Study Design and Components of Fitness

Objectives

- 6.2.1: Outline the importance of specificity, accuracy, reliability, and validity with regard to fitness testing.
- 6.2.2: Discuss the importance of study design in the context of the sport and exercise science
- 6.2.3: Outline the importance of the Physical Activity Readiness questionnaire (PAR-Q)
- 6.2.4 Evaluate field, laboratory, submaximal and maximal tests of human performance

Why is Study Design Important

- Discuss with your table why we must emphasize study design.

Four Parts of Study Design

1. Specificity
2. Accuracy
3. Reliability
4. Validity

Specificity

- Testing something in game related scenario…
- Volleyball: Seargent Jump test (vertical jump)…
- To be accurate to a volleyball player we would need to test repeated jumps.

Accuracy

- Making sure our equipment is working correctly

Reliability

- The degree to which a measure would produce the same result from one occasion to another

Validity

- It measures what is claims to measure.

Designing Sport and Exercise Science Experiment

- Open book to 144
- What is a control group?
- What is an experimental group?
- What is a placebo group?
- What is a double blind experiement?

- Could we perform the experiment listed with caffeine in this class?

- What is the IB experimentation policy.

PAR-Q

- Physical Activity Readiness Questionnaire
- Before asking someone to take part in a physical test will not put their health, indeed possibly their life at risk. Which is why it is Recommended to have your test subject to fill out a PAR-Q

Book Work

- Pg. 145 Look at the PAR-Q. Come up with 2 more possible questions you could put in a PAR-Q. You may use your electronic device to look at other PAR-Q's available.

Field test vs. Laboratory tests

- Field test would use different fitness tests to test ones VO2 max
- Laboratory tests would use specific equipment in a lab to test VO2 max

Maximal Test Vs. Submaximal Test

- Maximal Test—VO2max test or Max Bench Test (ideal, but hard for those who are not use to doing a test like this)
- Submaximal Tests—good for children and elderly who are either not aware of what they can handle or concerned of pushing it to hard.

Components of Fitness

- Physical fitness—an individuals physical ability to perform a specific activity.
- *Performance-related physical fitness* —a person's ability to physically perform a specific sport.
- At some point this becomes

Irrelevant for many people…

Components of Fitness

- Health-related physical fitness – an individual's physical ability to maintain health and perform activities of daily living.

Major Components of fitness

- Body Composition
- Cardio-respiratory Fitness
- Strength
- Speed
- Power
- Muscular Endurance
- Flexibility
- Agility
- Balance
- Reaction time

Major components of physical fitness

- Body Composition—proportion to an individual's body mass that is made up of fat and fat-free mass

Why is Body Composition Important?

- Depending on certain sports you may need to have a high body composition or a lower body composition to be able to effectively compete
- Ex. Wrestlers, Sumo Wrestlers, Boxing, Gymnastics
- Bone Density has a role in body composition

Cardio-respiratory fitness

- Ability to take in, deliver and use oxygen for use by the aerobic or oxidative energy system…commonly characterized by VO2 Max or aerobic capacity

Strength

- The ability to generate force by a muscle or muscle groups. It is underpinned by the muscle mass that is available (volume and muscle fiber type), the ability to activate that muscle mass and the co-ordination of this muscle activity.
- Dependant on both the neural and muscular systems

Speed

- Change of distance with respect to time when movement occurs…whole body or particular joint or muscle.
- Determined by the complex interaction of biomechanics and physiology…with max speed have a psychological element

Power

- Rate of doing work and represents the combo of force and velocity (strength and speed)

Muscular Endurance

- Ability of a muscle or muscle group to maintain force or power…also called fatigue-resistance

Flexibility

- Ability to move through the full range of movement around a joint…
- Factors influencing: the capacity of muscles and tendons to stretch; ligament condition; joint mechanics; size and shape of bones

Agility

- Ability to rapidly change direction and speed. May or may not be the response to a stimulus (physical ability to change direction or ability to mentally respond to change)

Balance

- Stability of the body
- To maintain balance the center of gravity needs to be maintained above the supporting base of the body and this is achieved through coordinated contraction and relaxation of postural muscles in response to positional changes.
- Successful balance depends on the ability to sense position and respond to sensory information in a coordinated fashion

Reaction Time

- Duration between the presentation of a stimulus and the associated response.
- Similar to balance it depends on integration of neuromuscular system.

To Do with Partner

- Pg. 149

- Strength
- Power
- Muscle endurance
- Flexibility
- Agility
- Balance
- Reaction Time

- Does each of the following have a functional role for both health-related and performance related fitness? Provide examples for each which illustrate why?

Theory of Knowledge

- On a Separate sheet of paper answer the following question on page 151. (6 Marks)

To Do pg 153

- In a chart organizer go through the following questions.