

ATHLETIC TRAINING – HOW MUCH IS TOO MUCH?

Performance Standards 12A/12D/11B/13A/13B.I

Students will apply the concepts, principles and processes of technological design to investigate motion and metabolic relationships, accordingly:

- *Knowledge:* understand the multiple dimensions of motion in physical metabolic settings.
- *Application:* use various measurements to determine athletic status.
- *Communication:* relate standards for physical fitness to athletic activity measurements and muscular motion.

Procedures

1. ***In order to know and apply concepts that explain how living things function, adapt and change (12A); concepts that describe force and motion and the principles that explain them (12D); the concepts, principles and processes of technological design (11B); the accepted practices of science (13A); and concepts that describe the interaction between science, technology and society (13B),*** students should experience sufficient learning opportunities to develop the following:

- Identify historic models which have been used to test human motion and metabolic activities.
- Research the engineering solutions for improving the testing of human motion and metabolism.
- Determine success criteria and testing logistics for measuring the Government Standards for Physical Fitness.
- Design a testing process which can measure and evaluate athletic ability according to the Government Standards for Physical Fitness, using older and newer testing equipment.
- Apply appropriate principles of safety for participants.
- Conduct multiple trials according to success criteria and established variables and controls.
- Analyze data to compare data from older and newer testing equipment for precision.
- Identify how previous, current and future technologies have been used to test and measure athletic fitness.
- Associate the scientific and technological concepts that are considered in athletic fitness testing, measurements and analysis.
- Communicate findings from testing process with graphic displays.
- Relate progression of engineering designs and technologies to test for physical fitness.
- Generate alternative ideas for testing athletic fitness according to the Government Standards for Physical Fitness.

Note to teacher: This activity relates to knowledge associated with Standards 12D and 12A addressing Performance Descriptors for Stage I within Standard 11B. Applying scientific habits of mind in Standard 13A are foundational. Applying the societal implications of this scientific research addresses Performance Descriptors in 13B. Students should have a basic understanding of the musculoskeletal system and government standards for physical fitness. Health Occupations students will be expected to evaluate the effectiveness of policies already in place when they enter into the workforce. They need to be prepared by assessing and creating their own assessments of the health of different body systems.

2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Begin this scientific investigation by reviewing the Government Standards for Physical Fitness. Ask students to brainstorm ways to measure, test and evaluate degrees of physical fitness according to these standards. Consider changes that have occurred in these standards, how they are measured currently and previously, as well as the impact of these standards in current athletic training. Students will create a design for testing a selected fitness standard using older and newer instruments, if possible. Students will sketch a schematic for the test and its instrumentation. Students will create a data table to record the results from their testing (using both instruments) to compare precision, ease of use, etc. They could measure distances according to range of motion, vertical or horizontal jumps, pulse, blood pressure, respiration, body temperature and other measurements important to athletic performance and health. They could compare recovery from aerobic and anaerobic activities. Students will report their process and data and present conclusions about the comparisons between the technologies used or improvements on the standards for physical fitness.

4. Evaluate each student's work using the Science Rubric as follows, and add the scores to determine the performance level:
- *Knowledge*: The explanations relating physical movement and metabolic functions are accurate and complete.
 - *Application*: The designs for collection, display and analysis of physical fitness measurements are correct and thorough.
 - *Communication*: The athletic measurements, muscular motion and comparison of fitness standards are related effectively and accurately.

Examples of Student Work

- [Meets](#)
- [Exceeds](#)

Time Requirements

- Two-to-three class periods to prepare for athletic testing (possibly with Physical Education class)
- One-to-two class periods for testing
- One-to-two class periods for analysis and presentations

Resources

- Athletic Fitness and Health Measurement student worksheet
- Older and newer equipment for testing pulse, blood pressure, respiration, etc.
- Government Standards for Physical Fitness
- Science rubric

ATHLETIC FITNESS AND HEALTH MEASUREMENTS

Student Worksheet

Review the *Government Standards for Physical Fitness*. Figure out a way to test for one of the standards using older and newer equipment. Compare the precision, ease of use and preference for the use of the equipment. Compare changes in the standards for physical fitness.

1. How can you test which standard with what equipment???
2. Create a schematic (series of drawings) of the test (what are the steps??) that you will use to assess the athletic fitness.
3. Create a data table to record results (what are the variables??) of all the subjects (who will you test??) tested with each device assessment (what will you use??---the old equipment and the new equipment).
4. Analyze your data (about the fitness and about the equipment and about the process) and report your findings (how can you display your findings?)
5. What would you do differently? How could you improve the testing or your data collecting?

SCIENCE RUBRIC

Exceeds - must receive no more than one 3 and the rest 4s in the other areas of the rubric.

Meets - may receive no more than one 2 and a combination of 3s and 4s in the other areas of the rubric.

Approaches - may receive no more than one 1 and a combination of 2s, 3s or 4s, in the other areas of the rubric.

Begins - must receive at least a 1 in all 3 areas of the rubric.

	KNOWLEDGE	APPLICATION	COMMUNICATION
	Knows and understands scientific terms, facts, concepts, principles, theories and methods.	Applies scientific knowledge, skills and methods to manipulate, analyze, synthesize, create and evaluate.	Communicates scientific knowledge and applications through writing, speech and visual displays.
4	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are complete and correct. 	<ul style="list-style-type: none"> • Applications are thorough, appropriate and accurate. 	<ul style="list-style-type: none"> • Written, oral and/or visual communication is well organized and effective.
3	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are mostly complete and correct. 	<ul style="list-style-type: none"> • Applications are mostly thorough, appropriate and accurate. 	<ul style="list-style-type: none"> • Most of the written, oral and/or visual communication is well organized and effective.
2	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are somewhat complete and correct. 	<ul style="list-style-type: none"> • Applications are somewhat appropriate and accurate. 	<ul style="list-style-type: none"> • Some of the written, oral and/or visual communication is organized and effective.
1	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are minimally present or correct. 	<ul style="list-style-type: none"> • Applications are minimally appropriate and accurate. 	<ul style="list-style-type: none"> • Little of the written, oral and/or visual communication is organized and effective.
0	<ul style="list-style-type: none"> • All descriptions of scientific terms, facts, concepts, principles, theories and methods are missing and/or incorrect. 	<ul style="list-style-type: none"> • All applications are missing and/or incorrect. 	<ul style="list-style-type: none"> • All of the written, oral or visual communication is missing and/or lacks organization.
Score			