

<p>VA SOL Standard: FI.1 The student will demonstrate mastery of movement skills and patterns used to perform a variety of strength training, physical conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Distinguish key elements of correct movement skills and patterns for strength-training, physical conditioning, and fitness activities ○ Critique peer observation skills of basic and advance strength training, physical conditioning and functional fitness. ○ Analyze the critical components of ergonomically safe movement patterns for strength training, physical conditioning and functional fitness. 			
<u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?	<u>Suggested</u> Assessments	Terms (Vocabulary) and Content Information	<u>Suggested</u> Activities
<p>FI.1.a Demonstrate correct movement skills and patterns for strength-training, physical conditioning, and fitness activities.</p> <p>I can demonstrate correct movement skills and patterns through participation in basic and advanced strength training activities.</p> <p>I can demonstrate correct movement skills and patterns through participation in basic and advanced physical conditioning activities.</p> <p>I can demonstrate correct movement skills and patterns through participation in basic and advanced fitness activities.</p> <p>FI.1.b Analyze movement activities for component skills and movement patterns.</p> <p>I can analyze the component skills and movement patterns of basic and advanced strength training, personal conditioning, and fitness activities.</p>	<p>Assessment for Learning Self and peer observation Teacher observation with feedback Written: identify motor cues, movement patterns (exit tickets, short answer, reflection activities)</p> <p>Assessment of Learning Self and peer observation with written feedback Create a google slide analysis of component skills and movement patterns of basic and advanced strength training, physical conditioning, and fitness activities.</p>	<p>Component skills and movement patterns may include:</p> <ul style="list-style-type: none"> • Squat • Lunge • Push • Pull • Bend • Twist <p>Terminology specific to selected basic and advanced strength training, personal conditioning, and fitness activities</p>	<p>Strength training activity skills may include:</p> <ul style="list-style-type: none"> - Free weight activities - Olympic lifts - Dumbbell / kettlebell activities - Manual resistance activities - Resistance band activities - Resistance machines <p>Specific physical conditioning and fitness activities referenced may include:</p> <ul style="list-style-type: none"> - Speed and agility activities - Endurance activities - Flexibility activities - Plyometric activities <p>Video feedback on basic and advanced skills in strength training, personal conditioning, and fitness activities</p> <p>Analysis of basic and advanced skills in strength training, personal conditioning, and fitness activities for component skills and movement patterns applicable to skill performance</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; http://www.exrx.net/Lists/Directory.html https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

<p>VA SOL Standard: FI.1 The student will demonstrate mastery of movement skills and patterns used to perform a variety of strength training, physical conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS Use basic training techniques to optimize motor-related fitness components.</p>			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.1.c Describe and demonstrate activities specific to improving the skill-related components of fitness.</p> <p>I can describe and plan for improvement in each of the six skill-related fitness components.</p> <p>I can demonstrate proficiency in activities that help improve agility, balance, coordination, power, reaction time, and speed.</p>	<p>Assessment for Learning Self and peer observation Teacher observation with feedback Written: identification of activities that improve skill-related components (exit tickets, short answer reflection activities)</p> <p>Assessment of Learning Create a written plan of activities to improve at least three specific skill-related components of fitness</p>	<p>Review previous year's vocabulary, as appropriate.</p>	<p>Participation in a variety of activities that contribute to the improvement of the health-and skill-related components of fitness</p> <p>Planning for improvement of at least three skill-related components of fitness</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

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<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.1.d Define and identify <i>activities of daily living</i> (ADL) as the tasks of everyday life.</p> <p>I can define activities of daily living (ADL) as the tasks of everyday life.</p> <p>I can identify movement skills and patterns involved in ADL.</p> <p>FI.1.e Apply movement skills and patterns to functional fitness activities that support ADL.</p> <p>I can apply movement skills and patterns used in ADL in to fitness activities to improve or maintain functioning in ADL.</p>	<p>Assessment for Learning Written: defining ADL; identification of activities involving ADL; reflection activities on the improvement / maintenance of movement skills and patterns involved in ADL</p> <p>Assessment of Learning Written: application of movement skills and patterns in to a prescription of fitness activities for an individual</p>	<p>Activities of Daily Living (ADL): basic tasks of everyday life, such as eating, bathing, dressing, transferring</p> <p>Movement skills and patterns used in ADL include:</p> <ul style="list-style-type: none"> • Bending/raising and lifting/lowering movements (e.g. squatting) • Single-leg movements • Pushing movements in vertical/horizontal planes and resultant movement • Pulling movements in vertical/horizontal planes and resultant movement • Rotational movements 	<p>Participation in activities which incorporate movement skills and patterns used in ADL, to include:</p> <ul style="list-style-type: none"> • Bending/raising and lifting/lowering movements (e.g. squatting) • Single-leg movements • Pushing movements in vertical/horizontal planes and resultant movement • Pulling movements in vertical/horizontal planes and resultant movement • Rotational movements
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; http://www.acefitness.org/acefit/healthy-living-article/60/1452/what-is-functional-strength-training/ https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

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ESSENTIAL UNDERSTANDINGS <ul style="list-style-type: none"> ○ Design a resistance-training program focused on the four unique properties of muscle tissue: excitability, contractibility, extensibility, and elasticity. ○ Design a resistance-training program focused on the three major types of muscular contractions (isometric, isotonic, and isokinetic) and the two types of isotonic contractions (concentric and eccentric) and their use in training. 			
<u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?	<u>Suggested</u> Assessments	Terms (Vocabulary) and Content Information	<u>Suggested</u> Activities
FI.1.f Identify and describe advanced resistance-training techniques. I can identify advanced training techniques, including Olympic lifts, plyometric exercises, pyramid training, and super sets. I can describe techniques used to complete the snatch and the clean and jerk. I can describe techniques used to perform multiple plyometric exercises to increase power. I can describe pyramid training methods used to increase muscle mass. I can describe multiple methods for completing a super set.	Assessment for Learning Identification of Olympic lifts, plyometric activities, and super set activities Assessment of Learning Create a pamphlet describing how to use advanced training techniques when creating a strength-training program for another individual	Olympic lifts: two exercises, the snatch and the clean and jerk, performed in the modern Olympic program Plyometric exercises: a system of exercise in which the muscles are repeatedly stretched then suddenly contracted; explosive exercise used to develop muscular power Pyramid training: training methodology in which high repetition, lower weight sets are paired with high weight, lower repetition sets Super sets: performing multiple exercises with little to no rest between	Olympic lifts: <ul style="list-style-type: none"> • Snatch • Clean and jerk Plyometric exercises: <ul style="list-style-type: none"> • Chops • Push-ups • Throws • Twists • Jumps (depth jumps, multiple jumps, lateral jumps) Pyramid training: <ul style="list-style-type: none"> • Ascending– weight is increased and repetitions decrease each set • Descending– weight is decreased and repetitions increase each set • Triangle– weight increases as reps decrease, then weight decreases as reps increase each set Super sets: <ul style="list-style-type: none"> • Compound sets– two+ exercises for same muscle group performed in succession • Isolation sets– exercises for two different muscle groups combined in superset
Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml ; http://www.exrx.net/Lists/PowerExercises.html ; http://www.exrx.net/Lists/OlympicWeightlifting.html ;			

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<p>FI.1.g Apply principles of exercise progression to improve fitness.</p> <p>I can apply the principle of progression to continually increase physical demand and achieve a safe and optimal level of overload.</p> <p>I can include appropriate rest and recovery to best improve levels of fitness.</p> <p>I can vary workout / exercise types to help enhance recovery.</p>	<p>Assessment for Learning Define principle of progression; identify recovery types and desired recovery times</p> <p>Assessment of Learning Create an infographic for a fitness plan for a teen, young adult and older individual, incorporating appropriate rest and recovery times to meet optimal fitness gains</p>	<p>Active Recovery: low intensity activities completed during recovery periods to speed up recovery process</p> <p>Passive Recovery: completely resting during scheduled recovery periods</p> <p>Principle of Progression: to effectively improve fitness, an individual must apply an optimal level of overload within a certain time period</p> <p>Ten Percent Rule: To meet optimal levels of overload, it is recommended to increase frequency, intensity, or duration by no more than 10% per week</p>	<p>Participation in a variety of fitness activities, utilizing appropriate rest and recovery times</p> <p>Development of a fitness plan, incorporating appropriate rest and recovery times</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

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ESSENTIAL UNDERSTANDINGS

- Skill in selection, proper application, and modification/amplification of resistance training exercises within abilities and goals.
- Recognize pertinent abilities or physical limitations, and selecting and using appropriate training methods, equipment, and procedures.
- Monitor and recognize proper and improper exercise technique and apply biomechanical principles to provide corrective measures necessary for proper exercise execution.
- Ability to inspect and maintain fitness equipment and physical activity surroundings to ensure safety.

<p style="text-align: center;"><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p style="text-align: center;"><u>Suggested</u> Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;"><u>Suggested</u> Activities</p>
<p>FI.1.h Demonstrate correct and safe techniques and form when performing strength-training, physical conditioning, and fitness activities and exercises.</p> <p>I can demonstrate safe and proper form when exercising.</p> <p>FI.1.i Demonstrate proper use of fitness equipment, selectorized weight machines, and free weights.</p> <p>FI.1.j Demonstrate safety protocols and procedures for strength-training, physical conditioning, and fitness activities.</p> <p>I can demonstrate appropriate use of exercise equipment.</p> <p>I can demonstrate selection of appropriate weight and activities to meet individual goals and abilities.</p> <p>I can demonstrate safety procedures through the use of a spotter.</p>	<p>Assessment for Learning Self and peer observation Teacher observation with feedback</p> <p>Assessment of Learning Create a google slide presentation about correct and safe techniques and form when performing strength-training, physical conditioning, and fitness activities and exercises and the proper use of fitness equipment, selectorized weight machines, and free weights</p>	<p>Review previous year's content and vocabulary as appropriate</p>	<p>Safe participation in a variety of strength training, physical conditioning, and fitness activities.</p> <p>Strength training activity skills may include:</p> <ul style="list-style-type: none"> - Free weight activities - Olympic lifts - Dumbbell / kettlebell activities - Manual resistance activities - Resistance band activities - Resistance machines <p>Specific physical conditioning and fitness activities referenced may include:</p> <ul style="list-style-type: none"> - Speed and agility activities - Endurance activities - Flexibility activities - Plyometric activities

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/phyped/index.shtml>; <http://www.exrx.net/Exercise.html>; http://www.teachpe.com/strengthening/free_weights.php

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<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.1.k Identify contraindications to advanced resistance-training techniques.</p> <p>I can identify conditions that can make advanced resistance training techniques improper and/or undesirable.</p>	<p>Assessment for Learning Self-assessment of physical abilities to identify any contraindications to advanced resistance training Written: identification of common contraindications to resistance training and advanced techniques</p> <p>Assessment of Learning Assessment of another individual to identify any contraindications to resistance training and/or advanced resistance training techniques</p>	<p>Contraindication: any condition that renders some particular movement, activity, or treatment improper or undesirable</p> <p>Contraindications for participation in resistance training include:</p> <ul style="list-style-type: none"> • Pain • Inflammation • Severe cardiac diseases • Cardiac symptoms such as chest pain (angina) or arrhythmias • Hypertension > 160/105 <p>Contraindications for participation in advanced resistance training techniques include:</p> <ul style="list-style-type: none"> • Inability to perform basic resistance-training techniques • Lack of muscular strength (Squat 1RM of less than 1.5 times body weight; Bench press 1RM of less than 1-1.5 times body weight) • Low levels of skill-related fitness 	<p>Discussion about conditions that make resistance training techniques undesirable</p> <p>Assessment of another individual to determine contraindications to participation in resistance-training activities</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; http://www.exrx.net/Exercise.html https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

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<p style="text-align: center;"><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p style="text-align: center;"><u>Suggested</u> Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;"><u>Suggested</u> Activities</p>
<p>FI.1.1 Identify and describe factors that influence participation in physical activity and adherence to an exercise program.</p> <p>I can identify factors that influence participation and adherence to an exercise program.</p> <p>I can describe that personal attributes, environmental factors, physical-activity factors, motivation, and feedback all influence participation in physical activity as well as adherence to an exercise program.</p> <p>I can assess an individual's likelihood of adhering to an exercise program.</p> <p>FI.1.n Describe psychological factors that may influence a person's adherence to an exercise program.</p> <p>I can describe the psychological factors associated with maintaining participation in an exercise program, including self-motivation and self-efficacy.</p>	<p>Assessment for Learning Written identification of factors that influence participation in and adherence to an exercise program; self-assessment to determine personal likelihood of adherence to an exercise program</p> <p>Assessment of Learning Assessment of another individual to determine likelihood of adherence to an exercise program Create poster of life skills for making good decisions and solving problems and barriers for participation and adherence to an exercise program</p>	<p>Personal Attributes:</p> <ul style="list-style-type: none"> • Activity history- past program participation is the most reliable predictor of current participation • Demographic variables– adherence is related to education, income, age, and gender; lower activity levels are seen in individuals with older age, lower education, and lower income; men demonstrate more adherence to exercise programs than women • Health perception– an individual's perception of their own health is a factor in exercise adherence as individuals that perceive themselves to be healthier tend to demonstrate more adherence • Health status– individuals with chronic illness are less likely to adhere to an exercise program • Knowledge, attitudes, beliefs– the more knowledge an individual has, the more likely they will adhere to an exercise program; individuals with an internal locus of control, or belief that internal or personal factors control events or outcomes, are more likely to adhere to an exercise program <p>Environmental Factors:</p> <ul style="list-style-type: none"> • Access to facilities– an individual is more likely to adhere to an exercise program if the facility is conveniently located near a person's home or work • Time– individuals that have the perception that there is not enough time to participate in physical activity is less likely to adhere to an exercise program 	<p>Instruction relating to the psychological components of behavior change and adherence to exercise programs</p> <p>Creation of adherence strategies to use as a fitness instructor</p>

- Social support– individuals with support from family and friends are more likely to adhere to an exercise program

Physical-Activity Factors:

- Intensity– individuals participating in vigorous intensity exercises are much more likely to drop out of the physical activity program; individuals participating in moderate intensity programs are more likely to adhere to the exercise program
- Injury– individuals that experience injury are less likely to adhere to an exercise program

Feedback:

- Intrinsic– information individuals provide to themselves based on their own sensory systems; adherence to an exercise program is dependent on intrinsic feedback
- Extrinsic– feedback provided from outside sources, including coaches or other fitness professionals; early in an exercise program, extrinsic feedback is key to program adherence

Psychological Factors:

- Motivation– an individual's motivation correlates with their adherence to an exercise program
- Self-motivation– reflective of one's ability to set goals, monitor progress, and self-reinforce, shows a positive relationship with adherence to an exercise program
- Self-efficacy- an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments; individuals with high levels of self-efficacy are more likely to adhere to an exercise program

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>;
<https://www.acefitness.org/blog/3808/motivation-behavior-change-and-program-adherence>; <http://exrx.net/Psychology/AdherenceTips.html>
<https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2>

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<p><u>Required</u> <u>VDOE Standard(s)</u> <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> <u>Assessments</u></p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> <u>Activities</u></p>
<p>FI.1.m Explain principles that result in behavior change.</p> <p>I can explain the Transtheoretical Model of behavior change.</p> <p>I can explain principles that result in behavior change, including operant conditioning, shaping, observational learning, and cognitions and behavior.</p> <p>FI.1.o Identify and apply strategies to increase adherence in an exercise program.</p> <p>I can identify strategies to increase exercise adherence, including stimulus control, written agreements and behavioral contracting, individualized goals, self-monitoring, feedback, and decision making.</p> <p>I can apply strategies to increase exercise adherence for self and others.</p> <p>FI.1.p Explain the role of the personal trainer in promoting an individual's adherence to an exercise program.</p> <p>I can explain the role of the personal trainer in exercise adherence, including program design; effective communication and role</p>	<p>Assessment for Learning Explain the Transtheoretical Model of behavior change and principles that result in behavior change, including operant conditioning, shaping, observational learning, and cognitions and behavior</p> <p>Assessment of Learning Create a Podcast about the Transtheoretical Model of behavior change</p>	<p><u>Transtheoretical Model of Behavior Change:</u> Stages of Change:</p> <ul style="list-style-type: none"> • Precontemplation – unaware that a behavior change is needed • Contemplation – considering a behavior change • Preparation – starting behavior change; inconsistent patterns of change • Action – consistent behavior change; <6 months after starting change • Maintenance – regular change in behavior; change becomes part of lifestyle; >6 months after starting change <p>Processes of Change: providing a process to move from one stage to the next; interventions necessary (see ACE TTM resource)</p> <p>Self-Efficacy: development of the belief that an individual can master the behavior change</p> <p>Decisional Balance: development of an understanding that the behavior change will benefit the individual</p> <p>Operant Conditioning: process by which behaviors are influenced by their consequences (positive and negative)</p> <p>Shaping: process of using reinforcements to gradually achieve a target behavior</p> <p>Observational Learning: learning which occurs through observing the behaviors of others</p> <p>Cognitions and Behavior: The influence a person's beliefs have on their behaviors</p>	<p>Instruction relating to the psychological components of behavior change and adherence to exercise programs</p> <p>Creation of adherence strategies to use as a fitness instructor</p>

<p>clarity; goal setting; and developing contracts or agreements.</p>		<p><u>Adherence Strategies</u></p> <p>Stimulus Control: making adjustments to the environment to increase the likelihood of engagement in a behavior (e.g. changing schedule to include workout times, laying out exercise clothes before bed, choosing a fitness location between home and school/work)</p> <p>Written Agreements and Behavior Contracting: specific written agreements which outline roles and behaviors of all involved in the behavior change</p> <p>Individualized Goal Setting: goals must be effectively written and tailored to the individual to elicit changes in behavior (e.g. SMART goal)</p>	
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.acefitness.org/blog/3808/motivation-behavior-change-and-program-adherence; http://exrx.net/Psychology/AdherenceTips.html; https://www.nfpt.com/the-role-of-a-personal-trainer</p>			

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ESSENTIAL UNDERSTANDINGS			
○ Modified, amplified, or alternative exercises to accommodate different levels of fitness, abilities, and/or to prevent exacerbation of chronic/acute conditions.			
<u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?	<u>Suggested</u> Assessments	Terms (Vocabulary) and Content Information	<u>Suggested</u> Activities
<p>FI.1.q Identify and explain considerations for special populations.</p> <p>I can identify considerations for individuals with specific conditions.</p> <p>I can explain and apply considerations for individuals with specific conditions, such as cardiovascular disorders, hypertension, stroke, peripheral vascular disease, dyslipidemia, cancer, fibromyalgia, low-back pain, aging adults, pre- and post-natal, diabetes, metabolic syndrome, asthma, osteoporosis, arthritis, chronic fatigue syndrome, weight management, and youth.</p>	<p>Assessment for Learning Identification of conditions which require special considerations when planning for physical activity; identification of special considerations and modifications to use when working with special populations</p> <p>Assessment of Learning Design an exercise program for an individual requiring special considerations in order to participate in physical activity</p>	<p>Exercise Considerations:</p> <ul style="list-style-type: none"> • Cardiovascular disease– all individuals with coronary artery disease (CAD) should have a physician-supervised maximal graded exercise test to determine functional capacity to establish safe exercise levels; heart rates should not exceed training targets, Rating of Perceived Exertion (RPE) should not exceed 11-14 on the Borg scale (6-20 scale). • Hypertension– participation in 30 minutes of regular exercise five times per week; aerobic activities supplemented with low-intensity resistance-training; avoid isometric training and teach proper technique and breathing; monitor blood pressure during and after bouts of exercise • Stroke– focus on optimizing activities of daily living (ADL) to regain balance, coordination, and functional independence; light to moderate intensity activities focusing on gait, balance, and coordination such as walking, bicycle ergometer, water, and weight-supported treadmill activities; • Peripheral Vascular Disease (PVD)– complete medical evaluation with a medical professional; walking that is short in duration and includes multiple opportunities for rest; general, non-impact conditioning activities with an RPE of 9-13 on the Borg scale • Dyslipidemia– individuals with dyslipidemia may also have other risk factors for cardiovascular diseases; fitness professionals should follow physician recommendations in the development of an exercise plan; individuals that do not exhibit any other risk factors may follow age-specific guidelines • Cancer– obtain physician clearance before any exercise program; gradual build-up focusing more on duration than intensity; light to moderate intensity; resistance-training activities utilizing low weights for 10-15 repetitions; proper warm-up and cool down; individuals with low white blood cell counts should avoid exercising in public gyms; encourage 	<p>Application of exercise considerations for individuals through the development of an exercise program for an individual with a need for special considerations (e.g. case study with fitness program development)</p>

proper nutrition and hydration; monitor for swollen ankles, unexplained weight gain, and/or shortness of breath at rest or with limited exertion; people should not exercise within two hours of chemotherapy or radiation.

- Fibromyalgia– discuss exercise goals and obtain medical clearance from physician prior to starting an exercise program; low-impact, low intensity activities (9-13 RPE on Borg scale) with intensity levels lowered during periods of flare-up; warm-water exercise is especially beneficial;
- Low-back pain– specific low-back exercises supplemented with aerobic activity for cardiorespiratory health; ensure proper form and alignment; focus on good posture
- Older adults– decrease in maximum heart rate, muscle mass, basal metabolic rate, balance, and coordination are common in older adults; older adults should consult a physician prior to starting an exercise program; older adults without other underlying factors can follow [age-specific guidelines](#)
- Pre and postnatal– pregnant women with preeclampsia, vaginal bleeding, premature rupture of membranes, or risk factors for pre-term labor should not exercise; use light to moderate intensity; avoid activities that require extensive running, hopping, skipping, jumping, or bouncing, deep knee bends, full sit-ups, double-leg raises, and contact sports; women should obtain medical clearance to begin exercise postpartum, and should begin slowly and work to increase duration
- Diabetes– monitor blood glucose levels and avoid exercise if fasting glucose levels are ≥ 250 mg/dL and ketosis is present or if blood glucose levels are > 300 mg/dL and no ketosis is present; avoid injecting insulin into the primary muscle groups that will be used during exercise; avoid exercise during peak insulin activity; exercise at the same time daily to establish a consistent routine; ensure that individuals with diabetes exercise with a partner and wear a medical ID; focus on hydration
- Metabolic syndrome– medical clearance prior to starting a program; exercise program should be designed around guidelines for treatment of overweight and obese individuals; aerobic modes of activity including walking, elliptical training/ergometers, stationary cycling, and other non-weightbearing activities such as aquatic exercise are recommended
- Asthma– medical clearance; ensure rescue medication at all times; avoid asthma triggers prior to exercise; gradual and prolonged warm-up and cool down; gradually increase intensity
- Osteoporosis– weightbearing and resistance activities with intensities that stimulate bone adaptation; avoid spinal

- flexion, jumping, high-impact aerobics, abducting or adducting legs against resistance
- Arthritis– focus on duration rather than intensity, ensure proper body alignment and exercise technique, put all joints through full range of motion (ROM) at least once daily; avoid exercise during periods of inflammation for rheumatoid arthritis patients
- Chronic Fatigue Syndrome– use a 1:3 exercise to rest ratio; limit deconditioned individuals to ADL; develop low-intensity activities
- Weight Management– low to moderate levels of intensity; dose-response relationship states the more exercise done the greater the response; recommended at least 150-200 minutes of physical activity/week
- Youth– obtain medical clearance and parental consent; proper supervision; ensure facility is safe for children prior to use; avoid single maximal lifts or sudden explosive movements; avoid competition with children; teach children how to breathe properly; allow for appropriate rest (at least two minutes between each exercise); encourage nutrition, hydration, and proper communication

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>; [Cardiovascular Disease Guidelines](#); [Stroke Guidelines](#); [Exercise for Fibromyalgia](#); [Guidelines for Cancer Survivors](#); [Guidelines for Pregnancy](#);

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Biomechanical movement strategies for the three planes of movement (sagittal, transverse, frontal). 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.2.a Identify the planes of movement and types of movement that occur in the frontal, sagittal, and transverse planes.</p> <p>I can identify the planes of movement, including the frontal plane, sagittal plane, and transverse plane.</p> <p>I can identify movements that occur in each plane of movement.</p>	<p>Assessment for Learning Written identification / definition of the planes of movement (class work, exit tickets)</p> <p>Assessment of Learning Analysis of movement forms to determine plane(s) of movement being executed</p>	<p>Frontal Plane– a vertical plane that divides the body in to anterior and posterior (front and back) sections. Movements that occur in the frontal plane include adduction, abduction, elevation, depression, inversion, and eversion.</p> <p>Sagittal Plane– a vertical plane that divides the body in to left and right sections. Movements that occur in the sagittal plane include flexion, extension, dorsiflexion and plantar flexion.</p> <p>Transverse Plane– a horizontal plane which divides the body in to superior and inferior (top and bottom) sections. Movements that occur in the transverse plane include rotation (internal and external), pronation, supination, horizontal flexion, and horizontal extension.</p>	<p>Analysis of multiple movement forms, to include basic and advanced skills and patterns in resistance training, physical conditioning, and fitness activities, to determine the plane(s) of movement for each</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.acefitness.org/blog/2863/explaining-the-planes-of-motion https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.

ESSENTIAL UNDERSTANDINGS

- Use proper terminology for all exercise prescriptions.

<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.2.b Define common anatomical terms.</p> <p>I can identify common anatomical terms of movement, such as abduction / adduction, circumduction, extension / flexion, external rotation / internal rotation, hyperextension, and supination / pronation.</p> <p>I can identify common anatomical terms of body position such as inferior / superior, proximal / distal, and medial / lateral.</p>	<p>Assessment for Learning Definitions thorough class work, exit tickets, reflection assignments</p> <p>Assessment of Learning Cognitive post-assessment Create an word cloud using definitions in exercise prescription and anatomical movements</p>	<p>Abduction– movements away from the midline of the body</p> <p>Adduction– movements toward the midline of the body</p> <p>Circumduction– a combination of flexion, extension, abduction, and adduction; circular movement; performed at shoulder, hip, wrist, and ankle (e.g. tennis overhead serve)</p> <p>Distal– distant from the main mass of the body (e.g. the hands are at the distal end of the arms)</p> <p>Dorsiflexion– flexion of the ankle joint in an upward direction</p> <p>Extension– movement which increases the angle between the bones of a joint</p> <p>External Rotation– rotation away from the center of the body</p> <p>Flexion– movement which decrease the angle between the bones of a joint</p> <p>Hyperextension– extension which increases the angle between bones of a joint to a point which is greater than normal</p> <p>Inferior– low, or lower in body position</p>	<p>Use of proper terminology through participation in basic and advanced skills and patterns in resistance training, personal conditioning, and fitness activities</p> <p>Use of proper terminology in course work, including exercise prescriptions</p>

		<p>Internal Rotation– rotation towards the center of the body</p> <p>Lateral– furthest away from the midline of the body (e.g. the lateral collateral ligament of the knee is on the outside of the knee)</p> <p>Medial– closest to the midline of the body (e.g. the medial collateral ligaments of the knee is on the inside of the knee)</p> <p>Plantar flexion– flexion of the ankle joint in a downward direction</p> <p>Pronation– internal rotation of the forearm or foot; pronation of the forearm/wrist will result in the thumb being medial; pronation of the foot will result in weight being borne on the medial part of the foot</p> <p>Proximal– closest to the main mass of the body (e.g. the shoulder joint is at the proximal end of the arms)</p> <p>Rotation– movement around a central axis</p> <p>Superior– high, or higher in body position</p> <p>Supination– external rotation of the forearm or foot; supination of the forearm/wrist will result in the thumb being lateral (carrying a cup of soup); supination of the foot will result in weight being borne on the lateral part of the foot.</p>	
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Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>; <https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2>

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> Design exercise prescriptions using structural components of the musculoskeletal system (bone, skeletal muscle, and connective tissues) and muscles that comprise major muscle groups. Appraise joint movement: flexion, extension, hyperextension, adduction, abduction, rotation, circumduction, supination, pronation, inversion, eversion, elevation, depression, dorsi flexion, and plantar flexion. 			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.2.c Identify major bones of the skeletal system.</p> <p>FI.2.d Identify and describe types of joints, including hinge and multiaxial (ball and socket).</p> <p>I can identify major bones being used in a variety of physical activities.</p> <p>I can identify joints being used in a variety of physical activities.</p> <p>I can describe the movements associated with hinge and multiaxial joints.</p>	<p>Assessment for Learning Written identification of major bones and joints/joint types</p> <p>Description of joints and their associated movements</p> <p>Assessment of Learning Create Google Slides for the major bones and joints/joint types and describe associated movements</p>	<p><u>Major bones of skeletal system:</u></p> <p>Skull – cranium, mandible, maxilla Shoulder girdle – clavicle, scapula Arm – humerus, radius, ulna Hand – carpals, metacarpals, phalanges Chest – sternum, ribs Spine – cervical vertebrae (7), thoracic vertebrae (12), lumbar vertebrae (5), sacrum (5 vertebrae fused together), coccyx Pelvis – ilium, ischium, pubis Leg – femur, tibia, fibula, patella Ankle – talus, calcaneus Foot – tarsals, metatarsals, phalanges</p> <p><u>Joint types:</u></p> <p>Hinge – joint in which movement is restricted to only one plane; allows for flexion/extension movements; e.g. elbow, knee</p> <p>Multiaxial (ball and socket) – joint in which a spherical head lies in a socket, allowing for multidirectional movement; allows for flexion/extension, abduction/adduction, and rotation movements; e.g. shoulder, hip</p>	<p>Identification of bones and joints being used in movement skills and patterns of basic and advanced resistance training, personal conditioning, and fitness activities.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml; http://www.teachpe.com/anatomy/skeleton.php; http://www.teachpe.com/anatomy/joints.php https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.

ESSENTIAL UNDERSTANDINGS

- Classify three types (skeletal, smooth, cardiac) of muscle tissue in the body.
- Roles muscles can assume (agonist, antagonist, stabilizer, and neutralizer).
- Three major types of muscular contractions (isometric, isotonic, and isokinetic) and the two types of isotonic contractions (concentric and eccentric) and their use in training.

<p style="text-align: center;">Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p style="text-align: center;">Suggested Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;">Suggested Activities</p>
<p>FI.2.e Explain muscle structure and function, to include major muscles of the body, terms related to muscles, and muscle origins and insertions.</p> <p>I can identify parts of the muscle and explain how those muscle anatomy functions in the musculoskeletal system.</p> <p>I can explain the points of origin and insertion for major muscles of the body.</p> <p>I can explain muscular terms, such as atrophy, hypertrophy, and hyperplasia.</p> <p>FI.2.f Explain movements that result based on muscle origin and insertion.</p> <p>I can explain that points of origin tend to be stationary and that points of insertion tend to be moved by muscle contraction– e.g., the point of origin of the biceps brachii is the scapula, which stays stationary while the biceps contracts, while the point of insertion is the radius which is moved to reduce the angle of the elbow when the biceps contracts.</p>	<p>Assessment for Learning Identification of major muscles, muscle origins and insertions Identification of muscle anatomy Definition of muscular terms Identification of muscle contractions</p> <p>Assessment of Learning Create pamphlet with explanation and depiction of the sliding filament theory of muscle contraction and agonist, and antagonist muscles and muscle origins, and insertions during movements</p>	<p>See Personal Fitness I/II for major muscle identification</p> <p><u>Terms related to muscles:</u> Agonist Muscle– muscle causing body to move (e.g. biceps brachii in a biceps curl movement)</p> <p>Antagonist Muscle– muscle lengthening causing body to move (e.g. triceps brachii in a biceps curl movement)</p> <p>Atrophy– decrease in muscle mass</p> <p>Concentric Contraction- contraction in which force causes muscle to shorten and change angle of a joint</p> <p>Eccentric Contraction– muscle elongates while under tension due to an opposing force greater than the muscle generates</p> <p>Hypertrophy– increase in muscle mass</p> <p>Hyperplasia– increase the number of muscle cells present in tissue</p> <p>Insertion– distal attachment point of a muscle; tends to be the more mobile structure of which the muscle is attached</p>	<p>Instruction on muscle identification, muscle anatomy, and muscle physiology</p>

<p>Fl.2.g Explain how muscles contract, to include agonist and antagonist movements in relation to muscle contraction.</p> <p>I can explain concentric, eccentric, and isometric muscle contractions.</p> <p>I can explain that muscles work in pairs called agonists and antagonists to create movement, e.g. the biceps brachii is the agonist muscle, shortening to cause movement, in elbow flexion while the triceps brachii is the antagonist, elongating due to the force of the agonist.</p> <p>I can explain the process by which muscles contract by defining the sliding filament theory.</p>		<p>Isometric Contraction- muscular force precisely matches the load, and no movement results</p> <p>Origin– proximal attachment point of a muscle; tends to be the more stationary structure of which the muscle is attached</p> <p><u>Muscle Structure</u></p> <p>Actin– thin protein filament that works with Myosin to cause muscles to contract</p> <p>Epimysium– connective tissue surrounding muscle</p> <p>Fasciculi– bundles of muscle fibers</p> <p>Motor Neuron– a nerve cell that causes the muscles to produce movement</p> <p>Motor Units– one motor neuron and all of the muscle fibers that it innervates</p> <p>Muscle fibers– cylindrical muscle cell that contracts when stimulated</p> <p>Myofibril– contractile unit of a muscle fiber, containing contractile proteins actin and myosin</p> <p>Myosin– Thick protein filament that works with Actin to cause muscle contraction</p> <p>Sarcomere– functional segment of a myofibril which shorten in a concentric muscle contraction</p> <p><u>Sliding Filament Theory</u></p> <p>Method by which muscles contract; Release of energy causes Myosin filaments to pull Actin filaments and the Z line inwards toward the H zone of the sarcomere to cause muscle to contract and generate force</p>	
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; http://www.teachpe.com/anatomy/types_of_muscle_contractions.php; http://www.teachpe.com/anatomy/sliding_filament.php; http://www.teachpe.com/anatomy/structure_skeletal_muscle.php; http://www.teachpe.com/gcse_anatomy/muscles.php; http://www.exrx.net/Lists/Directory.html</p>			

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Common postural deviations and associated bone/skeletal muscle involvements. ○ Common assessments used to measure range of motion and to identify postural abnormalities. 			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.2.h Identify and explain curvatures of the spine.</p> <p>I can identify the natural curvatures of the spine, including the cervical, thoracic, lumbar, sacral, and coccygeal curvatures.</p> <p>I can identify unnatural curvatures, such as curvatures that occur with kyphosis, lordosis, sway back, flat back, and scoliosis.</p> <p>I can explain that unnatural curvatures of the spine may indicate muscular endurance issues in postural muscles or a potential imbalance at the joints.</p> <p>FI.2.i Perform and analyze postural evaluation of another individual.</p> <p>I can perform a postural evaluation, such as the plumb line evaluation, to determine the postural alignment of another individual.</p> <p>I can identify postural deviations and evaluate the probable causes of the deviations.</p>	<p>Assessment for Learning Identification of natural curvatures of spine; identification of unnatural curvatures of spine (kyphosis, lordosis, sway back, flat back, scoliosis); documentation of possible muscle imbalances associated with postural irregularities</p> <p>Assessment of Learning Performance of a postural evaluation / assessment on another individual</p>	<p>Kyphosis – excessive outward curvature of the spine which causes a hunching of the back</p> <p>Lordosis – excessive inward curvature of the spine</p> <p>Scoliosis – abnormal lateral curvature of the spine</p> <p>Muscle Imbalances:</p> <ul style="list-style-type: none"> • Kyphosis / Lordosis: Facilitated/Hypertonic (Shortened) – hip flexors, lumbar extensors, anterior chest/shoulders, latissimus dorsi, neck extensors; Inhibited (lengthened) – hip extensors, external obliques, upper-back extensors, scapular stabilizers, neck flexors • Flat back: Facilitated/Hypertonic (Shortened) – rectus abdominus, upper-back extensors, neck extensors, ankle plantarflexors; Inhibited (lengthened) – iliacus / psoas major, internal oblique, lumbar extensors, neck flexors • Sway back: Facilitated/Hypertonic (Shortened) – hamstrings, upper posterior obliques, lumbar extensors, neck extensors; Inhibited (lengthened) – iliacus / psoas major, rectus femoris, external oblique, upper back extensors, neck flexors <p>Plumb Line Assessment – static assessment in which fitness professional / observer uses a centered line to look at alignment in the frontal, sagittal, and transverse planes to note asymmetries</p> <ul style="list-style-type: none"> • Frontal Plane 	<p>Postural evaluations of another individual</p>

- Anterior view – position plumb line with feet equidistant from line, using inside of heels as a point of reference; an individual with good posture will have the line pass equidistant between the feet and ankles, and will intersect the pubis, umbilicus, sternum, chin, maxilla (face), and forehead.
- Posterior view – position plumb line behind client with the line equidistant from the inside of the heels; an individual with good posture will have the line bisecting the sacrum and overlapping with the spinous processes of the vertebrae.
- Sagittal Plane
 - Position individual between plumb line and wall with individual facing sideways and line immediately anterior to the lateral malleolus (ankle); with good posture, the plumb line will pass through the anterior third of the knee, the greater trochanter of the femur, and the acromioclavicular joint, and will pass slightly anterior to the mastoid process of the temporal bone (in line with, or slightly behind the earlobe).

Postural Deviations

- 1- Ankle pronation / supination and the effect on tibial and femoral rotation
 - Pronation with internal rotation: places additional stresses on knee ligaments; eversion of calcaneus; tightens calf muscles and may limit dorsiflexion
 - Supination with external rotation: tightness of gluteal muscles
- 2- Hip adduction
 - Progressively lengthens and weakens adductor muscles
- 3- Pelvic tilting
 - Anterior pelvic tilt: indicative of tight hip flexors and erector spinae muscles; indicative of a sedentary lifestyle
 - Posterior pelvic tilt: indicative of an over dominant rectus abdominus and tight hamstrings
- 4- Shoulder positioning and the thoracic spine
 - Non-level shoulders: indicative of tight upper trapezius muscles, levator scapulae, rhomboids

		<ul style="list-style-type: none"> - Asymmetry to midline: indicative of tight lateral trunk flexors - Protracted (forward and rounded shoulders): indicates tight serratus anterior, anterior scapulo-humeral muscles, and upper trapezius - Medially rotated humerus: indicates tightness in pectoralis major, latissimus dorsi, and subscapularis - Kyphosis and depressed chest: indicates tightness in shoulder adductors, pectoralis minor, rectus abdominus, and internal obliques <p>5- Head position</p> <ul style="list-style-type: none"> - Forward head position (ear forward of acromioclavicular joint or cheekbone anterior to collarbone in sagittal view): indicates tightness in cervical spine extensors, upper trapezius, and levator scapulae 	
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Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>;
<https://www.acefitness.org/blog/2909/set-it-straight> ; <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4064851/>; <https://www.acefitness.org/blog/3771/posture-and-movement-assessments>; http://www.acefitness.org/groupfitnessresources/pdfs/GFI_Assessments.pdf; <https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2>

VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.

ESSENTIAL UNDERSTANDINGS

- Sophisticated vs. practical screening techniques, and ability to discern in which setting they are most appropriate.
- Impact of acute or chronic skeletal and muscular conditions on exercise testing and design.
- Identify skeletal and muscular factors or conditions that may require input from a qualified healthcare provider prior to exercise testing and design.

<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.2.j Perform and analyze movement evaluation for stability and mobility of the joints of another individual.</p> <p>I can perform movement evaluations such as the bend and lift screen, hurdle step screen, shoulder push stabilization screen, and thoracic spine mobility screen.</p> <p>I can analyze performances of movement evaluations to determine muscular inefficiencies.</p> <p>FI.2.m Identify contraindications to assessments of movement.</p> <p>I can identify contraindications to movement assessment, such as pain, inability to complete the assessment, and low levels of health-related fitness.</p>	<p>Assessment for Learning Identification of movement evaluations that can assess and evaluate stability and mobility; identification of indications of stability and mobility evaluations</p> <p>Assessment of Learning Stability and mobility assessments/evaluations</p>	<p><u>Bend and Lift Screen</u>: individual will bend and lift at the ankle, knee, and hip to pick up two dowels / broomsticks from the floor, measuring symmetrical lower-body extremity mobility and stability and upper-body stability</p> <ul style="list-style-type: none"> - Lack of foot stability indicates tight soleus, lateral gastrocnemius, and peroneals; indicates weak medial gastrocnemius, gracilis, Sartorius, and tibialis group - Inward moving knees indicate tight hip adductors and tensor fascia latae; indicate weak gluteal muscles - Lateral shifting to one side indicates a dominance and muscle imbalance due to potential lack of stability in lower extremity during joint loading - Heels lifting from floor indicates tight plantar flexors - Movement being initiated at knees indicates quadriceps and hip flexor dominance and insufficient activation of gluteal muscles - Being unable to achieve parallel between tibia and torso indicates poor mechanics and a lack of dorsiflexion due to tight plantar flexors - Hamstrings contacting calves indicates muscle weakness and poor mechanics - Excessively arched back indicates tightness in hip flexors, back extensors, and latissimus dorsi; indicates weakness in rectus abdominus, gluteal muscles, and hamstrings - Rounded back indicates tightness in latissimus dorsi, teres major, pectoralis major and minor muscles; indicates weakness in upper back extensors - Downward-facing head indicates increased hip and trunk flexion - Upward-facing head indicates compression and tightness in cervical extensor region 	<p>Movement evaluations, such as the bend and life screen, hurdle step screen, shoulder push stabilization screen, and thoracic spine mobility screen.</p>

Hurdle Step Screen: individual will step and raise one heel to and over a string placed at a height of the middle of the tibia to assess the mobility of one limb and the stability of the contralateral limb, while maintain hip and torso stabilization

- Lack of foot stability indicates tight soleus, lateral gastrocnemius, and peroneals; indicates weak medial gastrocnemius, gracilis, Sartorius, tibialis group, gluteal group; indicates inability to control internal rotation
- Inward moving knees indicate tight hip adductors and tensor fascia latae; indicate weak gluteal muscles
- Hip adduction indicates tight hip adductors and tensor fascia latae; indicates weak gluteal muscles
- Inward rotation of the hip indicates tight internal rotators and weak external rotators
- A lateral torso tilt indicates a lack of core stability
- A lack of ankle dorsiflexion indicates tight ankle plantarflexors and weak ankle dorsiflexors
- A limb deviating from sagittal plane indicates tight raised-leg hip extensors and weak raised-leg hip flexors
- A hiking of the raised hip indicates tight stance-leg hip flexors
- An anterior tilt with forward torso lean indicates tight stance-leg hip flexors and weak rectus abdominus and hip extensors
- A posterior tilt with hunched torso indicates tight rectus abdominus and hip extensors and weak stance-leg hip flexors

Shoulder Push Stabilization Screen: individual will execute several push-ups to full arm extension to examine stabilization of the scapulothoracic joint and core control during closed kinetic chain movements.

- Winging in the scapula indicates an inability of the serratus anterior, trapezius, levator scapula, and rhomboids to stabilize the scapulae against the rib cage
- Collapsing of the low back indicates a lack of core, abdominal, and low-back strength

Thoracic Spine Mobility Screen: individual will sit with a dowel / broomstick across shoulders and will rotate bilaterally to examine the bilateral mobility of the thoracic spine.

- A bilateral discrepancy can indicate biomechanical issues such as a side dominance, differences in paraspinal development, and issues with torso rotation (possibly associated with some hip rotation)

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Measurement devices to analyze flexibility. 			
<p style="text-align: center;">Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p style="text-align: center;">Suggested Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;">Suggested Activities</p>
<p>FI.2.k Perform and analyze flexibility evaluation of another individual.</p> <p>I can perform assessments such as the sit and reach test, Thomas test, passive straight-leg raise, and shoulder mobility assessments to evaluate the flexibility of another individual.</p> <p>I can analyze the results of a flexibility evaluation to determine flexibility needs of an individual.</p>	<p>Assessment for Learning Identification of flexibility evaluations; identification of indications from flexibility evaluations</p> <p>Assessment of Learning Perform flexibility evaluation on another individual</p>	<p>Thomas Test: assesses the length of muscles involved in hip flexion (hip flexors / iliopsoas and rectus femoris) through moving from a sitting position to a laying position while pulling one thigh towards the chest</p> <ul style="list-style-type: none"> - Observations include whether the back of the lowered thigh touches the table, with the knee of the lowered leg achieves 80 degrees of flexion, and whether the knee remains aligned straight or falls into internal or external rotation <p>Passive Straight-Leg Raise (PSL): assesses the length of the hamstrings by attempting to lift one leg from a lying position to a 90° position; inability to reach at least 80° indicates tight hamstrings</p> <p>Shoulder Flexion / Extension Assessment: assesses shoulder flexion and extension through an individual lying flat on the back with elevated knees and moving the arms simultaneously into shoulder flexion and down to the ground (flexion); individual will lay prone and bring shoulders into extension while lifting arms off of floor (extension)</p> <ul style="list-style-type: none"> - Inability to flex to 170° or discrepancies in limbs indicates tightness in pectoralis major and minor, latissimus dorsi, teres minor, rhomboids, and subscapularis - Inability to extend to 50° or discrepancies between limbs indicates tightness in pectoralis major, abdominals, 	<p>Performance of multiple flexibility evaluations on another individual, including:</p> <ul style="list-style-type: none"> ● Sit and reach ● Thomas Test for Hip Flexion and Quadriceps length ● Passive Straight-leg (PSL) Raise ● Shoulder Mobility Assessments <ul style="list-style-type: none"> ○ Flexion ○ Extension ○ Internal / External Rotation ○ Apley's Scratch Test

subscapularis, anterior deltoid, coracobrachialis, and biceps brachii

Internal / External Rotation Assessments: assess the internal (medial) and external (lateral) rotation of the humerus at the shoulder joint through rotating shoulders while laying down and arms bent at elbow

- Inability to externally rotate forearms to floor (90°) overhead indicates potential tightness in subscapularis as well as tightness in joint capsule and ligaments
- Inability to internally rotate forearms forward to 70° indicates potential tightness in infraspinatus and teres minor, as well as tightness in joint capsule and ligaments

Apley's Scratch Test: assesses simultaneous movements of the shoulder girdle (scapulothoracic and glenohumeral joints). Shoulder flexion, external rotation, and scapular abduction are measured by the individual raising one arm overhead, bending the elbow, and reaching behind the head with palms inward in an attempt to touch the medial border of the contralateral scapula, or to touch the vertebrae as low as possible. Shoulder extension, internal rotation, and scapular adduction are measured by the individual reaching an arm behind the lat and rotating the arm inward with the palm facing outward in an attempt to touch the inferior angle of the contralateral scapula, or to reach up the spine as far as possible

- Inability to reach specific landmarks indicates a need for further evaluation to determine the source of the limitation

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>; <https://www.acefitness.org/blog/3771/posture-and-movement-assessments>; http://www.acefitness.org/groupfitnessresources/pdfs/GFI_Assessments.pdf

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Apply methods of measuring core strength. 			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.2.I Perform and analyze balance and core-strength evaluations of another individual.</p> <p>I can perform evaluations such as the Sharpened Romberg Test and the Stork-Stand Balance Test to understand the balance and core-strength abilities of another individual.</p> <p>I can analyze data from balance and core-strength evaluations.</p>	<p>Assessment for Learning Identification of balance and core-strength evaluations Identification of criteria for balance and core-strength evaluations</p> <p>Assessment of Learning Perform an analysis of balance and core-strength evaluations on another individual</p>	<p>Sharpened Romberg Test: Assessment in which individual stands with one foot in front of the other, with arms crossed and eyes closed in order to assess static balance by standing with a reduced base of support while removing visual sensory information; the individual will be timed and a time of less than 30 seconds is indicative of inadequate static balance and postural control.</p> <p>Stork-Stand Balance Test: assessment in which individual stands in a stork position with the heel elevated, meant to assess static balance; Rating Scale:</p> <ul style="list-style-type: none"> - Excellent: Female: > 30 seconds, Male: > 50 seconds - Good: Female: 25-30 seconds; Male: 41-50 seconds - Average: Female: 16-24 seconds; Male: 31-40 seconds - Fair: Female: 10-15 seconds; Male: 20-30 seconds - Poor: Female: < 10 seconds; Male: < 20 seconds 	<p>Performance of balance and core-strength evaluations, such as the Sharpened Romberg Test and the Stork-Stand Balance Test</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.acefitness.org/blog/3771/posture-and-movement-assessments; http://www.acefitness.org/groupfitnessresources/pdfs/GFI_Assessments.pdf</p>			

VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.

ESSENTIAL UNDERSTANDINGS

- Skill in administering fitness assessment tests.
- Terminology, purpose, and procedures and methods of assessing cardiorespiratory, strength, and flexibility fitness levels.
- Apply and interpret statistical norms to determine cardiorespiratory, strength, and flexibility fitness levels.
- Implement appropriate modifications for fitness testing based on known characteristics (obesity, balance problems, age, etc.).

<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.2.n Perform assessments to evaluate the health-related components of fitness.</p> <p>I can perform assessments to evaluate an individual's cardiorespiratory endurance, muscular endurance, and muscular strength.</p> <p>FI.2.o Perform assessments to evaluate the skill-related components of fitness.</p> <p>I can perform assessments to evaluate an individual's agility, balance, coordination, power, reaction time, and speed.</p> <p>FI.2.p Identify contraindications to health-related and skill-related fitness assessments.</p> <p>I can identify reasons to avoid certain fitness assessments.</p>	<p>Assessment for Learning Identification of physiological assessments to measure cardiorespiratory endurance, muscular strength, muscular endurance, agility, balance, coordination, power, reaction time, and speed; Identification of contraindications to fitness assessments</p> <p>Assessment of Learning Perform fitness assessment evaluations for another individual</p>	<p>YMCA Submaximal Step Test – individual will step up and down a 12-inch step at a rhythm of 96 beats per minute. At the conclusion, the individual will take their pulse for one minute, indicating relative levels of cardiorespiratory fitness.</p> <p><u>Contraindications to Fitness Assessments</u></p> <p>Cardiorespiratory Assessments</p> <ul style="list-style-type: none"> - Individuals who are extremely overweight - Individuals who are extremely deconditioned - Individuals with balance concerns - (YMCA) Individuals with balance concerns - (YMCA) Individuals that are short in stature <p>Assessments involving exertion (Cardiorespiratory, Muscular Strength, Muscular Endurance)</p> <ul style="list-style-type: none"> - Onset of angina or chest pain - Significant drop in systolic blood pressure - Significant increase in diastolic blood pressure - Excess fatigue - Subject requests to stop 	<p>Criterion-referenced fitness assessments, such as the Fitnessgram ® assessments</p> <p>Cardiorespiratory assessments such as the YMCA Submaximal Step Test, YMCA Bike Test, Submaximal Talk Test, VT2 Threshold Test, Rockport Fitness Walking Test, and / or the 1.5 Mile Run Test</p> <p>Muscular endurance assessments such as the push-up test, curl up test, and body-weight squat test</p> <p>Muscular strength assessments such as the 1 repetition max (RM), 3RM, Estimated 1RM strength assessments</p> <p>Agility assessments, e.g. shuttle run, pro agility run, Illinois agility run</p> <p>Balance assessments, e.g. Romberg test</p> <p>Coordination assessments, e.g. stick test</p> <p>Body composition assessments, e.g. bioelectrical impedance analysis, BMI, skinfold measures</p> <p>Power assessments such as the vertical jump and broad jump</p> <p>Reaction time assessments, e.g. ruler drop test</p> <p>Speed assessments, e.g. 40 yard dash, 100 meter dash</p>

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>;
http://www.acefitness.org/groupfitnessresources/pdfs/GFI_Assessments.pdf; <http://www.exrx.net/Calculators/RiskClass.html>;
<http://www.exrx.net/Testing/YMCATesting.html>; <http://www.exrx.net/Testing.html>; <http://www.acefitness.org/blog/4842/physiological-assessments-muscular-fitness>;
<http://www.acefitness.org/blog/4831/physiological-assessments-cardiovascular>;

VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.

ESSENTIAL UNDERSTANDINGS

- Knowledge of various body fat measurement methods and the relative advantages/disadvantages of each method.
- Ability to calculate and classify Body Mass Index results for men and women.

<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.2.q Identify and explain different methods for determining body composition.</p> <p>I can identify methods to determine body composition in a fitness setting.</p> <p>I can identify methods to determine body composition that are used in a laboratory setting.</p> <p>FI.2.r Explain the benefits and challenges of different methods for determining body composition.</p> <p>I can analyze different methods of determining body composition and explain the benefits and challenges of multiple methods.</p>	<p>Assessment for Learning Identification of methods to determine body composition</p> <p>Assessment of Learning Create a Podcast about the benefits and challenges of multiple methods of determining body composition</p>	<p>Bioelectrical Impedance Analysis (BIA): measurement of the amount of impedance or resistance to electric current flow as it passes through the body. Impedance is greatest in fast tissue, giving an accurate assessment of fat mass in the body. BIA can be done using a device in a fitness setting; however, more accurate whole-body machines are found only in laboratory settings.</p> <p>Body Mass Index (BMI): Ratio of height to weight; easy to complete; does not take in to account lean mass and fat mass</p> <p>Dual-Energy X-Ray Absorptiometry (DEXA): whole-body scanning system that delivers low-radiation x-ray to determine bone and soft-tissue mass; very accurate, yet found only in laboratory settings</p> <p>Hydrostatic Weighing: Measurement that determines body fat through completely submerging an individual in water and measuring water displacement; seen as the gold standard of body composition measures, yet found primarily in laboratory settings</p> <p>Near-Infrared Interactance: Measurement of tissue composition through use of near-infrared light, usually at the biceps brachii. Easy to use in a fitness setting; however it is not seen to be as accurate as laboratory techniques</p>	<p>Instruction on multiple methods used to determine body composition, including:</p> <ul style="list-style-type: none"> • Bioelectrical Impedance Analysis (BIA) • Body Mass Index (BMI) • Dual-Energy X-Ray Absorptiometry (DEXA) • Hydrostatic Weighing • Near-Infrared Interactance • Skinfold Measurements • Waist-to-Hip Ratio (WHR) • Whole-Body Air Displacement Plethysmography (Bod Pod) <p>Instruction should include methodology for body composition measurements, as well as benefits and challenges of each.</p>

Skinfold Measurements: Use of a caliper to pinch a fold of skin and fat at several sites on the body (see [Jackson-Pollock](#) for measurement sites), with measurements plugged in to an equation to calculate body fat percentage; easy to use in a fitness setting, and provides accurate measurements so long as the individual taking the measurements has been properly trained in this method.

Waist-to-Hip Ratio (WHR): Measurement of the difference in body circumference at the waist and hip; ratios indicative of higher circumference in the waist are indicative of greater health risks.

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>; <http://www.exrx.net/Testing.html>; <http://www.acefitness.org/blog/3815/physiological-assessments-anthropometric>; <http://www.exrx.net/Testing/BFTestComparisonStudy.html> <https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2>

VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.

ESSENTIAL UNDERSTANDINGS

- Knowledge of various fuel sources within the body and how they are mobilized during physical activity.
- Ability to use the energy balance equation to achieve goals (weight loss, weight management, weight gain) within an appropriately defined amount of time.
- Knowledge of characteristics of cardiorespiratory training (aerobic and anaerobic) and related physiological adaptations at rest and during submaximal and maximal exercise.
- Knowledge of the physiologic process for muscular strength gains and the adaptations that occur as a result of resistance training.

<p style="text-align: center;">Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p style="text-align: center;">Suggested Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;">Suggested Activities</p>
<p>FI.2.s Differentiate between recommendations for physical activity and training principles to meet goals for general health benefits, weight management, fitness improvements, and athletic performance enhancement.</p>	<p>Assessment for Learning Assess knowledge of recommendations for physical activity and training principles to meet goals for general health benefits, weight management, fitness improvements, and athletic performance enhancement</p> <p>Assessment of Learning Apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities planning</p>	<p>Review previous year's content and vocabulary as appropriate</p>	<p>Instruction on multiple methods used to determine body composition, including:</p> <ul style="list-style-type: none"> • Bioelectrical Impedance Analysis (BIA) • Body Mass Index (BMI) • Dual-Energy X-Ray Absorptiometry (DEXA) • Hydrostatic Weighing • Near-Infrared Interactance • Skinfold Measurements • Waist-to-Hip Ratio (WHR) • Whole-Body Air Displacement Plethysmography (Bod Pod) <p>Instruction should include methodology for body composition measurements, as well as benefits and challenges of each.</p> <p>Analysis of basic and advanced skills in strength training, personal conditioning, and fitness activities for component skills and movement patterns applicable to skills specific to sports/activities</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.

ESSENTIAL UNDERSTANDINGS

- Knowledge of impact of acute or chronic skeletal and muscular exercise on anaerobic or aerobic testing and design.
- Ability to recognize acute conditions that require referral to a healthcare provider.

<p style="text-align: center;"><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p style="text-align: center;"><u>Suggested</u> Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;"><u>Suggested</u> Activities</p>
<p>FI.2.t Explain the effects of acute and chronic exercise on aerobic and anaerobic energy systems.</p>	<p>Assessment for Learning</p> <ul style="list-style-type: none"> ○ Knowledge of impact of acute or chronic skeletal and muscular exercise on anaerobic or aerobic testing and design. <p>Assessment of Learning Ability to recognize acute conditions that require referral to a healthcare provider</p>	<p>Review previous year's content and vocabulary as appropriate</p>	<p>Review the body's response to an acute bout of exercise and long-term physiological adaptations to exercise training with an emphasis on endurance exercise. Provide an overview of skeletal muscle actions, muscle fiber types, and the major metabolic pathways involved in energy production. Discuss the importance of adequate fluid intake during exercise sessions to prevent impairments induced by dehydration on endurance exercise, muscular power, and strength. Review physiological adaptations that result from regular exercise training such as increases in cardiorespiratory capacity and strength. Emphasize the cardiovascular and metabolic adaptations that lead to improvements in maximal oxygen capacity.</p>

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>; <https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2>

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Purpose and mechanisms of proper warm up and cool down techniques. ○ Knowledge of components of a cardiorespiratory exercise program (mode, frequency, intensity, and duration) ○ Provide appropriate cardiorespiratory training program progression. ○ Skill in selection, proper application, and modification/amplification of resistance training exercises within abilities and goals. 			
<u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?	<u>Suggested</u> Assessments	Terms (Vocabulary) and Content Information	<u>Suggested</u> Activities
<p>FI.2.u Explain the body's response to cardiorespiratory exercise.</p> <p>FI.2.v Explain the body's response to resistance training.</p> <p>FI.2.w Explain the body's response to warm-up and cool down.</p> <p>FI.2.x Explain blood-pressure response related to acute exercise, chronic exercise, and changes in posture.</p>	<p>Assessment for Learning</p> <ul style="list-style-type: none"> ○ Knowledge of components of a cardiorespiratory exercise program (mode, frequency, intensity, and duration) and knowledge of components of a cardiorespiratory exercise program (mode, frequency, intensity, and duration). <p>Assessment of Learning</p> <p>Use an individual's current level of cardiorespiratory fitness to appropriately determine mode, intensity, and/or duration of cardiorespiratory training</p> <p>Incorporate an interval training program based on an individual's current fitness level and ability</p>		<p>Instruction concerning blood-pressure response related to acute exercise, chronic exercise, and changes in posture.</p> <p>Systolic blood pressure increases linearly with increases in exercise intensity. In a healthy person with a 'normal' systolic pressure of 120 mmHg, vigorous aerobic fitness training can increase systolic pressure to 180 mmHg and take 10-20 minutes to return to resting levels. The higher the intensity of exercise, the greater the rise in heart rate will be, and consequently the larger the increase in systolic blood pressure</p> <p>With most types of exercise there is minimal change in diastolic blood pressure.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4914008/</p>			

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> Effect of reversibility or deconditioning on fitness and performance. 			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.2.y Explain reversibility or deconditioning and the effect on fitness and performance.</p>	<p>Assessment for Learning Examine the many physiological changes that take place when one stops exercising.</p> <p>Assessment of Learning Investigate how reversibility or deconditioning effects fitness and performance for people of different age and levels of fitness.</p>	<p>Reversibility means that an athlete can lose the effects of training when they stop, and can gain the effects when they begin to train again.</p> <p>Deconditioning or detraining occurs once you stop exercising.</p> <p>Cardiovascular (aerobic) gains made with exercise—notably the heart’s ability to pump blood more efficiently, the muscles’ improved capacity to process oxygen, and the body’s enhanced ability to use carbs for fuel.</p>	<p>Explore how quickly it takes for deconditioning to occur once an individual stops exercising factoring in age, fitness level, how long the individual has been exercising, and the type of exercise the individual was doing and at what level.</p> <p>Even two weeks of detraining can lead to a significant decline in cardio fitness, according to the American College of Sports Medicine. Not exercising for two to eight months leads to loss of virtually all fitness gains. In general, the loss of aerobic capacity occurs more rapidly than declines in muscle strength.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.

ESSENTIAL UNDERSTANDINGS

- Types of exercise-related injuries such as strains, sprains, bursitis, shin splints, their signs/symptoms, and impact on exercise session.
- Safety rules and procedures for strength, and flexibility activities to prevent injury and/or overtraining.

<p style="text-align: center;"><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p style="text-align: center;"><u>Suggested</u> Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;"><u>Suggested</u> Activities</p>
<p>FI.2.z Define common musculoskeletal injuries.</p> <p>FI.2.aa Compare and contrast muscle fatigue and delayed onset muscle soreness (DOMS) with musculoskeletal injury/overuse.</p>	<p>Assessment for Learning Identify exercise-related injuries such as strains, sprains, bursitis, shin splints, their signs/symptoms, and impact on exercise session.</p> <p>Assessment of Learning</p> <ul style="list-style-type: none"> ○ Teach safety rules and procedures for strength, and flexibility activities to prevent injury and/or overtraining. ○ Identify cause and treatment for DOMS injuries. 	<p>Delayed-Onset Muscle Soreness (DOMS) is exercise-related muscle pain. It develops after excessive and unaccustomed exercise. It is particularly prevalent if that exercise has an eccentric component.</p> <p>A musculoskeletal injury affects the body's muscle or skeletal system and interferes with the body's ability to move freely and without pain.</p>	<p>Compare and contrast muscle fatigue and delayed onset muscle soreness (DOMS) with musculoskeletal injury/overuse</p> <p>Discuss the best treatment for DOMS</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.ncbi.nlm.nih.gov/pubmed/12617692</p>			

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS Analyze the body's inflammatory response to exercise, upper-extremity injuries and lower-extremity injuries and manage the healing process.</p>			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.2.bb Explain inflammatory response and the healing process.</p> <p>FI.2.cc Identify and describe upper-extremity injuries.</p> <p>FI.2.dd Identify and describe lower-extremity injuries.</p>	<p>Assessment for Learning Explain inflammatory response and the healing process.</p> <p>Identify and describe upper-extremity injuries.</p> <p>Identify and describe lower-extremity injuries.</p> <p>Assessment of Learning Appropriately respond and treat injuries, and modify mode, frequency, intensity, and/or duration of exercise prescription.</p>	<p>Inflammatory response triggered by damage to living tissues</p>	
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml;</p>			

<p>VA SOL Standard: FI.2 The student will apply knowledge of anatomy and movement principles and concepts to skill performance in strength training, conditioning, and fitness activities.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Modify program design for physical or functional limitations. 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.2.ee Identify and explain exercise modifications appropriate when participant is injured.</p>	<p>Assessment for Learning Explain exercise modifications appropriate when participant is injured.</p> <p>Assessment of Learning Appropriately modify exercise program design for physical or functional limitations.</p>	<p>Review previous year's vocabulary, as appropriate</p>	<p>Strength training activity skills may include:</p> <ul style="list-style-type: none"> - Free weight activities - Olympic lifts - Dumbbell / kettlebell activities - Manual resistance activities - Resistance band activities - Resistance machines <p>Specific physical conditioning and fitness activities referenced may include:</p> <ul style="list-style-type: none"> - Speed and agility activities - Endurance activities - Flexibility activities - Plyometric activities <p>Video feedback on basic and advanced skills in strength training, personal conditioning, and fitness activities</p> <p>Analysis of basic and advanced skills in strength training, personal conditioning, and fitness activities for component skills and movement patterns applicable to skills specific to sports/activities</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml ;</p>			

<p>VA SOL Standard: FI.3 The student will plan and describe a personalized fitness and conditioning program for others that includes skill-related and health-related fitness components to achieve and maintain a health-enhancing level of physical fitness for a lifetime.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Limitations of health/medical history. ○ Symptoms common for cardiovascular, metabolic, or pulmonary diseases. ○ Conduct health and exercise history. 			
<p style="text-align: center;">Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p style="text-align: center;">Suggested Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;">Suggested Activities</p>
<p>FI.3.a Identify components of health/medical history</p> <p>FI.3.b Identify limitations of health/medical history.</p> <p>FI.3.c Identify signs and symptoms common for cardiovascular, metabolic, or pulmonary diseases.</p> <p>FI.3.d Conduct health and exercise history with another individual.</p>	<p>Assessment for Learning Identify the components of and limitations of a health/medical history.</p> <p>Assessment of Learning Evaluate clients' health/medical histories and identify signs and symptoms common for cardiovascular, metabolic, or pulmonary diseases.</p> <p>Investigate clients' exercise history and determine limitations.</p>	<p>Review previous year's vocabulary, as appropriate</p>	<p>Strength training activity skills may include:</p> <ul style="list-style-type: none"> - Free weight activities - Olympic lifts - Dumbbell / kettlebell activities - Manual resistance activities - Resistance band activities - Resistance machines <p>Specific physical conditioning and fitness activities referenced may include:</p> <ul style="list-style-type: none"> - Speed and agility activities - Endurance activities - Flexibility activities - Plyometric activities <p>Video feedback on basic and advanced skills in strength training, personal conditioning, and fitness activities</p> <p>Analysis of basic and advanced skills in strength training, personal conditioning, and fitness activities for component skills and movement patterns applicable to skills specific to sports/activities</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml;</p>			

VA SOL Standard: FI.3 The student will plan and describe a personalized fitness and conditioning program for others that includes skill-related and health-related fitness components to achieve and maintain a health-enhancing level of physical fitness for a lifetime.

ESSENTIAL UNDERSTANDINGS

- Ability to recognize and translate desired outcomes into challenging, realistic, and measurable (SMART) fitness goals.

<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.3.e Develop SMART fitness goals with another individual based on fitness assessments and personal desired outcomes.</p> <p>FI.3.f Apply FITT principle to improve or maintain cardiovascular and musculoskeletal fitness in healthy adults, seniors, youth, adolescents, and pregnant women.</p>	<p>Assessment for Learning Knowledge of the FITT principle to improve or maintain cardiovascular and musculoskeletal fitness in healthy adults, seniors, youth, adolescents, and pregnant women.</p> <p>Assessment of Learning Ability to provide appropriate cardiorespiratory training program progression, and use an individual's (adults, seniors, youth, adolescents, and pregnant women) current level of strength to appropriately determine mode, frequency, intensity, and progression of resistance training.</p>	<p>S.M.A.R.T. goal is a best practice framework for setting goals – they are Specific, Measurable, Achievable, Realistic/Relevant and Time-bound to clarify exactly what will be required for achieving success and to be able to share that clarification with others.</p> <p>The FITT principle is a set of rules that dictates the frequency, intensity, type and time of exercise.</p>	<p>Strength training activity skills may include:</p> <ul style="list-style-type: none"> - Free weight activities - Olympic lifts - Dumbbell / kettlebell activities - Manual resistance activities - Resistance band activities - Resistance machines <p>Specific physical conditioning and fitness activities referenced may include:</p> <ul style="list-style-type: none"> - Speed and agility activities - Endurance activities - Flexibility activities - Plyometric activities <p>Video feedback on basic and advanced skills in strength training, personal conditioning, and fitness activities</p> <p>Analysis of basic and advanced skills in strength training, personal conditioning, and fitness activities for component skills and movement patterns applicable to skills specific to sports/activities</p>

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>;

VA SOL Standard: FI.3 The student will plan and describe a personalized fitness and conditioning program for others that includes skill-related and health-related fitness components to achieve and maintain a health-enhancing level of physical fitness for a lifetime.

ESSENTIAL UNDERSTANDINGS

- Proper application, and modification/amplification of cardiorespiratory and resistance training exercises within abilities and goals.
- Progressive balance, speed, agility, and quickness training programs for clients at any level of training.
- Exercise testing for older adults before they begin engaging in a moderate to vigorous activity routine.

<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.3.g Develop functional programming for stability, mobility, and movement.</p> <p>FI.3.h Develop a resistance-training program with appropriate progressions.</p> <p>FI.3.i Develop a cardiorespiratory-training program with appropriate progressions.</p> <p>FI.3.j Evaluate fitness programming for others to determine effectiveness.</p> <p>FI.3.k Identify contraindications of cardiorespiratory exercise.</p>	<p>Assessment for Learning Knowledge of how exercise testing provides a unique way of assessing physical capacity.</p> <p>Knowledge of acute cardiac contradictions to exercise, such as high blood pressure, unstable angina, uncontrolled-abnormal heart rhythms, severe aortic stenosis, symptomatic heart failure and suspected or known dissecting aneurysm, pulmonary infarction, severe shortness of breath, inflammation or infection in the heart or any other systemic infection.</p> <p>Assessment of Learning Develop functional programming for cardiovascular, resistance-exercise, stability, mobility, and movement training program with appropriate progressions for clients of various abilities.</p>	<p>Functional programming is an approach to training used a little or a lot to increase strength, correct imbalances, improve movement quality, and gain comfort and confidence in a variety of positions.</p> <p>Contraindications – there are two types of contraindications to exercise, absolute and relative. Absolute contraindications are risk of injury or even death, and far outweigh the benefits of exercise. Relative contraindications require accommodations for a person to safely exercise.</p>	<p>Strength training activity skills may include:</p> <ul style="list-style-type: none"> - Free weight activities - Olympic lifts - Dumbbell / kettlebell activities - Manual resistance activities - Resistance band activities - Resistance machines <p>Specific physical conditioning and fitness activities referenced may include:</p> <ul style="list-style-type: none"> - Speed and agility activities - Endurance activities - Flexibility activities - Plyometric activities <p>Video feedback on basic and advanced skills in strength training, personal conditioning, and fitness activities</p> <p>Analysis of basic and advanced skills in strength training, personal conditioning, and fitness activities for component skills and movement patterns applicable to skills specific to sports/activities</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml;</p>			

VA SOL Standard: FI.3 The student will plan and describe a personalized fitness and conditioning program for others that includes skill-related and health-related fitness components to achieve and maintain a health-enhancing level of physical fitness for a lifetime.

ESSENTIAL UNDERSTANDINGS

- Mechanisms of flexibility training (muscle spindles, Golgi tendon organ, stretch reflex).
- Common assessments used to measure range of motion and to identify postural abnormalities and contraindications.

<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.3.l Define and explain exercises to improve range of motion, to include dynamic stretching, passive stretching, proprioceptive neuromuscular facilitation (PNF), and partner stretching.</p> <p>FI.3.m Identify contraindications of range of motion exercises.</p>	<p>Assessment for Learning Knowledge of exercises to improve range of motion, to include dynamic stretching, passive stretching, proprioceptive neuromuscular facilitation (PNF), and partner stretching. and contraindications of range of motion exercises.</p> <p>Assessment of Learning Ability to teach and demonstrate flexibility exercises.</p> <p>Skill in selection, proper application, and modification/amplification of flexibility training exercises within abilities and goals for maintaining or improving range of motion/extensibility.</p>	<p>Dynamic stretching is the use of movement to stretch muscles before exercise, and relies on momentum to engage the muscles, rather than holding a stretch at a standstill.</p> <p>Static stretching is stretching to the farthest point and holding the stretch.</p> <p>Passive stretching, while also being a static stretch, where an external force is created by an outside force, such as a partner.</p> <p>Proprioceptive Neuromuscular Facilitation (PNF) involves both stretching and contracting The muscle group to be stretched is positioned so muscles are stretched and under tension - then individual contracts the stretched muscle group for 5-6 seconds while a partner applies sufficient resistance to inhibit movement - contracted muscle group is then relaxed and a controlled stretch is applied for 20 to 30 seconds.</p>	<p>Explain the different types of stretching, and how stretches are either dynamic (meaning they involve motion) or static (meaning they involve no motion). Dynamic stretches affect dynamic flexibility and static stretches affect static flexibility (and dynamic flexibility to some degree).</p> <p>The different types of stretching are:</p> <ol style="list-style-type: none"> 1. ballistic stretching 2. dynamic stretching 3. active stretching 4. passive (or relaxed) stretching 5. static stretching 6. isometric stretching 7. PNF stretching
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml;</p>			

VA SOL Standard: FI.3 The student will plan and describe a personalized fitness and conditioning program for others that includes skill-related and health-related fitness components to achieve and maintain a health-enhancing level of physical fitness for a lifetime.

ESSENTIAL UNDERSTANDINGS

- Indications and contraindications of exercise that combines body movement, mental focus, and controlled breathing to improve strength, balance, flexibility, and overall health.

<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.3.n Describe different forms of mind-body exercise (e.g. yoga, Pilates, tai chi).</p> <p>FI.3.o Identify indications for use of mind-body exercise.</p> <p>FI.3.p Identify contraindications for mind-body exercise.</p>	<p>Assessment for Learning</p> <p>Knowledge that when performed correctly, Yoga, Tai chi, and Pilates are traditional forms of mind-body exercises.</p> <p>Assessment of Learning</p> <p>Skill in recognizing pertinent abilities or physical limitations, and selecting and using appropriate training exercise that combines body movement, mental focus, and controlled breathing to improve strength, balance, flexibility, and overall health.</p>	<p>Yoga is a type of exercise in which you move your body into various positions in order to become more fit or flexible, to improve your breathing, and to relax your mind.</p> <p>Pilates is a system of exercises using special apparatus, designed to improve physical strength, flexibility, and posture, and enhance mental awareness.</p> <p>Tai chi is a Chinese martial art and form of stylized, meditative exercise, characterized by methodically slow circular and stretching movements and positions of bodily balance.</p>	<p>Instruction on mind body exercises that combine body movement, mental focus, and controlled breathing to improve strength, balance, flexibility, and overall health.</p> <p>Explain how mind-body exercises are helpful in reducing stress, creating a sense of calm, decreasing chronic pain, and improving sleep patterns.</p> <p>Experience yoga, Pilates, and martial arts such as tai chi, tae kwan do, and qi gong which are the most commonly known types of physical activity classified as mind-body exercises.</p>

Resources: VDOE Physical Education Instructional Resources <http://www.doe.virginia.gov/instruction/physed/index.shtml>;

<p>VA SOL Standard: FI.4 The student will accept responsibility for taking a leadership role as well as demonstrate the ability to follow, in order to accomplish group goals.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Ability to interact effectively with people of different cultures. 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.4.a Define and explain cultural competence and its importance in developing rapport with another individual.</p>	<p>Assessment for Learning Explain cultural competence and its importance in developing rapport with all clients.</p> <p>Assessment of Learning Skilled communicator with the ability to respond respectfully and effectively in a manner that recognizes, affirms, and values diversity and equity.</p>	<p>Cultural competence describes the ability of an individual or organization to interact effectively with people of different cultures.</p>	<p>Instruction on cultural competence improves sustainability by reinforcing the value of diversity, flexibility, and responsiveness in addressing the current and changing needs of clients, communities, and the personal fitness training environments.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml;</p>			

<p>VA SOL Standard: FI.4 The student will accept responsibility for taking a leadership role as well as demonstrate the ability to follow, in order to accomplish group goals.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> Effective teaching techniques for working with individuals of different learning styles, motivation levels, and physical activity levels 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.4.b Demonstrate effective teaching techniques for working with individuals of different learning styles, motivation levels, and physical activity levels.</p> <p>FI.4.c Explain learning styles and instructional strategies, to include visual, auditory, and kinesthetic.</p> <p>FI.4.d Demonstrate effective and varied teaching techniques for a variety of exercises.</p>	<p>Assessment for Learning Knowledge of different teaching methods, teaching strategies, and levels in order to reach all clients effectively.</p> <p>Assessment of Learning Builds trusting relationships with clients by creating a safe, positive, and productive learning environment, and uses assessment and reflection strategies, and instructional rigor and relevance to improve physical performance.</p>	<p>Individual learning style refers to the preferential way in which the person absorbs, processes, comprehends and retains information</p>	<p>Explore intrinsic motivators that may include fascination with the subject, a sense of its relevance to life and the world, a sense of accomplishment in mastering it, and a sense of calling to it. Intrinsic motivation can be long lasting and self-sustaining when compared to extrinsic motivators that may include following doctors' or family members' advice.</p> <p>Discuss how deep learners respond well to the challenge of mastering a difficult and complex subject, and are intrinsically motivated students.</p> <p>Explain how every client learns differently. .</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml;</p>			

<p>VA SOL Standard: FI.4 The student will accept responsibility for taking a leadership role as well as demonstrate the ability to follow, in order to accomplish group goals.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> Monitoring and recognizing signs of discomfort/distress during physical activity and responding appropriately. Ability to develop and follow established injury and/or emergency procedures including CPR, complete injury report form(s), and refer injured persons to an appropriate healthcare professional. 			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.4.e Demonstrate and explain how to respond in an emergency situation.</p> <p>FI.4.f Identify signs of cardiac emergency.</p> <p>FI.4.g Demonstrate CPR and AED procedures for adults and children.</p> <p>FI.4.h Identify emergency situations requiring first aid.</p> <p>FI.4.i Demonstrate first-aid techniques used in emergency situations.</p> <p>FI.4.j Identify and describe universal precautions and personal protection used during CPR and first aid.</p>	<p>Assessment for Learning Knowledge of first-aid techniques and how to respond to a cardiac or other emergency.</p> <p>Assessment of Learning</p> <ul style="list-style-type: none"> Skill in monitoring and recognizing signs of discomfort/distress during physical activity and responding appropriately. Ability to develop and follow established injury and/or emergency procedures including CPR, complete injury report form(s), and refer injured persons to an appropriate healthcare professional. 	<p>Universal precautions refers to the practice, in medicine, of avoiding contact with patients' bodily fluids, by means of the wearing of nonporous articles such as medical gloves and face shields.</p>	<p>Discuss why client safety is a priority.</p> <p>Develop an Emergency Action Plan (EAP) that includes the identification of an Emergency Response Team (ERT), is specific to each fitness venue and reflects the following important considerations related to managing emergency situations:</p> <ul style="list-style-type: none"> emergency personnel emergency communication emergency equipment medical emergency transportation
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml;</p>			

<p>VA SOL Standard: FI.5 The student will explain energy balance.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Essential nutrients; and ability to list caloric value, function, major food sources, and RDA. ○ Public healthy eating tools such as current US Dietary Guidelines for Americans and MyPlate. 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.5.a Identify and explain dietary guidelines based on USDA recommendations.</p>	<p>Assessment for Learning Knowledge of dietary guidelines and healthy eating tools based on USDA recommendations.</p> <p>Assessment of Learning Skilled at recommending general nutritional guidelines for clients to gain general health benefits according to US Dietary Guidelines within scope of practice.</p>	<p>Dietary Guidelines reflects the current body of nutrition science, helps health professionals and policymakers guide Americans to make healthy food and beverage choices, and serves as the science-based foundation for vital nutrition policies and programs across the United States.</p>	<p>Explain how dietary Guidelines provides food-based recommendations to promote health, help prevent diet-related chronic diseases, and meet nutrient needs, and review all topics; https://www.cnpp.usda.gov/about-dietary-guidelines</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml;</p>			

<p>VA SOL Standard: FI.5 The student will explain energy balance.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> Roles and mechanisms of carbohydrate, fat, and protein with regard to aerobic and anaerobic metabolism. Diet macronutrient composition affects satiety, compliance, daily energy expenditure and weight control. 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.5.b Identify macronutrients used by the body for energy.</p> <p>FI.5.c Identify the number of kilocalories found in macronutrients that provide energy.</p>	<p>Assessment for Learning Knowledge of general nutritional guidelines, how to analyze diet to achieve favorable body composition.</p> <p>Assessment of Learning Skill in recommending general nutritional guidelines for weight control/management, or to enhance sports performance.</p>	<p>Macronutrient - an essential nutrient that has a large minimal daily requirement, including proteins, fats, carbohydrates, and water.</p> <p>A calorie (or thermochemical calorie) is a unit of energy. There are 1,000 calories in a kilocalorie. The number of calories a person needs depends on age, height, weight, gender, and activity level. People who consume more calories than they burn off in normal daily activity or during exercise are more likely to be overweight.</p> <p>Gram of fat contains 9 calories.</p> <p>Protein and carbohydrates contain 4 calories per gram.</p>	<p>Describe the three macronutrients required by humans: carbohydrates (sugar), lipids (fats), and proteins. Each of these macronutrients provides energy in the form of calories.</p> <p>Discuss the number of calories a person needs depends on a host of factors, including gender, age and activity level. For both genders and in all age groups, calorie recommendations go up by 200 per day for those who are moderately active and 400 for those who are very active. Moderate activity means the equivalent of walking 1.5 to 3 miles daily at a pace of 3 to 4 miles per hour, while an active person walks more than 3 miles day at that same pace or does an equivalent activity.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml;</p>			

VA SOL Standard: FI.5 The student will explain energy balance.

ESSENTIAL UNDERSTANDINGS

- Reliable sources of nutrition and weight management information.
- Answer questions, handle issues, and dispel myths regarding relationship of macronutrients to successful alteration of body composition.
- Resting or basal metabolic rate and its relevance to weight management.

<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.5.d Explain energy balance and relationship to weight gain, weight loss, or weight maintenance.</p>	<p>Assessment for Learning Knowledge of resting metabolic rate and basal metabolic rate and its relevance to nutrition and weight management.</p> <p>Assessment of Learning Ability to use the energy balance equation to achieve goals (weight loss, weight management, weight gain) within an appropriately defined amount of time.</p> <p>Ability to perform basic calculations related to nutrient intake and caloric expenditure.</p>	<p>Resting metabolic rate refers to the minimal amount of caloric energy required to maintain basic physiological needs, such as breathing, heart rate, thinking and sleeping.</p>	<p>Instruction includes an explanation that energy balance is the relationship between “energy in” (food calories taken into the body through food and drink) and “energy out” (calories being used in the body for our daily energy requirements). This relationship, which is defined by the laws of thermodynamics, dictates whether weight is lost, gained, or remains the same. According to these laws, energy is never really created and it’s never really destroyed. Rather, energy is transferred between entities. We convert potential energy that’s stored within our food (measured in Calories or kcals) into three major “destinations”: work, heat and storage.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml;</p>			

<p>VA SOL Standard: FI.5 The student will explain energy balance.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Influences of nutrition and physical activity on lipid and lipoprotein profiles. ○ Clinical approach for reducing cardiovascular disease risk due to dyslipidemia is to prescribe changes in diet and physical activity. 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.5.e Explain lipid and lipoprotein profiles.</p> <p>FI.5.f Explain the influences of nutrition and physical activity on lipid and lipoprotein profiles.</p>	<p>Assessment for Learning Knowledge about the influences of nutrition and physical activity on lipid and lipoprotein profiles.</p> <p>Assessment of Learning Design individualized physical activity programs to enhance lipid lipoprotein profiles by reducing triglycerides (TG), increasing HDL, and lowering LDL/HDL for clients.</p>	<p>Lipid profile: A pattern of lipids in the blood. A lipid profile usually includes the levels of total cholesterol, high-density lipoprotein (HDL) cholesterol, triglycerides, and the calculated low-density lipoprotein (LDL) 'cholesterol.</p> <p>Lipoproteins are molecules that have a globular shape and are a combination of lipid and protein.</p> <p>The standard clinical approach for reducing cardiovascular disease risk due to dyslipidemia is to prescribe changes in diet and physical activity.</p>	<p>Students should understand that total blood cholesterol as a measure of the cholesterol components LDL (low-density lipoprotein) cholesterol, HDL (high-density lipoprotein) cholesterol, and VLDL (very low-density lipoprotein, which is the triglyceride-carrying component of lipids). Explain that triglycerides are the chemical form in which most fat exists in food and the body. Triglycerides are mostly carried in VLDL and chylomicrons. VLDL comes from the liver and also has cholesterol. Chylomicrons come from dietary fat.</p> <p>Along with cholesterol, triglycerides form plasma lipids. Excess triglycerides in plasma have been linked to the occurrence of coronary artery disease in some people. Like cholesterol, increases in triglyceride levels can be detected by plasma measurements. These measurements should be made after an overnight food and alcohol fast.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml;</p>			

VA SOL Standard: FI.5 The student will explain energy balance.

ESSENTIAL UNDERSTANDINGS

- Recommend appropriate hydration methods dependent on type and length of physical activity.
- Recognize dehydration symptoms and provide appropriate response(s).

<p style="text-align: center;"><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p style="text-align: center;"><u>Suggested</u> Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;"><u>Suggested</u> Activities</p>
<p>FI.5.g Explain the importance of hydration.</p> <p>FI.5.h Explain how to maintain hydration in a physically active lifestyle, including effective methods to rehydrate after exercise.</p>	<p>Assessment for Learning Understand the importance of hydration and effective ways to rehydrate after exercise.</p> <p>Assessment of Learning Ability to identify and recommend appropriate hydration methods dependent on type and length of physical activity.</p>	<p>Dehydration happens when your body does not have as much water as it need to function properly.</p>	<p>Instruction includes understanding that good hydration means getting the right amount of water before, during, and after exercise. Water regulates your body temperature and lubricates your joints. It helps transport nutrients to give you energy and keep you healthy. Your body cannot perform at its highest level if you are not hydrated,</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/phyped/index.shtml;</p>			

<p>VA SOL Standard: FI.5 The student will explain energy balance.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Effects of megadosing with certain vitamins and minerals. ○ Knowledge of ergogenic aids' effects on physical performance and their potential risks. 			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.5.i Identify and describe common supplements and ergogenic aids used by individuals in training programs.</p> <p>FI.5.j Explain potential risks, benefits, and contraindications associated with the use of supplements and ergogenic aids.</p>	<p>Assessment for Learning Knowledge of common supplements and ergogenic aids used by individuals in training programs, and potential risks, benefits, and contraindications associated with the use of supplements and ergogenic aids.</p> <p>Assessment of Learning</p> <ul style="list-style-type: none"> ○ Respond to questions and guide clients about the use of dietary supplements, the effects of ergogenic aids on physical performance and their potential risks based on objective scientific facts. 	<p>Dietary supplements are an umbrella for a wide range of products, including weight loss pills and substances that promise to increase physical performance.</p> <p>Ergogenic aids are classified as nutritional, pharmacologic, physiologic, or psychological; methods to enhance athletic performance range from use of accepted techniques, such as carbohydrate loading to illegal and unsafe approaches such as use of anabolic-androgenic steroids.</p>	<p>Instruction includes potential risks, benefits, and contraindications associated with the use of supplements and ergogenic aids.</p> <p>Have students investigate dietary supplements used to enhance exercise and athletic performance that come in a variety of forms, including tablets, capsules, liquids, powders, and bars. Many of these products contain numerous ingredients in varied combinations and amounts. Among the more common ingredients are amino acids, protein, creatine, and caffeine.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml ;</p>			

VA SOL Standard: FI.5 The student will explain energy balance.

ESSENTIAL UNDERSTANDINGS

- Methods of measuring body composition (BMI, skinfold calipers and waist circumference measurement).
- Ability to calculate and classify Body Mass Index results for men and women.

<p style="text-align: center;"><u>Required</u> <u>VDOE Standard(s)</u> <u>Student Friendly Language</u> What will the student know and be able to do?</p>	<p style="text-align: center;"><u>Suggested</u> <u>Assessments</u></p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;"><u>Suggested</u> <u>Activities</u></p>
<p>FI.5.k Explain the relationship between body composition and health.</p> <p>FI.5.l Define terms related to body composition including <i>body mass index (BMI)</i>, <i>lean body mass</i>, and <i>fat mass</i>.</p>	<p>Assessment for Learning Knowledgeable about the relationship between body composition and health.</p> <p>Assessment of Learning Skillfully convey relevant and reputable information and resources regarding nutrition, weight control, and lifestyle issues.</p>	<p>Body mass index (BMI) is a measure of body fat based on height and weight.</p> <p>Lean body mass, refers to all of your body components except fat - it includes your body's water, bone, organs and muscle content. However, when it comes to weight management and body composition, fat-free mass refers primarily to muscle mass.</p> <p>Fat mass is total body fat, and can be measured with dual energy absorptiometry or bioelectrical impedance techniques.</p>	<p>Discuss benefits of having a healthy body composition:</p> <ul style="list-style-type: none"> Normal blood pressure level Improved quality of sleep Improved mood and self-confidence Increased energy and endurance throughout the day Reduced pain in joints, hips, and lower back Improved blood circulation — leading to lower risk for heart disease Higher fertility rates and lower risk for pregnancy-related complications Improved breathing, respiration, and lung function Improved glucose tolerance and insulin sensitivity <p>Review factors that can lead to altered body composition:</p> <ul style="list-style-type: none"> Lack of exercise and physical activity Eating large portion sizes and overeating in general High-fat, high-sugar diet Lack of whole foods in the diet such as fruits, vegetables, nuts, seeds, legumes Excessive alcohol intake
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml;</p>			

<p>VA SOL Standard: FI.5 The student will explain energy balance.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Influences on body composition. ○ Inappropriate weight loss methods. ○ Effective goal setting and behavior reinforcement techniques. 			
<p style="text-align: center;">Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do?</p>	<p style="text-align: center;">Suggested Assessments</p>	<p style="text-align: center;">Terms (Vocabulary) and Content Information</p>	<p style="text-align: center;">Suggested Activities</p>
<p>FI.5.m Explain influences on body composition, including diet, exercise, and behavior modification.</p> <p>FI.5.n Identify and explain inappropriate weight loss methods.</p>	<p>Assessment for Learning Knowledge of influences on body composition, including diet, exercise, and behavior modification, and inappropriate weight loss methods.</p> <p>Assessment of Learning Ability to help an individual identify their barrier(s) to making positive behavior changes; and skill in assisting them to address/remove barrier(s).</p> <p>Ability to identify and use adherence strategies for long-term maintenance of healthy behaviors.</p>	<p>Influences on body composition include gender, age, diet, activity level, and genes. Men tend to have more muscle mass than women and women tend to have more fat mass than men. As people age, lean muscle mass decreases, making it somewhat more difficult to maintain optimal body composition.</p>	<p>Provide instruction concerning healthy and unhealthy ways to lose weight.</p> <p>Have students research starvation, fasting, or very low-calorie diets.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml;</p>			

<p>VA SOL Standard: FI.5 The student will explain energy balance.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> Common eating disorders and factors related to the female athlete triad. Inappropriate weight loss methods. 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.5.o Identify and explain eating disorders including anorexia nervosa and bulimia nervosa.</p> <p>FI.5.p Explain the female athlete triad.</p>	<p>Assessment for Learning Knowledge about disordered eating and the female athlete triad.</p> <p>Assessment of Learning Skill in understanding and leveraging an individual's actions/reactions to bring about positive behavior change and recognize acute conditions that require referral to a healthcare provider.</p>	<p>The Female Athlete Triad is a syndrome of three interrelated conditions that exist on a continuum of severity including energy deficiency with or without disordered eating, menstrual disturbances/amenorrhea, and bone loss/osteoporosis.</p> <p>Anorexia Nervosa is a psychological and possibly life-threatening eating disorder defined by an extremely low body weight relative to stature, extreme and needless weight loss, illogical fear of weight gain, and distorted perception of self-image and body.</p> <p>Bulimia nervosa is a psychological and possibly life-threatening eating disorder in which people (bulimics) consume large amounts of food (binge) and then trying to rid themselves of the food and calories (purge) by fasting, excessive exercise, vomiting, or using laxatives.</p>	<p>Explain eating disorders including anorexia nervosa and bulimia nervosa.</p> <p>Discuss the female athlete triad.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

<p>VA SOL Standard: FI.6 The student will identify and explain professional and legal responsibilities to manage a personal business and be employed as a personal fitness instructor.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Requirements to become a certified personal fitness instructor and maintain certification, to include certification requirements, and requirements to maintain certification. ○ Engage in professional development to increase knowledge and skill and maintain certification. 			
<p><u>Required</u> VDOE Standard(s) <u>Student Friendly Language</u> What will the student know and be able to do</p>	<p><u>Suggested</u> Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p><u>Suggested</u> Activities</p>
<p>FI.6.a Identify and explain requirements to become a certified personal fitness instructor and maintain certification, to include certification requirements, requirements to maintain certification, and resources for professional development to increase knowledge and skill and maintain certification.</p>	<p>Assessment for Learning Knowledge about requirements to become a certified personal trainer (CPT) or fitness instructor, and how to maintain the credential through continuous professional development.</p> <p>Assessment of Learning Become and maintain a certified personal trainer or fitness instructor credential.</p>	<p>A NASM certified personal trainer has obtained certification from the National Academy of Sports Medicine, which means that they have taken a course and passed an exam on a broad range of personal training topics, including anatomy, physiology, and fitness basics.</p>	<p>Explain the requirements to become a certified personal fitness instructor and maintain certification, to include certification requirements, requirements to maintain certification, and resources for professional development to increase knowledge and skill and maintain certification.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

<p>VA SOL Standard: FI.6 The student will identify and explain professional and legal responsibilities to manage a personal business and be employed as a personal fitness instructor.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Knowledge of boundaries that determine scope of practice for personal trainers .and ○ Knowledge of confidentiality practices ○ Knowledge of current research in physical activity and exercise and their effects on various health conditions/outcomes 			
Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do	Suggested Assessments	Terms (Vocabulary) and Content Information	Suggested Activities
<p>FI.6.b Identify and explain the role, scope of practice, and code of ethics of a personal fitness instructor.</p> <p>FI.6.c Identify and describe professional responsibilities of a personal fitness instructor.</p>	<p>Assessment for Learning Knowledge of ethics and professional practices and maintain certification (continuing education, CPR, etc.) Knowledge of basic communication skills and characteristics necessary for effective teaching/exercise leadership</p> <p>Assessment of Learning http://www.csub.edu/reccenter/employment%20opportunities/Job%20Description%20-%20Personal%20Trainer.pdf Ability to discuss the importance of the health-related components of fitness Ability to provide relevant and reputable information and resources regarding nutrition, weight control, and lifestyle issues</p> <p>Provide clients with exercise and nutritional recommendations to meet their desired fitness goals.</p>	<p>Review previous year's vocabulary, as appropriate</p>	<p>Explain the role, scope of practice, and code of ethics of a personal fitness instructor.</p> <p>Describe professional responsibilities of a personal fitness instructor</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

<p>VA SOL Standard: FI.6 The student will identify and explain professional and legal responsibilities to manage a personal business and be employed as a personal fitness instructor.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ Knowledge of safety rules and procedures for using exercise equipment ○ Prevent worksite injuries or illnesses by both identifying workplace hazards and creating guidelines to mitigate risks ○ Facility maintenance deals with proper staff education and training on handling bloodborne pathogens. Responsibility for proper OSHA adherence lies mainly with the fitness center manager/owner. 			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.6.d Identify and describe necessary facility maintenance.</p> <p>FI.6.e Explain and describe appropriate inspection and care of equipment to maintain safety and maximize use.</p> <p>FI.6.f Identify and describe appropriate facility supervision to maintain safety of users.</p>	<p>Assessment for Learning Educate clients and enforce policies regarding safe and proper use of equipment and facilities.</p> <p>Assessment of Learning Instruct clients on basic exercise physiology and inform them as to proper lifting and exercise technique. Ability to inspect and maintain fitness equipment and physical activity surroundings to ensure safety Ability to teach and demonstrate use of resistance training equipment (weight machines, free weights, small apparatuses, resistance tubing, others) using proper exercise form and technique</p>	<p>Review previous year's vocabulary, as appropriate</p>	<p>Describe necessary facility maintenance.</p> <p>Explain appropriate inspection and care of equipment to maintain safety and maximize use.</p> <p>Identify appropriate facility supervision to maintain safety of users.</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			

<p>VA SOL Standard: FI.6 The student will identify and explain professional and legal responsibilities to manage a personal business and be employed as a personal fitness instructor.</p> <p>ESSENTIAL UNDERSTANDINGS</p> <ul style="list-style-type: none"> ○ liability types and issues related to health history review, fitness assessment, and program design/implementation and methods of minimizing liability/risk. ○ Liability waivers, general liability insurance ○ Negligent acts defined as an act of omission or an act of commission. 			
<p>Required VDOE Standard(s) Student Friendly Language What will the student know and be able to do</p>	<p>Suggested Assessments</p>	<p>Terms (Vocabulary) and Content Information</p>	<p>Suggested Activities</p>
<p>FI.6.g Identify and describe legal considerations of working as a personal fitness instructor.</p>	<p>Assessment for Learning Describe legal considerations of working as a personal fitness instructor</p> <p>Assessment of Learning Attained a level of competency and to adhere to the established standard of care</p>	<p>Act of Omission: Failing to act responsibly. Example: A trainer who fails to spot a client who is lifting a considerable amount of weight.</p> <p>Act of Commission: Performing an act or allowing an individual to perform an act that causes harm. Example: A trainer who asks a client to perform a squat jump, knowing that the client has a knee injury.</p> <p>Liability waivers potentially provide protection for trainers, in the event a client sustains injury, preventing the client from recovering for damages.</p> <p>General Liability Insurance is specific to the industry and protects in the case of injury due to slips and falls in fitness facilities.</p>	<p>Provide instruction concerning the legal considerations of working as a personal fitness instructor</p>
<p>Resources: VDOE Physical Education Instructional Resources http://www.doe.virginia.gov/instruction/physed/index.shtml; https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2</p>			