

LESSON 5: AEROBIC VERSUS ANAEROBIC ACTIVITY

Grade-Level Outcomes

Primary Outcomes

Fitness knowledge: Identifies each of the components of the overload principle (FITT formula: frequency, intensity, time, type) for different types of physical activity (aerobic, muscular fitness and flexibility). (S3.M11.6)

Fitness knowledge: Differentiates between aerobic and anaerobic capacity, and between muscular strength and endurance. (S3.M10.6)

Fitness knowledge: Employs correct techniques and methods of stretching. (S3.M9.6)

Embedded Outcomes

Health: Identifies components of physical activity that provide opportunities for reducing stress and for social interaction. (S5.M2.6)

Engages in physical activity: Participates in self-selected physical activity outside of physical education class. (S3.M2.6)

Lesson Objectives

The learner will:

- continue his experience of the progressive overload principle through a walk/run progression.
- participate in correct stretching techniques after participating in a walk/run progression.
- differentiate between aerobic and anaerobic activities.

Equipment and Materials

- Beginner's 5K Training Schedule, 1 copy per group of 4 or 5 students (see lesson 2)
- Stopwatches (1 per group of 4 or 5 students)
- Whiteboard easel on casters
- Index cards
- Pencils
- Pedometers

Introduction

Today we will continue our walk/run progression so you can continue to experience the progressive overload principle. Today, the key concepts you will be learning are intensity and aerobic versus anaerobic fitness.

Instructional Task: Warm-Up

■ PRACTICE TASK

Have students complete a brisk 5-minute walk in small groups of four or five, with one person in each group keeping time.

EMBEDDED OUTCOME: S5.M4.6. Many people walk with a friend or small group for exercise. Discuss with students how this might increase enjoyment or reduce stress for people who might not be motivated to exercise.

Student Choices/Differentiation

- Student leaders can rotate.
- Students can rotate groups or choose to walk with new peers.

What to Look For

- Students are walking briskly.
- Students' discussion of using physical activity for enjoyment is more sophisticated.
- Group leaders are precisely timing the 5-minute warm-up.

Instructional Task: Training (Week 2, Workout 1)

■ PRACTICE TASK

Have students alternate 90 seconds of jogging and 2 minutes of walking for a total of 20 minutes.

Provide pedometers to some or all students, depending on class size and available equipment.

Leaders in each small group time the 90-second and 2-minute intervals; you keep track of the 20-minute duration.

Have students keep track of the distance traveled during the 20-minute walk/jog (e.g., How many laps did they cover during that time?).

Students with pedometers can also keep track of how many steps were taken during this time.

Refinements

- Efficient runners do not bounce up and down very much when they run. Have students attempt to run without bouncing. Students can assess each other by watching a classmate run next to a wall or fence. Using the fence or wall as a reference point, students should see minimal bouncing up and down.
- Encourage students to use a slight forward lean when running. This makes it easier for the foot to land under the center of gravity rather than having the heel strike out in front of the center of gravity. Heel striking makes it difficult for the body to reduce impact forces.

Student Choices/Differentiation

- Rotate student leaders.
- Students can choose their groups.
- Students can use a pedometer or a running plan app on their smartphones.
- Students can watch video clips of good running form.
- Let students take breaks if they need them.
- Students can listen to music for motivation (as long as they can keep up with the changing pace commands).

Note: You can modify the Beginner's 5K Training Schedule to fit various school and class schedules (e.g., block schedule, shorter or longer class periods).

What to Look For

- Students are alternating 90 seconds of jogging with 2 minutes of walking.
- Students are keeping track of distance traveled (e.g., laps around the school, field, track).
- Students are maintaining good running and walking form while doing the training program.

Instructional Task: Review of Training Program

■ PRACTICE TASK

Define *progressive overload*, *frequency*, *intensity*, and *time* on the portable whiteboard.

Guiding questions for students:

- How far did you travel today using the 20-minute walk/jog?
- How many steps did you take today?
- Was your hypothesis from last week correct?

Point out that an increase in distance means that they have increased their intensity.

If you covered the same distance, then you definitely will see an increase in week 3 when we increase the amount of jogging again. What other data did we collect in class that would indicate an increase in intensity?

Student Choices/Differentiation

Students may use visual aids defining terminology to help them remember the concepts.

What to Look For

- Students recognize that progressive overload will result in an increase in intensity.
- Students are able to apply the overload concepts when answering questions.

Instructional Task: Stretching

■ PRACTICE TASK

Practice and reinforce PNF and static stretching after the physical activity.

Extension

Depending on class time, conduct a more in-depth discussion of how PNF stretching works.

Student Choices/Differentiation

- Students may do PNF stretching in pairs or individually.
- Students may do static stretching.

What to Look For

- Students are holding the stretch long enough to make improvements in range of motion or to maintain range of motion.
- Students are following the sequence for PNF stretching.

Instructional Task: Aerobic Versus Anaerobic

■ PRACTICE TASK

Define *aerobic* and *anaerobic* on the portable whiteboard as follows:

Aerobic = slow energy conversion

Anaerobic = quick energy conversion

Explain how the body converts energy that we take in (food = chemical energy) into human movement and that our bodies have different energy systems that allow us to convert that energy.

One system does this slowly and requires oxygen to do so. This is our aerobic energy system, and this system is utilized when the body has time to take in and use oxygen for energy.

The other system is very quick. It allows us to produce movement quickly and does not require oxygen. This is our anaerobic system. The letters an in front of aerobic mean “without oxygen.”

Point out that it is fairly simple to differentiate between activities that are aerobic and anaerobic if we think about it this way.

Extension

Pass out a worksheet listing various activities and exercises. Have students check off whether the activities are aerobic or anaerobic in nature.

Guiding questions for students:

- Do you think today’s walk/jog was aerobic or anaerobic?
- To derive the most health benefits for your cardiorespiratory system, would you choose activities that are aerobic or anaerobic?

Student Choices/Differentiation

- Have videos or handouts available.
- Allow students to do worksheets in partners.

What to Look For

- Students recognize that activities that are performed quickly (like sprinting) will use the anaerobic system since the body does not have time to take in and use oxygen to produce the movement.
- Students recognize that activities that are performed slowly (like walking or jogging) are aerobic since the body has time to take in and use the oxygen.
- Students recognize that today's activity was aerobic in nature.

Formal and Informal Assessments

- Worksheet on aerobic versus anaerobic
- Class discussion on aerobic versus anaerobic

Closure

- Have the walk/jog groups share something new that they learned today.
- Define *aerobic* and *anaerobic* in your own words.
- Can you provide an example of a sport or activity that is largely aerobic or anaerobic?
- What two pieces of data would suggest that you had an increase in intensity today? (Answer: an increase in distance covered in 20 minutes; an increase in the number of steps taken in 20 minutes)

EMBEDDED OUTCOME: S3.M2.6. *To increase overall fitness, try to participate in at least one physical activity outside of physical education class. Try to have a good mix of aerobic and anaerobic activities.*

Journal assignment:

- Is the training getting easier?
- Which do you prefer, aerobic or anaerobic activities? Why?
- Which do you think your parents prefer, aerobic or anaerobic activities? Do you think this influences you at all?

Reflection

- Do students seem to understand the difference between aerobic and anaerobic?
- Does simplifying the terms to “aerobic = slow” and “anaerobic = quick” help sixth graders better understand a concept that can be very difficult?

Homework

Think about the difference between muscular strength and endurance. See if you can find good definitions for these terms on the Internet, and bring them to class next time.

Participate in physical activity outside of class, and record the activity and how long you participated in your physical activity log.

Finish your journal assignment.

Resources

Brooks, G.A., Fahey, T.D., & Baldwin, K. (2004). *Exercise physiology: Human bioenergetics and its applications*. 4th ed. New York: McGraw-Hill Education.

Corbin, C.B., & Lindsay, R. (2007). *Fitness for life*. Updated 5th ed. Champaign, IL: Human Kinetics.
Internet keyword search: “5K running plans”