascular fitness according to PE.K.4.2.

**First** – have students begin to realize signs of intensity. Red cheeks, sweating, increased breathing. This is covered in PE.1.4.1. Students will also continue to increase the frequency of participation outside of the classroom setting as per PE.1.3.1. Students will participate in types of activities that will measure and improve their fitness levels as per PE.1.4.2.

**Second** – students will begin to understand the concept of time. The more time a student spends doing physical activity the greater the benefits will be. It is not justified by a CSO at this grade level, but it sounds good. Increased frequency outside of school is still encouraged as per PE.2.3.1. Students will be able to identify appropriate types of physical activities to improve fitness and participate in them as per PE.2.3.2 and PE.2.4.1.

**Third** – students will begin to understand type of activity. They will be able to identify various activities that will increase cardiovascular endurance. The students have already been held accountable for learning types of activities to an extent, so they will continue learning. Students will continue to increase frequency of participation in activity outside of class as per PE.3.3.1. The students will distinguish between physical activities that are moderate to vigorous in intensity in accordance with PE.3.4.2. This would also be a good time to go over time concepts again so that students understand that more vigorous activities require less time to achieve benefits than low intensity activities.

**Fourth** – students will further their understanding of frequency and intensity. They will understand that frequency should be at least three times a week. Students will further their understanding of intensity by learning about target heart rate zone and pulse. This is in accordance with PE 4.3.1 and PE.4.3.2. Students will be able to identify different types of activities and also match fitness assessment items to their appropriate fitness components according to PE.4.4.2 and PE.4.4.3. Students will be able to specifically identify the characteristics of activities needed to maintain cardiovascular fitness as per PE.4.4.4. Students will be able to identify the components of the F.I.T.T. principles of exercise: frequency, intensity, time, and type as per PE.4.4.5.
**Fifth** – students will further their understanding of time and type. Students will know that to achieve beneficial results they must exercise for at least 30-60 minutes per day. Students will understand the types of activities that provide the best opportunities for improvement in cardiovascular health (e.g. walking, jogging, swimming, running, biking). This covers PE.5.3.3, identifying lifestyle behaviors that increase physical activity. Students will use the F.I.T.T. principles to maintain an activity log of outside of class activity as per PE.5.3.1. Students will be able to define the components of the F.I.T.T. principles as per PE.5.4.3.

**Sixth** – students will understand all components of FITT. Frequency of at least three times a week. Intensity/Differences between moderate and vigorous activity. Students will know the amount of time they need to spend on moderate and vigorous activity. Students will be able to identify the types of exercises that they can use to benefit cardiovascular health as per PE.6.4.3. Students will be able to demonstrate involvement in moderate to vigorous activity outside of class by using the F.I.T.T. principles to keep an activity log as per PE.6.3.1.

**Cardiovascular Activities and Assessment**

**Kindergarten**

1. The students will place one hand on their hearts and squeeze their other hand when they feel their heart beat. Students will be asked to describe how fast it is beating by squeezing the other hand every time they feel it beat. Students will then participate in an activity to increase their heart rate and check their heart rate again. Students will then be asked to describe the differences in the two if there were any.

2. Identify how and why people sweat during physical activity and what purpose this serves for our bodies. Recite how to replenish body after sweating by drinking liquids such as water or Gatorade. COMPLETELY UNRELATED TO ASSESSMENT; THIS IS MORE RELATED TO HR TRACKING. JUST BECAUSE THIS WAS INCLUDED ORIGINALLY DOES NOT MEAN IT WAS GOOD! Students will participate in some sort of cardiovascular activity (jumping jacks, jumping rope, tag game, etc.) to increase their heart rate enough for them to break a sweat. Students will then be asked to describe how their bodies feel (tired, thirsty, sticky, wet, etc.) Students will then receive an explanation on why and how the body sweats and how important it is to replenish bodily fluids with water. They will then be asked follow up questions to check for understanding.

**1st Grade**

1. Distinguish and compare heart rate while doing sit and reach and shuttle run. DEVELOPMENTALLY INAPPROPRIATE; 1ST GRADERS CAN BARELY WRITE! Students will take their resting heart rate and write down the number of beats in ten seconds on a sheet of paper. Students will then be asked to perform a cardiovascular activity of their choice. Students will then be asked to stop and take their heart rate again and write it down on the same sheet of paper. Student will then compare the two numbers and be asked a series of follow up questions to check for understanding.

2. Recite how being physically active helps the heart beat faster, circulating blood to the rest of the body more efficiently. Students will perform cardiovascular activity. Student will then be given information on why being physically active is good for the body such as improves circulation, lower blood pressure, and strengthens the heart. Students will then be asked to recall the information back to me.

3. Identify three activities such as jump roping, jumping jacks, or jogging that contribute to cardiovascular activity. UNLIKELY: Students will be asked to recite cardiovascular exercises off the top of their head. Students will then perform the exercises that they recited. Students will be asked to name the exercises that they just performed and be given additional cardiovascular exercises that can be performed outside the school setting.

**2nd Grade**

1. The students will be able to list the benefits of regular cardiovascular fitness such as increased blood supply to heart, better circulation of blood to the body and increased oxygen capacity. The students will be able to recite examples of different cardiovascular activities and the benefit of regular participation in cardiovascular exercises such as, lower resting heart rate, strengthen the heart, and reduces body fat.
2. The students will be able to list the five components of health related fitness and give one example of an activity for each component. The students will be able to list the five components of health related fitness and name the exercises on the PPFT that pertain to each.

3rd Grade
1. Students will be involved in a fitness gram in the areas of the one-mile walk/run, shuttle run, and pacer activities as they relate to cardiovascular fitness. I believe this one does not need to be changed because by this age every student should be familiar with the FITNESSGRAM test.
2. Students will be able to identify one place to take their pulse (typically their radial pulse) after engaging in a moderate to vigorous cardiovascular workout. Students will be able to identify the correct way to take a pulse and at least one place on their body to take their own (typically the carotid pulse) after engaging in moderate to vigorous cardiovascular activity. RADIAL OR CAROTID?
3. Students will know how cardiovascular fitness applies to disease prevention, social health, and mental health. Students will be familiar with the concept of cardiovascular fitness such as how to make improvements, how it applies to disease prevention, social health, and mental well being.
4. Students will practice items on a FITNESSGRAM test daily for six weeks to increase their fitness levels and meet both age and gender standards. Students will practice one item on the FITNESSGRAM test daily for six weeks along with other auxiliary exercises to increase cardiovascular endurance just before PPFT tests are to be completed.

4th Grade
1. Students will relate the FITT principle to exercising in a cardiovascular workout. I believe this does not need to be changed because students of this age should know and be able to relate the FITT principle to cardiovascular exercise.
2. Students will be able to list the five main health-related fitness components. Students will be able to list and define the five components of health related fitness. HOW DOES THIS MATCH W/ CV ACTIVITIES AND ASSESSMENT?
3. Students will be able to identify three characteristics of activity needed to maintain health-related cardiovascular fitness such as increased heart rate, heavy breathing, and sweating. I think this is a good idea but just needs to be reworded to say “Students will be able to identify three characteristics of cardiovascular activity needed to maintain cardiovascular fitness such as maintaining a target heart rate, maintaining a good pace, and exercising for at least 10 min at a time to increase cardiovascular endurance.”

5th Grade
1. Students will be able to identify on their body and name at least three places to take a pulse and be able to differentiate between normal resting heart rate and an active heart after doing 8-10 minutes of continuous cardiovascular activity such as tag game or a modified basketball game.
2. Students will be able to list health benefits of everyday cardiovascular fitness. I believe that this should remain the same because students of this age should be able to list health benefits of regular cardiovascular exercise.
3. Students will keep a journal of FITNESSGRAM activities that they will use outside of class with specific descriptions of the frequency, intensity, time, and type. They will try to increase fitness levels by assessing their own individual practices of these items. I think this is a great idea for students of this age group to start to learn how to take responsibility for their own health and learn how to manage it as well.

6th Grade
1. Students will be able to differentiate between aerobic and anaerobic activities and be able to list the benefits of both. Students will participate in both aerobic and anaerobic activities and then be asked to describe in a short essay how their bodies felt after the activities to better understand the differences between the two.
2. Students will be able to find their maximum heart rate as well as their target heart rate zone. Students will be able to pick one cardiovascular fitness training method and keep a journal of activities outside of class. I feel that this should not be changed because students of this age group are more than capable of understanding the mathematical formal used to calculate target heart rate zone.