RLP-PEA · RLP Physical Education A — Fitness Science, Safety and a Personal Plan

Unit 3: How Training Works

Practice Workbook. The same problems, in the same order, as the Practice sections of the online lessons.

Name _____ Period _____

Lesson 3.1 — Aerobic and Anaerobic Energy — How Muscles Use Oxygen

FLUENCY

1. Name the three energy systems that rebuild ATP and state whether each needs oxygen.

2. About how long can each system supply energy at hard or maximal effort, according to the OpenStax figures in the lesson: (a) creatine phosphate; (b) anaerobic glycolysis; (c) aerobic respiration?

3. Define *steady state* and *oxygen debt*.

APPLICATION

4. Aerobic respiration yields about 36 ATP per glucose. Glycolysis makes 4 ATP but uses 2. (a) What is the net yield of glycolysis? (b) How many times more ATP per glucose does the aerobic pathway produce than the net from glycolysis?

5. Classify each as mainly aerobic, mainly anaerobic or mixed, and name the system that leads: (a) a single maximal vertical jump; (b) a 400-meter run; (c) a one-hour flat bike ride; (d) a basketball game.

6. Explain why breathing and heart rate climb during the first minutes of a walk before settling.

7. Name the major muscle groups worked in (a) walking or cycling and (b) a push-up, and explain why one suits aerobic training and the other leans anaerobic.

CHALLENGE

8. Explain why heart-rate recovery is a useful fitness measure, using the idea of oxygen debt.

REVIEW

9. Review (Lesson 2.3): an example 15-year-old rides a flat stretch of the Katy Trail at 140 bpm. Is that within his moderate zone of about 131 to 156 bpm, and which energy system is supplying most of the ATP?

Lesson 3.2 — Steady-State and Interval Sessions with Heart-Rate Recovery

FLUENCY

1. An interval session uses 30 seconds of work and 90 seconds of easy recovery. (a) What is the work-to-recovery ratio? (b) How long does one round take? (c) How many minutes do 8 rounds take?

2. Define *heart-rate recovery* and say whether a larger or smaller value usually means better aerobic fitness.

3. Give the RPE ranges the lab uses for steady state, for hard intervals and for easy intervals.

APPLICATION

4. Example data from a student named Elena. Steady state: stop 138 bpm, 1 minute later 112 bpm. Intervals: stop 164 bpm, 1 minute later 128 bpm. Calculate both recovery values and explain why the interval recovery can be larger even though it felt harder.

5. Describe the heart-rate pattern you would expect to see on a graph of each session.

6. Why does the lab use the same activity, the same time of day and a rest day between the two sessions?

7. Write a FITT description for an interval session a beginner could put in a training block, and explain why the lab says to "start low and go slow" with intervals.

CHALLENGE

8. An example student counted her pulse while still marching fast, and her numbers jumped around. Name the source of error and one way to reduce it.

REVIEW

9. Review (Lesson 1.2): why must you keep walking slowly instead of stopping suddenly after a hard interval?

Lesson 3.3 — Strength Training Critical Elements — Bodyweight and Bands

FLUENCY

1. List the five general critical elements for every lift.

2. Name the main muscle groups trained by (a) the split squat; (b) the band row; (c) the glute bridge.

3. Define *concentric* and *eccentric* phases, and identify each in a push-up.

APPLICATION

4. Match each error to its fix: (1) push-up hips sagging; (2) split-squat front knee caving inward; (3) band row shoulders shrugging; (4) bridge low-back arch.

5. Give three band-safety checks from the lesson.

6. An example student holds his breath for a whole set of split squats and bounces at the bottom of each rep. Which two critical elements is he missing, and what should he do instead?

7. Explain why push-ups and band rows make a good pair in a strength routine.

CHALLENGE

8. An example student, Lena, has no resistance band. Describe the substitute the lesson suggests for the row, and explain how she should film and review her technique.

REVIEW

9. Review (Lesson 1.3): how do the push-up's critical elements in this lesson compare with Lesson 1.3's, and which progression rule from 1.3 still applies?

Lesson 3.4 — Designing Training with FITT, Overload, Progression and Specificity

FLUENCY

1. What does each letter of FITT stand for? Give one example of how to measure or describe each.

2. Define overload, progression and specificity in one sentence each.

3. Name which FITT variable changes in each: (a) 20 minutes → 25 minutes of walking; (b) a lighter band → a heavier band; (c) 3 → 4 sessions a week; (d) walking → cycling.

APPLICATION

4. An example student walks 20 minutes, 3 days a week. (a) What is her weekly aerobic time? (b) If she adds 5 minutes per session each week for two weeks, what is her weekly time in week 3? (c) By what percentage did her weekly time rise from week 1 to week 3?

5. An example student, Ty, wants stronger upper-body muscular endurance but trains only by jogging. Which principle is he ignoring, and what should he change?

6. In Jordan's example block, week 3 makes two changes and week 4 makes none. Explain why week 4 "holds steady."

7. List three signs from the lesson that a week was too hard, and what to do.

CHALLENGE

8. Design a four-week strength progression for an example student whose Unit 2 push-up result was below her goal. Use FITT for each week and label overload, progression and specificity.

REVIEW

9. Review (Lesson 2.1): when Jordan retests in week 4, what should he compare his results with, and what should he never compare them with?

10. Review (Lesson 3.2): which session type, steady state or intervals, would you put in a block to add vigorous minutes, and which for building aerobic endurance gradually?

Unit 3 checkpoint

1. Which energy system powers a 10-second maximal sprint up a short hill?
   A. Aerobic respiration
   B. Creatine phosphate
   C. Digestion
   D. Oxygen debt
2. Aerobic respiration produces about _____ ATP per glucose molecule.
3. True or false: About 95 percent of the ATP used by resting or moderately active muscles comes from aerobic respiration.
4. Stop heart rate is 150 bpm and one minute later it is 118 bpm. What is the heart-rate recovery?
   A. 32 bpm
   B. 118 bpm
   C. 150 bpm
   D. 268 bpm
5. A session of 30 seconds of work and 90 seconds of recovery has a work-to-recovery ratio of 1 : _____.
6. Which muscles are the main movers in a glute bridge?
   A. Pectorals and triceps
   B. Gluteals and hamstrings
   C. Biceps and rear deltoids
   D. Calves only
7. True or false: During a lift you should exhale during the effort and inhale on the return.
8. Where should a resistance band be anchored for a band row?
   A. Around a loose chair
   B. In the hinge side of a closed door with a door anchor
   C. Above face level on a shelf
   D. Tied to a pet's leash
9. Changing from 2 sets of 8 to 2 sets of 10 squats changes which FITT variable?
   A. Frequency
   B. Intensity
   C. Time
   D. Type
10. True or false: Specificity means band rows will greatly improve a 1-mile walk time.
11. The federal guidelines' safety advice for anyone inactive is to "start low and go _____."

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