Cycling by Energy Zones

The amount of individual effort exerted when exercising is related to the Maximum Heart Rate (MHR). In order to predict your maximum heart please use the calculation below.

**Age-Predicted Maximum Heart Rate**

The most common way to predict one’s maximum heart rate is with a simple, arithmetic calculation. Males should subtract their age from 220; females should subtract their age from 226. 30-year-old males and females would use the respective equations:

**Male:**
- 220 (max HR)
- - 30 (age)

\[\text{MHR} = 190 \text{ predicted max}\]

**Female:**
- 226 (max HR)
- - 30 (age)

\[\text{MHR} = 196 \text{ predicted max}\]

*Note: The predicted maximum heart rates are only estimates. If you seem to be working much too hard, or not nearly hard enough to reach your target zones, consult a physician and consider a clinical test to determine your maximum oxygen uptake.*

MHR can also be related to a Perceived Exertion as set out in the chart below. The chart also establishes the MHR for four energy zones (Intervals is similar to Strength) used during cycling workouts.

### Perceived Exertion Chart

<table>
<thead>
<tr>
<th>Energy Zone</th>
<th>Description</th>
<th>Heart Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy</td>
<td>Very little or light effort. You could maintain this pace for a long time.</td>
<td>Recovery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50–65% of maximum</td>
</tr>
<tr>
<td>Moderate</td>
<td>A moderate, completely aerobic pace that you could endure for at least 15 minutes. It's a pace that does not leave you breathless; you can still talk while at this exertion level.</td>
<td>Endurance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65–75% of maximum</td>
</tr>
<tr>
<td>Hard</td>
<td>Comfortably hard (athletes would call it threshold). You could endure this pace for about 5–8 minutes. Breathing is harder, so talking is possible, but you have to pause for breaths between phrases.</td>
<td>Strength</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75–85% of maximum</td>
</tr>
<tr>
<td>Very Hard</td>
<td>This is the highest exertion level you could reach. You could maintain this pace for only a short time—no more than 3 minutes. Talking would be very uncomfortable and difficult.</td>
<td>Race Day (upper end of zone)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>85–92% of maximum</td>
</tr>
</tbody>
</table>
Below is a description of the five energy zones. Classes by Steve will be titled Endurance, Strength, Intervals and occasionally, Race Day. The Endurance Energy Zone will be the most frequent type of class since it will target aerobic training that teaches the body to burn fat and develop an aerobic base. The Recovery Zone will not likely be covered as a whole class. However, each class will begin and end in the Recovery Energy Zone for 5 to ten minutes as we Warm-up and Cool-Down. Exercising outside of the Endurance Energy Zone is not necessary except for competitive athletes. However, monthly classes may include Interval and Strength Energy Zone training, which adds a challenge and can break the monotony of continuous Endurance training.
Relaxation and energy accumulation.

Exercise intensity: 50-65% of maximum heart rate.

Recovery sessions are an essential component of any fitness program. Unfortunately, they are often the least practiced training day. This is by far the most difficult training day for most people. We all know how to push, but few know how to rest. The Recovery training session should focus the mind, and most importantly, circulate blood and oxygen throughout the body.

The main objective of a Recovery ride is to make the body feel like it has been gently massaged and is vibrating with gathered energy. Unlike the other Energy Zone™ rides, there are no hills and no Jumps. Only light resistance is used. Hills and Jumps detract from the recovery process by fatiguing the muscle fibers and depleting the body of oxygen.

Work in the Recovery Zone should consist of breathing exercises, visualization and energy accumulation. If the standing position is used in a Recovery ride, it must be with light resistance, with no burning in the muscle. It is important to stay between 50-65% of maximum heart rate. If a student feels any burn or goes above 65%, they should decrease resistance and/or sit down and roll their legs easily until their heart rate returns to appropriate levels.

When applying resistance to the flywheel, make sure it is in very small increments to protect against a sharp increase in pulse rate or muscle burn. In a Recovery ride, everything is eased into. Treat this ride like a meditation on the bike where you work on balance, breathing, centering the psyche and rejuvenating the body.

If you or any of your students are exhausted or feeling less than 100% healthy (sore throat, swollen glands, stuffy head, etc.), it is highly recommended that you forego exercise until you feel better. If you’re feeling “normally tired” from accumulated training stress, a Recovery training session is beneficial. Studies indicate that light exercise actually accelerates the body’s recovery process.
Endurance

Even application of energy for sustained periods.

Exercise intensity: 65-75% of maximum heart rate.

An endurance training session trains the body to be more efficient at metabolizing fat and to maintain a comfortable pace for extended periods. The emphasis in this ride is on finding a comfortable heart rate and pedaling style that can be maintained for hours. It is recommended that your students remain in the saddle during the Endurance ride to increase pedaling efficiency and improve hip flexor strength. Increasing aerobic capacity through Endurance sessions helps the rider maintain a steady pace and resist fatigue for longer durations.

Energy output must be significant enough to raise heart rates into the Endurance zone—65% to 75% of your maximum heart rate. During an Endurance ride, students should strive to stay within five beats of their chosen heart rate for the entire training session. This is NOT a ride where heart rate is varied throughout the Energy Zone™. Pick a number, stay in the saddle and establish a smooth, steady rhythm for the entire ride.

Endurance training sessions challenge the body physically and mentally as the rider adapts to holding a steady position and steady heart rate for extended periods. This improves mental discipline as well as aerobic efficiency. Riders can stand occasionally to stretch their legs, but heart rate should remain constant and they should not stand for more than 30 seconds.

Performance is maximized when a rider achieves an even application of energy over the duration of the exercise. This is where the heart rate monitor becomes a valuable tool. Due to changes in fatigue levels and perceived exertion over the course of the training session, the only way to ensure that effort is applied evenly is by maintaining a constant heart rate.

A variation of the traditional Endurance Energy Zone can be used for new riders or for times when you want more variety in your aerobic training and base building rides. The variation includes expanded heart rate parameters of up to 80% MHR for those who can still work aerobically at 80%. The variation also allows for using additional core movements—Standing Flat, Seated Climb and Standing Climb, provided that riders remain at an aerobic heart rate.
Heavy resistance to develop muscular endurance and power.

Exercise intensity: 75-85% of maximum heart rate.

The Strength training session involves steady, consistent pedaling with heavy resistance. Strength rides promote muscular and cardiovascular development that will enable you to feel like a strong and powerful climber. This training session may be conducted in a seated or Standing Climb position. The heavy resistance will cause lactic acid to accumulate in the muscles. Followed by adequate rest, fatigued muscles will respond by becoming stronger and more capable of handling challenging climbs.

The heart rate range of the Strength Energy Zone straddles the region where the body switches from aerobic to anaerobic metabolism. Thus, students can choose to conduct this training session in the lower range of the zone and remain entirely aerobic or extend their efforts into the higher range to introduce anaerobic metabolism.

The goal of training in the Strength Energy Zone is to build the cardiovascular strength to handle a slightly uncomfortable pace. This can be accomplished throughout the heart rate range. Working at the upper limits will also develop the ability to buffer lactate that begins to accumulate in muscles at that intensity. Keeping the heart rate under 80% of maximum in the Strength training session will develop strength and derive maximum aerobic benefits with minimal anaerobic stimulation.

Recovery from this session is critical. Because we place increased resistance on the muscles during Strength rides, you may experience muscle soreness, necessitating a Recovery ride or complete rest the following day.

A Strength training session develops mental as well as physical strength. Students develop the ability to remain relaxed and focused as they adapt to increasing resistance and fatiguing muscles. Strength rides help students learn to turn adversity (hills) into opportunity. By learning to mentally overcome obstacles, participants develop improved self-confidence in all areas of life.
*Interval*

*Speed, tempo, timing and rhythm require a substantial fitness base.*

*Exercise Intensity: 65-92% of maximum heart rate.*

Interval (formerly known as All Terrain) training sessions emphasize speed, tempo, timing and rhythm. Movements may include high RPM (but never above 110) pedaling on the flats, acceleration drills and recovery stretches.

The goal of training in the Interval Energy Zone is to develop the ability to recover quickly after work efforts, an exercise that can be done in several heart rate ranges, depending on the fitness levels of your students.

While the typical Interval ride involves anaerobic heart rates, you can also conduct aerobic intervals. Aerobic intervals range from 65% of max heart rate (recovery period) to 80% (work efforts). Anaerobic intervals range from 65% (recovery period) up to as high as 92% (work efforts).

While you can subjectively judge fitness improvement by monitoring perceived exertion during a challenging Interval session, riders can also perform a Working Recovery Heart Rate test to get an accurate measurement of fitness improvement (see page 3.08). For the Working Recovery Heart Rate test and to ensure that your work and rest intervals are conducted appropriately, it is highly recommended that all riders utilize heart rate monitors during Interval sessions.

A helpful guideline to use for proper recovery between hard efforts is to attain your Working Recovery Heart Rate (usually 65% of maximum: 125 in the example on the page). You can mix up the type of movements on the work efforts—seated or standing climbs, high cadence or high resistance efforts on the flats.

If, after several work efforts, heart rate does not drop to working recovery in the usual amount of time, no further intervals should be conducted. This indicates maximum training benefits have been achieved, and further work increases the risk of overtraining.

Training in the Interval Energy Zone develops the student’s mental ability to use breathing and visualization techniques to assist in quick recovery from work efforts.
Race Day

Peak Performance—sustained “time trial” effort at anaerobic threshold. Requires a substantial fitness base.

Exercise intensity: 80-92% of maximum heart rate.

The Spinning® Race Day Energy Zone ride was created to give riders an opportunity to measure the progress of their fitness gained from training in the other four Energy Zones. A Race Day ride simulates a “time trial”—an all-out solo effort against the clock.

Race Day is a special event. To obtain the full benefits from this training session, it should be treated like a real race. If students are less than 100% physically energized and mentally rested, they should postpone their Race Day ride until their bodies are ready for peak performance. Top athletes will not race if their bodies aren’t in top form—neither should you or any of your students. Ample recovery should always be taken after a Race Day ride to properly absorb the fitness benefits.

Unlike Interval training sessions, where work efforts are broken by consistent rest periods, a Race Day ride is carried out at a steady heart rate consistent with a student’s anaerobic threshold. This means there are no Jumps, no Standing Flats and no significant fluctuations in pace during the ride. Anaerobic threshold (or “AT”) heart rates can be determined by scientific testing or by noticing heart rates that can be maintained for the duration of the time trial.

AT is often described as “red-line”—going any faster would cause the rider to “blow up” and be unable to complete the distance. AT heart rate usually falls between 85-92% of maximum heart rate. Carefully conducted anaerobic threshold Race Day rides will effectively raise a rider’s AT (the pace one can hold as AT increases).

A Race Day ride is about “laying it on the line.” By welcoming the physical challenge and striving for peak performance, students experience increased self-confidence, greater satisfaction with exercise and an improved ability to set and achieve goals.

Caution

Race Day training sessions require a substantial fitness base and should NEVER be conducted until successfully completing at least two months of aerobic base building (see the Aerobic Base Building section). This is NOT a ride for new students.