

## Q & A About Heart Rate Monitor Use and Assessment

As adults, we tend to think back to our personal experiences in P.E. class where the athletes set the bar for participation while the non-athletes struggled to keep up. As a result, some ended up hating P.E. class and physical activity because they could never run fast enough or jump high enough to achieve success.

Since the mid 1990's, physical education has been undergoing a major shift. The focus has moved from the assessment of performing sports skills toward maintaining or improving overall health related fitness. Of course we still use sport activities as a vehicle, but the focus is on functional movement and effectively increasing and maintaining heart rate, not on wins, losses or how many baskets you can make. As a result, we've begun to use technology to assist with the assessment of physical activity.

We've received a lot of feedback regarding the use of heart rate monitors in P.E. classes, both positive and negative, so hopefully this Q&A form will help explain the process and procedure for the use of this type of equipment in our classes. As a district, we are dedicated to developing both the mind and bodies of our students so they may live an active and healthy lifestyle. We would like our students to have a strong understanding of exercise principles and how to accurately and safely apply them in their lives.

### **Q: How often will my son/daughter use heart rate monitors in P.E. class?**

**A:** This varies from teacher to teacher; however, most classes will utilize heart rate monitors twice a week. Some classes don't use them at all because of the nature of the class. For instance, Dance Techniques will rarely use them; however, Fitness classes will use them approximately once a week. You should check with the instructor at the beginning of the semester to see how often heart rate monitors will be used in that course.

### **Q: How do you determine how hard my son/daughter should be working?**

**A:** The department's main focus is to teach how to determine the proper level of intensity in a workout. Our instruction is focused on using heart rate to achieve desired fitness and wellness results. These heart rates make up a range, expressed as percentages but measured in beats per minute or bpm, of heart beats for our students to strive to achieve. Determining proper exercise intensity simply begins with figuring out your maximum HR (MHR) by subtracting your age from 220. This will give us a starting point to personalize a target zone.

We teach our students to take their pulse at the wrist or neck to determine a resting heart rate (RHR). To assess accuracy, we teach them to take their pulse for 10, 30 and 60 seconds. Once students have an accurate RHR, we ask them to plug that number into a formula called the “Karvonen Formula.” This is the most accurate formula to determine exercise intensity as it allows each student to individualize their exercise intensity or target zone. Because fitness levels differ from person to person, this formula allows for individualization based on the student’s level of fitness.

### Karvonen Formula

- A.  $220 - \text{Age} = \text{Max HR}$
- B.  $\text{MHR} - \text{RHR} = \text{HR Reserve}$
- C.  $\text{HR Reserve} \times .60 + \text{RHR} = \text{Lower Limit of target zone}$
- D.  $\text{HR Reserve} \times .80 + \text{RHR} = \text{Upper Limit of target zone}$

## **Q: What exactly is a Training Zone and why is that important?**

**A:** The state of Illinois has recently updated the learning targets for physical education. Among these updates is the expectation that physical activity intensity occur in the moderate to vigorous zones for at least 50% of the class period. The most effective and accurate way to assess this is to use heart monitors. Zones are divided into percentages, calculated using the Karvonen Formula and Heart Rate Reserve (HRR).

**Healthy Heart Zone (Warm Up) – 50-60%** The easiest zone and probably the best zone for people just starting a fitness program. It can also be used as a warm up for more serious walkers. This zone has been shown to help decrease body fat, blood pressure and cholesterol. It also decreases the risk of degenerative diseases and has low risk of injury. 85% of calories burned in this zone are fats! Exercising in this zone requires a significant increase in overall exercise time. The benefits of this zone are very difficult to achieve in a 35 minute P.E. class.

**Aerobic Zone (Moderate Physical Activity) – 60-80%** This zone provides the same benefits as the healthy heart zone, but is more intense and burns more total calories. The percent of fat calories is still approximately 80%. Exercising in this zone also requires an increase in overall exercise time. This zone and benefits are achievable in a 35 minute physical education class. The lowest end (60%) of this zone is the department expectation during cardiovascular activities.

**Anaerobic Zone (Vigorous Physical Activity) – 80-90%** Benefits of this zone include an improved VO<sub>2</sub> maximum (the highest amount of oxygen one will consume during exercise) and thus an improved cardiovascular system. One can also expect a higher lactate tolerance which means their endurance will improve and be able to fight fatigue. This is a high intensity zone which burns the most calories: 15% from fat. This level of intensity can only be sustained for short periods of time and therefore is generally completed in intervals.

### F.I.T. Principle

Think of the F.I.T principle as a set of rules that must be adhered to in order to benefit from any form of fitness program. These rules relate to the Frequency, Intensity, and Time of exercise. These principles are applicable to all individuals exercising at moderate training levels and may be used to establish guidelines for both cardiovascular and resistance training. With any target zone above, the F.I.T. principle may change the levels of intensity and time in regards to desired zone. For example, you can't exercise at 80-90% for as long as you can at 60%.

### **Q: Is it fair to grade students who are out of shape with a Heart Rate Monitor?**

**A:** Actually, the very purpose of heart rate monitors and the basics of calculating a target heart zone is to assure fairness and so students can participate at safe level. Our heart rate monitors are set at a level that is consistent with the [American College of Sports Medicine](#) recommendation that Americans should get at least 150 minutes of **moderate** exercise per week. A moderate exercise heart rate for a 15 year old with a RHR of 60 bpm is approximately 153 bpm. This is equivalent to the lower end of the Aerobic Zone. A student who is less fit cardiovascularly will actually enter the zone at a faster rate. Polar Heart Rate Monitors allow your students to see the effect of exercise on their body. This also allows us to objectively assess students of all abilities while safely monitoring them with instant feedback.

[http://www.polar.com/us-en/training\\_with\\_polar/training\\_articles/get\\_active/introduction\\_to\\_heart\\_rate\\_based\\_training](http://www.polar.com/us-en/training_with_polar/training_articles/get_active/introduction_to_heart_rate_based_training)

### **Q: Is it fair to grade students who are in shape with a Heart Rate Monitor?**

**A:** All students, fit and unfit, can elevate their heart rate to any stated level. The difference lies in the speed of their recovery when they stop exercising. The more fit the student, the quicker their heart rate returns to normal. This is the reason why we utilize the Karvonen Formula, to determine individual intensity during activity. It takes resting heart rate into account, which is a strong predictor of fitness level. We also differentiate groups within our classes so the fit students aren't in a situation where they may need to slow down for the unfit students to keep up.

When students walk into a physical education class, they will be met with individualized physical programming and information to enhance their knowledge of their own wellness. If they are pushed beyond their limits to "make the grade" or not challenged enough because they are already "fit", they lose. This is no different than any other course; students must be challenged regardless of their ability. In physical education, we can easily differentiate ability levels utilizing heart rate monitors which allow us and the student to adjust the activity accordingly. District 99 expects all teachers to differentiate activity and instruction in all classes. Using heart rate monitors assures that we are using accurate data to adjust exercise intensity.

Students participating in exercise sessions with heart rate monitors may notice very quickly that not every student is moving at the same pace. Using the Karvonen formula, we are assured that all students are participating at the same 60% workload. This level of intensity looks different for everybody, but as long as students remain at their calculated workload, all students will be performing the same amount of work.

**Q: Are heart rate monitors an accurate measure of my student's effort in class?**

**A:** North High has been using Polar heart rate monitors for over 10 years. We have found the transmitters to be an accurate measure of a student's heart rate while exercising. This is not to say that there is never a malfunction but, usually through proper fit, proper moisture on the transmitter and proper attachment of the transmitter we can attain a proper reading.

One activity we do when teaching students how to use the heart rate monitors is to compare a pulse reading with the heart rate monitor reading. We have consistently experienced identical readings.

**Q: I've heard the technology is temperamental and is constantly experiencing technical difficulties. Is this true?**

**A:** Whenever we have students report that the transmitters are not working, we check to make sure they were applied correctly and if they were moistened enough. Most times we find that the student may have a torso that prevents the transmitter from contacting their skin. The former are easily correctable. The latter has directed us to experiment with a "soft strap".

Soft straps are applied the same way but conform to the body more consistently. Students who need to use the soft straps have seen positive results with the technology. Ideally, we would like each student to have their own soft strap. This would cut down on the issues that arise due to constantly having to adjust the size and length when putting it on. Currently, the department washes our straps after each use. Over time, they begin to lose elasticity which causes the transmitter to fit improperly.

Below is a link to the use of the model of heart rate monitors we use at North High. While we don't offer students the opportunity to purchase their own straps; we are open to the possibility of it happening. If you are interested in purchasing a soft strap, contact the P.E. department for more information.

<https://www.youtube.com/watch?v=LMhicvxnu7w>

**Q: Why does my student have to make up PE?**

**A:** PE is a lab class. The majority of our activity and instruction is designed to improve or maintain your student's overall fitness level. When a student is not present, they miss out on important activity that is designed using the F.I.T. (Frequency, Intensity, Time) principle. Throughout the course of the semester, the activity intensity and time is increased as students meet certain benchmarks.

District 99 has taken steps in the last 15 years to make P.E. relevant, rigorous and necessary for every student. As a result, we have revised our make-up policy to allow students to perform make-ups on their own time, performing activities they enjoy. They can do this by checking out a heart rate monitor from their P.E. teacher. This also supports our goal in encouraging students to lead an active lifestyle by participating in activities of their choosing. Of course, they may make up PE classes in school as well.

**Q: Why does the grading scale have such a large portion dedicated to fitness activities?**

Our objective is to develop students who not only understand the principles of fitness but also know how to apply the concepts we are teaching. Application of the training principles can be difficult and confusing. In our effort to assure rigor, we want to make sure we can assess our students as objectively as possible. It is entirely possible to achieve the expectations set and with the guidance we provide, students can be successful when performing at any prescribed level.

We do not want a program that provides grades for wearing the proper clothing and attendance. Those are behaviors that are handled through the building discipline code. Through heart rate monitors, fitness activities, and cognitive work, we are changing the face of physical education in CSD 99. We are not merely an introduction to recreational activities, but a model for what choosing a fitness plan and activity will be like following graduation.

**Q: How can I contact my student's teacher to ask how they will use heart rate monitors?**

You can find e-mail addresses and office extensions on the PE web page. Look on the right hand side of the page and click on the link "contact your PE.H.Dr Ed. Teacher".