

Practice & Learn: The Target Heart Rate Zone Equation

by
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Grade Level: 4th and 5th Grade

National Standards:

Standard 2; Standard 3; Standard 4.

Learning Objectives:

- The students will work with the teacher in a whole class situation to learn the Target Heat Rate Zone Equation.
- The students will work with a small group to practice and calculate the Target Heat Rate Zone Equation.
- The student will work independently to calculate the Target Heart Rate Zone Equation.
- The student will be able to explain, in written form, what cardiovascular fitness is and how a person becomes cardiovascularly fit.

Space Needed:

- Any space.

Equipment & Materials Needed:

- One (1) Target Heart Rate Zone Equation worksheet per student.
- One (1) writing implement per student.
- One (1) clipboard per student.

Set-Up:

- Place the clipboard, pencil and Target Heart Rate Zone Equation worksheet together, in a designated location per student.

Rationale for Lesson and Assessment:

- Standard Two (2): Demonstrates understanding of movement concepts, principles, strategies, and tactics as they apply to the learning and performance of physical activities.
- 3rd-5th grade sample performance outcomes (indicators): Describes how heart rate is used to monitor exercise intensity; Identifies physical and psychological benefits that result from long-term participation in physical activity. *"Moving Into the Future: National Standards for Physical Education, 2nd Edition."
- Demonstrates an understanding of Heart Rate by counting their heart best accurately; Calculates the Target Heart Rate Equation using different variables; Demonstrates an understanding of Target Heart Rate Zone by indicating if they are within their given zone. *Kamehameha Schools Maui Performance Indicators.
- Instructional and Assessment Examples for Standard Two (2): Event tasks; written tests; problems; scoring rubric; problem-solving-situational questions; problem-solving-use of recording sheets related to biomechanics; group project-oral report; performance task-record of pointers. *"National Physical Education Standards in Action."
- Standard Three (3): Participates regularly in physical activity.
- 3rd-5th grade sample performance outcomes (indicators): Monitors his or her physical activity by using a pedometer to count the number of steps taken or the distance walked; Maintain a physical activity log for a two-or-three-day period documenting activity data. *"Moving Into the Future: National Standards for Physical Education, 2nd Edition."

- Takes their own Heart Rate or use a Heart Rate monitor and then records the results; Maintains a record of Heart Rate before, during, and after participation in activities. *Kamehameha Schools Maui Performance Indicators.
- Identify the benefits derived from regular physical activity; Describes healthful benefits that result from regular and appropriate participation in physical activity. *"National Physical Education Standards in Action."
- Standard Four (4): Achieves and maintains a health-enhancing level of physical fitness.
- 3rd-5th grade sample performance outcomes (indicators): Participates in selected activities that develop and maintain each component of physical fitness; engages in appropriate physical activity that results in the development of cardiorespiratory endurance; recognizes that physiological responses to exercise are associated with their own levels of fitness; Maintains heart rate within the Target Heart Rate Zone for a specific length of time during an aerobic activity. *"Moving Into the Future: National Standards for Physical Education, 2nd Edition."
- Identifies several activities related to the development and maintenance of each component of physical fitness; Participates in cardiovascular fitness activities for a minimum of 30 minutes, without stopping; Recognizes that physiological responses to exercise are associated with their own level of fitness; Understands the results of formal fitness testing and correctly associates these results with overall fitness level and personal health status; Recognizes that Heart Rate during hiking (for instance) is a good indicator of exercise intensity and may be an indication of cardiorespiratory fitness. *Kamehameha Schools Maui Performance Indicators.
- Identify several activities related to each component of physical fitness; Maintains continuous aerobic activity for a specific time and/or activity. *"National Physical Education Standards in Action."

Description of Learning Activities:

- This lesson may be spread across several days to complete the entire equation and should be repeated several times to ensure students retain information.
- Teacher introduces the Target Heart Rate Equation to the entire class, as a whole group.
- Allow 4th graders to use calculators, which the students may need to be taught how to use them.
 - Have one student read the directions aloud, to the entire class.
 - Discuss the Lower Limit and the Upper Limit (the lowest your heart should be exercising to gain any benefits; the highest your heart should be beating that is considered safe).
 - Start by working with the Lower Limit only.
 - Ask: "We are trying to figure out the Heart Rate Zone for the person on this worksheet. How old is the person?" (Use the age that has been pre-determined, and written on the worksheet.
 - Write this number in the first box, labeled "Age".
 - Subtract this person's age from the number 220, and write the answer in the box labeled "MHR". (Have the students rewrite this same number in the box below).
 - There are several different ways to determine which resting heart rate we are using for the person on this worksheet: the first is taking their pulse, while they are lying down, by counting their heart beats, and then adding a zero to the end of that number; and the second way is to use the resting heart rate already determined in the directions.
 - Ask: "What is this person's resting heart rate?"

- Write the resting heart rate in the box labeled "RHR".
- Subtract the RHR from the MHR; and write the answer in the box labeled "A"—be sure to have the students transfer this number to the box below.
- Have students look at the Upper Limit side of the equation and make observations—(students should be able to see that the equation is exactly the same as the Lower Limit up to this point).
- Have students copy the numbers from the Lower Limit to the Upper Limit.
- Return to the box labeled "A".
- Notice that on the Lower Limit this number is multiplied by 50%; be sure to teach the students how to use the decimal equivalent (.5).
- Write the problem to the side of the equation and do the math with the students.
- Show students how to add the decimal place back into the answer by asking "How many numbers are after the decimal point for 50% (.5)—students should answer one (1) number; if there is one (1) number after the decimal point in 50%, then we must have one (1) number after the decimal point in the answer.
- Draw a looped line starting after the last number in the answer, under the last number, and place the decimal point between the last number and the second to the last number.
- Repeat this example using two numbers after the decimal point to assist the students in understanding this concept.
- Have students write the answer in the corresponding answer box.
- Repeat this process for the Upper Limit; 90% (.9).
- Have student revert their attention back to the Lower Limit side of the equation.
- Have students read the next box's label (RHR).
- "What does RHR stand for in this equation?" (Resting Heart Rate).
- "So I can use any resting heart rate I desire, correct?" Students should answer no, and tell you the correct resting heart rate from the previous RHR box.
- Write the RHR in this box.
- Add the number in the answer box to the number in the RHR box; write this answer in the box below. This is a good time to remind and/or show students how to line up their place values, i.e. one's go with one's; ten's go with ten's, etc. Students will often add the number after the decimal point to the one's column.
- Have students review the answer; if they have a number such as 756 or 1008, ask "Is it possible to have a heart rate of 756 (or 1008)?" Student response should be no. "What would happen if your heart rate was that high?" Students' answers will vary but as long as they understand that it is not healthy or safe, that is fine. Give students the hint "If you ever get numbers like these, just know that it is not possible, and you should go back and check your math, particularly where the decimal point is located."
- Discuss rounding as it pertains to heart rates; you may want to compare it to rounding of whole numbers.
- Write the answer next to the equation; if the number after the decimal point is 5, 6, 7, 8, or 9, add one (1) to the whole number and drop the decimal point; if the number after the decimal point is 0, 1, 2, 3, or 4, cross off the decimal point and leave the whole number as is.
- Give several other examples, having the students verbally give the correct answers for each one.
- Have students write the number in the box labeled "Rounded #".
- Say "Because we need to ensure we have the actual Target Heart Rate Zone's Lower and Upper Limit, we must write the final numbers together, like a range." Have students look at the very last set of answer lines and notice the hyphen between the two numbers.

- Have students write the Lower Limit final number (answer) on the answer line.
- Repeat this process to complete the Upper Limit side of the Equation.
- Once all students have completed this equation, with the specific figures given in the directions, have them calculate again using a new set of figures, in a small group and then in pairs, so they can work together.
- Once the class has mastered the equation as a whole class, in a small group, and in a pair, have them do the calculations individually.

Assessment :

- Give students a Target Heart Rate Zone Equation written quiz with the directions (step-by-step).
- Give the students a Target Heart Rate Zone Equation written quiz with the directions but eliminate the step-by-step directions.
- Calculate the number of heartbeats during a prescribed time, given the average heart rate during that time; calculate the target heart rate zone; and using a manual recall function, record the heart rate at designated intervals and graph the results.
- Compare heart rates during two activities and write an essay stating which activity is more aerobic and why.
- Analyze their recovery heart rate (how long it takes to return the heart rate to normal after a workout) in order to determine their fitness levels.
- Participate in an aerobic circuit while maintaining the same heart rate; then write an essay describing the difference between pieces of exercise equipment.
- Have students take a blank Target Heart Rate Zone Equation worksheet home and do the calculations for their family members.

References :

- National Physical Education Standards in Action by NASPE.
- Kamehameha Schools Maui Performance Indicators.
- Moving Into the Future: National Standards for Physical Education, A Guide to Content and Assessment, 2nd Edition by NASPE.
- Elementary Heart Health: Lessons and Assessment by Donna Baker, M.A.
- Assessing Heart Rate in Physical Education by Marilyn M. Buck, Ed.D.
- Assessing and Improving fitness in Elementary Physical Education by Shirley Ann Holt/Hale, Ph.D.