

Principles of Program Design Lab Quiz

Part 1: Exercise Basics

1. List the three main components of fitness.
2. Name the four muscle performance pillars.
3. Explain why a client must warm up before testing baseline strength.
4. What is the primary reason for initial strength gains in a novice client?
5. When should resistance/load be increased during strength training?
6. Describe how you could increase or decrease the load in the following exercises:
 - Pushups
 - Inverted row
 - Single leg stability exercise (split squat, step up)
 - Standing plank
 - Rotational core stability
7. Identify the indications for spinal flexion and extension stretches.
8. How is functional balance primarily improved?
9. What is overspeed training, and how does it benefit neurological processing speed?
10. List the three aspects of joint health.
11. What are structural faults, and how do they affect joint health?
12. How is the Karvonen formula used in cardiorespiratory health?
13. What target heart rate range (using heart rate reserve) corresponds to moderate intensity exercise?

Part 2: Principles of Exercise Program Design

14. Define the specificity principle in exercise program design.
15. What is the overload principle, and why is it important?
16. Explain the progression principle. List three ways to increase intensity in a training program.
17. What are the key variables to consider in program design?
18. Describe the importance of exercise selection in program design. What is the difference between compound and accessory/isolated exercises?

19. How frequently should progressive resistance exercise (PRE) and cardiorespiratory exercise be performed?
20. What is the recommended exercise order within a session?
21. If a client can complete 10 reps of an exercise, what percent of their 1RM are they lifting?
22. Differentiate between sets and reps.
23. Why is rest important in exercise programs? How does overtraining affect performance?
24. What are the three phases of strength training, and what are their key characteristics?
25. What is circuit training, and how does it integrate resistance and cardiorespiratory training?
26. Define functional exercise and its importance in a training program.

Answer Key

Part 1: Exercise Basics

1. Muscle performance, Joint health, Cardiorespiratory health
2. Strength, Flexibility, Balance, Neurological processing speed
3. To ensure safety and optimize performance by increasing blood flow, muscle temperature, and preparing the body for the motion.
4. Neurological adaptation and learning (up to 11% of initial gains).
5. When the client can perform 2 reps over their last rep max value on 2 separate days.
6.
 - Pushups: Increase/decrease the angle or add/remove weight.
 - Inverted row: Change the angle or adjust the height of the bar.
 - Single leg stability exercise: Use a higher/lower surface or add weight.
 - Standing plank: Add movement or resistance (e.g., with a band).
 - Rotational core stability: Increase resistance or range of motion.**
7.
 - Spinal flexion: When flexion postures decrease pain, such as in spinal stenosis.
 - Spinal extension: When extension postures decrease pain, such as in a disc bulge.**
8. Through single-leg stability exercises and training the foot, hip, and core stabilizers.
9. Overspeed training involves moving faster than normal to improve neurological processing speed and power.
10. Structural Faults, Aberrant Motion Patterns, Anthropomorphic Measures
11. Structural faults impact joint loading and function by affecting the anatomical structure, which can influence the movement.
12. It calculates target heart rate using heart rate reserve (max HR minus resting HR).
13. 40-60% of HRR.

Part 2: Principles of Exercise Program Design

14. Exercises should closely mimic the movements associated with the activity or performance goals.
15. The applied stimulus must be greater than current system demands to have a positive effect on the system.
16. Intensity must progressively increase to continue to produce higher performance levels.
Ways to increase intensity: increase session frequency, increase load, change the type of exercise.
17. Needs analysis, Exercise selection, Training frequency, Exercise order, Resistance/load, Volume, Rest.

18. Exercise selection ensures exercises are specific to the client's goals and include both compound and accessory exercises. Compound exercises involve multiple joints and large muscles, while accessory exercises target single joints and smaller muscles.
19. PRE: 2-3 times per week; Cardiorespiratory 150-300 mins/week of moderate or 75 mins/week of vigorous intensity exercise. Target heart rate ranges: 40-60% of HRR for moderate, 60-84% for high/vigorous.
20. Compound, multi-joint exercises before single-joint exercises; large muscles before small muscles; alternate muscle groups.
21. 75% of their 1RM.
22. Sets are groups of reps performed in one session; reps are the number of times an exercise is performed within a set.
23. Rest is necessary for recovery and progressive performance. Overtraining can lead to decreased performance, burnout, and increased injury risk.
24. Phases:
 - Connective tissue adaptation phase: 2 sets of 15-20 reps (<65% 1 RM), rest <30 seconds.
 - Hypertrophy phase: 2-3 sets of 8-12 reps (65-80% 1 RM), rest 30-90 seconds.
 - Strength phase: 3-5 sets of <8 reps (>80% 1 RM), rest 2-5 minutes.**
25. Circuit training combines resistance and cardio training with quick transitions to maintain an elevated heart rate.
26. Functional exercises mimic daily movements to improve strength, tissue health, and reduce injury risk.