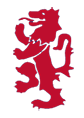
**Kingshill School**

**Unit 1: Fitness for Sport & Exercise**

**Student workbook**

**BTEC First Award in Sport**

|  |  |
| --- | --- |
| **Name of Module** | **Unit 1: Fitness for Sport and Exercise** |
| **Name of Module Teacher.** |  |
| **Student Name** |  |

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## **scheme of work**

|  |  |  |
| --- | --- | --- |
| **Week** | **Content** | **Assessment dates** |
|
| **1** | Introduction to module and assessment |  |
| Components of Physical Fitness (A.1) |
| Components of Skill Related Fitness (A.2) |
| Reasons fitness components are important for successful sports participation (A.3) |
| **(THEORY)** |
| **2** | Exercise intensity and how it is determined (A.4) |  |
| **(THEORY)** |
| **3** | Principles of Training- FITT (A5) |  |
| Principles of Training- progressive overload, specificity, individual differences, adaptation, reversibility, variation, rest and recovery, and application (A6) |
| **(THEORY)** |
| **4** | Applying knowledge to different scenarios |  |
| **(THEORY)** |
| **5** | Fitness Training Methods (B1, B2, B3) |  |
| **(PRACTICAL & THEORY)** |
| **6** | Fitness Training Methods (B1, B2, B3) |  |
| **(PRACTICAL & THEORY)** |
| **7** | Fitness Training Methods (B1, B2, B3) |  |
| **(PRACTICAL & THEORY)** |  |
| **9** | Applying knowledge to different scenarios |  |
| **(PRACTICAL & THEORY)** |
| **9** | Fitness Testing Methods (C.1) |  |
| Importance of fitness testing to performer and coach (C.2) |
| Requirements for administration of fitness test (C.3) Interpreting Results (C4) |
| **(PRACTICAL & THEORY)** |
| **10** | Fitness Testing Methods (C.1) |  |
| Importance of fitness testing to performer and coach (C.2) |
| Requirements for administration of fitness test (C.3) Interpreting Results (C4) |
| **(PRACTICAL & THEORY)** |
| **11** | Fitness Testing Methods (C.1) |  |
| Importance of fitness testing to performer and coach (C.2) |
| Requirements for administration of fitness test (C.3) Interpreting Results (C4) |
| **(PRACTICAL & THEORY)** |
| **12** | Fitness Testing Methods (C.1) |  |
| Importance of fitness testing to performer and coach (C.2) |
| Requirements for administration of fitness test (C.3) Interpreting Results (C4) |
| **(PRACTICAL & THEORY)** |
| **13** | MOCK EXAM - Exam Revision workshop | **Assessment**  **(A, B & C)** |
|  |
| **14** | **EXAM – On-line Assessment** | **Online Final Assessment**  **(A, B & C)** |
|  |

## **introduction to the module and assessment**

**What is the module about?**

This unit will provide you with details upon a variety of fitness training methods and fitness testing procedures and their application within a fitness training programme relevant to the desired fitness components.

**How is the module assessed?**

* This unit is externally assessed using an onscreen computer based test.
* The awarding body Edexcel sets and marks the test.
* The test lasts for one hour and has 50 marks.
* The assessment will take place on \_\_\_\_\_**17th December 2019\_\_\_\_\_\_\_\_\_\_\_\_.**
* The onscreen test has different types of questions including objective and short-answer questions. Some questions contain graphics, photos, animations or videos.
* An onscreen calculator is available for questions requiring calculations.
* An onscreen notepad is available for making notes.
* Each item will have an accessibility panel that allows a learner to zoom in and out, and apply a colour filter.

**About this workbook**

You need to keep this workbook in a safe place. You will need to complete parts of the workbook every week and you will be able to use this to revise for your online assessment test.

If you lose or misplace this workbook it will be available on your course Moodle page to download, however all of the notes you have added will not!

## **week 1**

Components of Physical Fitness (A.1)

|  |  |
| --- | --- |
|  | **Aerobic endurance (Stamina)**   * Add definition * What is involved in the CV system? * What is the CV system responsible for? * Give examples |
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| [Image result for sit up](https://www.bing.com/images/search?view=detailV2&ccid=uQxzHc1r&id=2AE06B5B773B39C30AA33844AE876745D7286BC2&thid=OIP.uQxzHc1rIak8K0dJS9xwWgHaFK&mediaurl=http://navymedicine.navylive.dodlive.mil/files/2013/06/sit-ups.jpg&exph=2528&expw=3624&q=sit+up&simid=608015150279036788&selectedIndex=40&adlt=strict) | **Muscular endurance (Stamina)**   * Add definition * Explain the difference between **Muscular Endurance** and **Muscular strength** * Give examples |
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|  | **Flexibility (Suppleness)**   * Add definition * Identify the two types of flexibility * Give examples |
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|  | **Speed**   * Add definition * Identify the three different types of speed * Give examples |
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|  | **Muscular Strength**   * Add definition * Give examples |
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| --- | --- |
| [Image result for body composition](https://www.bing.com/images/search?view=detailV2&ccid=yqtNOdma&id=FDAC994D5E3CE5CE735CBDE398DD3CAC27BC07F2&thid=OIP.yqtNOdmaGOjTEviYVHYvaAHaEC&mediaurl=https://inbodyusa.com/wp-content/uploads/2018/04/COMPARING-BMI-with-shorts.png&exph=508&expw=931&q=body+composition&simid=608028503260399349&selectedIndex=32&adlt=strict) | **Body Composition (Somatotype)**   * Add definition * Give examples |
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Components of Skill Related Fitness (A.2)

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| --- | --- |
|  | **Agility**   * Add definition * Give examples |
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|  | **Co-ordination**   * Add definition * Give examples |
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|  | **Balance**   * Add definition of the two types * Give examples |
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|  | **Power**   * Add definition * Give examples | |
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|  | | **Reaction Time**   * Add definition * Give examples |
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Reasons fitness components are important for successful sports participation (A.3)

**Chose four sports** and for each sport describe the three most important components of physical fitness

|  |  |
| --- | --- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

Select 4 sports and rank the importance of each of the physical and skill related fitness components that are required for each sport.

Identify the 3 most important components and describe and/ or explain why they are important.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sport 1** | **Aerobic endurance** | **Muscular endurance** | **Flexibility** | **Speed** | **Strength** | **Body composition** | **Agility** | **Balance** | **Co-ordination** | **Power** | **Reaction time** | **Describe/ explain the 3 most important components required for excellence in the sport and where in the sport it is used?** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Sport 2** | **Aerobic endurance** | **Muscular endurance** | **Flexibility** | **Speed** | **Strength** | **Body composition** | **Agility** | **Balance** | **Co-ordination** | **Power** | **Reaction time** | **Describe/ explain the 3 most important components required for excellence in the sport and where in the sport it is used?** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sport 3** | **Aerobic endurance** | **Muscular endurance** | **Flexibility** | **Speed** | **Strength** | **Body composition** | **Agility** | **Balance** | **Co-ordination** | **Power** | **Reaction time** | **Describe/ explain the 3 most important components required for excellence in the sport and where in the sport it is used?** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Sport 4** | **Aerobic endurance** | **Muscular endurance** | **Flexibility** | **Speed** | **Strength** | **Body composition** | **Agility** | **Balance** | **Co-ordination** | **Power** | **Reaction time** | **Describe/ explain the 3 most important components required for excellence in the sport and where in the sport it is used?** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

## **week 2**

Exercise intensity and how it is determined (A.4) (PRACTICAL & THEORY)

|  |  |  |
| --- | --- | --- |
|  | **The Training Pyramid** | **Training in this zone** |
| 100% MHR | **Speed Zone**  **Anaerobic zone**  **Aerobic zone** |  |
| 95% MHR |  |
| 85% MHR |  |
| 60% MHR |  |
| Resting HR |  |

Calculation of maximum Heart Rate (HR)

|  |  |
| --- | --- |
| Age predicted Maximum HR | Max HR= 220 – Age |
| Please work out your Maximum Heart Rate |  |

Calculation of Heart Rate (HR) Training Zones

|  |  |
| --- | --- |
| **The aerobic zone** | = 60-80% of MHR |
| **The anaerobic zone** | = 85-95% MHR |
| **The speed zone** | = 95-100% MHR |

Heart Rate Training Zones

Please work out your age predicted heart rate training zones

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **220- Age = Max HR**  **X 0.6 = 60%**  **X 0.7 = 70%**  **X 0.8 = 80%**  **X 0.9 = 90%** | **60%** | **220- age = \_\_\_\_\_\_\_\_\_\_\_** | **x 0.6 =** |  |
| **70%** | **x 0.7 =** |  |
| **80%** | **x 0.8 =** |  |
| **85%** | **x 0.85 =** |  |

The Borg Rating of Perceived Exertion (RPE scale)

|  |  |  |  |
| --- | --- | --- | --- |
| **6** | 20% effort |  |  |
| **7** | 30% effort | Very, very light intensity |  |
| **8** | 40% effort |  |  |
| **9** | 50% effort | Very light intensity |  |
| **10** | 55% effort |  |  |
| **11** | 60% effort | Fairly light intensity |  |
| **12** | 65% effort |  |  |
| **13** | 70% effort | Somewhat hard intensity |  |
| **14** | 75% effort |  |  |
| **15** | 80% effort | Hard intensity |  |
| **16** | 85% effort |  |  |
| **17** | 90% effort | Very hard intensity |  |
| **18** | 95% effort |  |  |
| **19** | 100% effort | Very, very hard intensity |  |
| **20** | Exhaustion |  |  |

Suggest a sporting activity that may be appropriate at each stage of the scale.

The suggested following relationship between HR training zones and the BORG scale: RPE x 10 = HR.

e.g. at 14 on the RPE (BORG scale) this would be the equivalent to 140bpm.

**Activity**

Complete five CV exercises in the gym.

For each of the CV machines identify:

* What levels and /or speeds you would be working out at for 60- 80% maxHR
* How long you worked out on the machine to achieve this level, and
* Rate the intensity on the BORG scale.

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| --- | --- | --- | --- | --- |
| **Machine** | **Level** | **Speed** | **Time** | **Intensity rating** |
| **Treadmill** |  |  |  |  |
| **Cross trainer** |  |  |  |  |
| **Rower** |  |  |  |  |
| **Stepper** |  |  |  |  |
| **Bike** |  |  |  |  |

Using one machine identify what speed and level you would need to work out at for the following stages of the BORG scale. Machine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| **7** | 30% effort | Very, very light intensity |  |
|  |  |  |  |
| **9** | 50% effort | Very light intensity |  |
|  |  |  |  |
| **11** | 60% effort | Fairly light intensity |  |
|  |  |  |  |
| **13** | 70% effort | Somewhat hard intensity |  |
|  |  |  |  |
| **15** | 80% effort | Hard intensity |  |
|  |  |  |  |
| **17** | 90% effort | Very hard intensity |  |
|  |  |  |  |
| **19** | 100% effort | Very, very hard intensity |  |

## **week 3**

Principles of Training (A5)

Describe the FITT principles.

|  |  |
| --- | --- |
| **F** | How often am I going to train? How many Reps/Sets am I going to do? |
| **I** | How hard am I working? 75% of maximum? 90% of maximum?  Heart rate! To tell us! |
| **T** | How long am I going to train for?  How long is the exercise going to be? |
| **T** | Muscular endurance training Aerobic endurance: Continuous training, Interval and Fartlek training. Plyometric training SAQ training. |

List 3 ways that the intensity of exercise can be increased

|  |  |
| --- | --- |
| **1** | The more weight you are lifting. |
| **2** | Number of repetitions. |
| **3** | Number of sets. |

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| How can fitness levels be improved using FITT principles? |
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Write a training session for an athlete of your choice using the FITT principles

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Additional Principles of Training (A6)

Describe the additional principles of training.

|  |  |
| --- | --- |
| **Progressive Overload** | I consistently push myself to my maximum. |
| **Specificity** | A specific focus/activity for every session. |
| **Individual differences** | Gender. Age. Interests. Money. Facilities. Race. Disability. |
| **Adaptation** | Changing the activity based on the conditions.  Noticing a change in your body shape. |
| **Reversibility** | Your fitness levels get worse.  1. Injury.  2. Not pushing to maximum.(Effort) |
| **Variation** | Working the same muscle groups, but doing different activities. |
| **Rest and recovery** | You allow your muscles to rest and rebuild.  If you don’t rest and recover you could “burn out.” |

There are potential hazards of overtraining. Write down as many reasons why overtraining can have a negative effect on fitness.

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If you were currently able to lift 10kg, how could you progressively overload to cause adaptation over 6 weeks? Remember this must be realistic!

|  |
| --- |
| Week 1: Bicep Curls. – 1 set, 10 reps, 12kg  Week 2: Bicep Curls. – 1 set, 15 reps, 12kg  Week 3: Bicep Curls – 1 set, 15 reps, 15kg  Week 4: Bench Press – 1 set, 10 reps, 45kg  Week 5: Bench Press – 2 sets, 10 reps, 45kg  Week 6: Bench Press – 2 sets, 15 reps, 55kg |

## **week 4**

## 

## **Work on the task provided by your teacher to apply your knowledge**

## **week 5**

Fitness Training Methods (B1, B2, B3) - Warm up, cool down and flexibility

(PRACTICAL & THEORY)

**Preparation for training**

Before undertaking training it is important to consider health & safety.

Complete the blanks in the sentences below.

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ use of any equipment used.
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ application of training techniques.
* Undertake a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ before training.
* Perform a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ after training to aid recovery.
* Apply the \_\_\_\_\_\_\_\_\_\_\_ principles correctly for each training method.
* Ensure that the training is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the component of fitness you are trying to develop.

A warm up includes the following 3 phases:

|  |  |
| --- | --- |
| **Pulse raising** |  |
| **Stretching** |  |
| **Joint mobilization** |  |

A cool down includes the following 3 phases:

|  |  |
| --- | --- |
| **Pulse lowering** |  |
| **Static stretching** |  |
| **Developmental stretching** |  |

Flexibility Training- describe the stretches you performed

|  |  |
| --- | --- |
| Stretches | Static Stretching: Stretches where you do not move. **These are included in a cool down.** |
|  | PNF Stretching:   1. You need a partner.  2. The person contracts the leg and pushes against their partner.  3. As they relax their muscles, the partner increases the range of movement. 4. This process is repeated until the person has a full range of movement.  **The best form of stretching.** |
|  | Ballistic Stretching  The person bounces up and down. The range of movement is increased  **Big downside: the risk of injury is significantly higher.**   Gymnasts use this most commonly. |

Devise a warm up for a sport of your choice.

|  |
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|  |

Devise a cool down for a sport of your choice.

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## **week 6**

Fitness Training Methods (B1, B2, B3) - Aerobic Endurance and strength training

(PRACTICAL & THEORY)

Aerobic Endurance Training

Define aerobic endurance:

|  |
| --- |
| **- Working for a prolonged period of time.** |
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* Endurance training takes part mainly in the aerobic training zone (60-80% MHR).
* The work to rest ratio should be 3:1-   
  E.g. if you exercise for 30 minutes you would rest for 10 minutes.

Match up the definitions:

|  |  |  |
| --- | --- | --- |
| **Heart Rate Training** |  | This involves working for a sustained period of time without rest. Usually lasting at least 30 minutes. It improves cardio-vascular fitness. |
| **Interval Training** |  | This training can be called 'Speed play' training. It has no rest and involves varying your speed and the type of terrain over which you run, walk, cycle or ski. It improves aerobic and anaerobic fitness. |
| **Continuous Training** |  | This involves alternating between periods of hard exercise (usually 30 sec- 5 minutes) and rest. It improves anaerobic endurance by increasing the work times and decreasing the rest times. Total work time is at least 20 minutes and rest is one third of the work. |
| **Fartlek Training** |  | This training uses your maximum heart rate (MHR) to calculate how hard you should work your heart to develop either aerobic or anaerobic fitness to calculate MHR: 220 - Age = MHR |

Write what you will complete for a continuous training session:

|  |
| --- |
| Running: I would run for 30 minutes around a field. I would ensure that I don’t stop. |

Write what you will complete for a fartlek training session:

|  |
| --- |
| Cycling:  Participant will cycle for 1 minute on 1 turn difficulty.  Participant will cycle for 45 seconds on 2 turn difficulty. Participant will cycle for 30 seconds on 3 turn difficulty.  Participant repeats the above. |
|  |

Write what you will complete for an interval training session:

|  |
| --- |
| Rowing: Rower will row for 5 minutes on 7/10 difficulty. Rower will then rest for 5 minutes, as their partner completes the activity.  Participant repeats the above. |

Free weights

* An effective way to improve muscular strength and endurance.
* Encourages the body to develop core strength as the weight is unstable compared to resistance machines.
* Good techniques vital to prevent injury.
* Ensure you work through a full range of motion (ROM).
* Use a ‘spotter’ when necessary.
* 1 lift is called 1 ‘repetition’ or ‘rep’.
* One repetition maximum (1RM) is the most a person can lift in 1 rep.
* The number of repetitions completed without rest is called a ‘set’.
* Rest in between sessions in order to aid recovery- 2 days between sessions will allow muscles to fully recover.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Strength training** | Low reps and high resistance | 90% 1RM | 1-6 reps | Producing movement against high resistance |
| **Muscular endurance training** | High reps and low resistance | 50-60% 1RM | 12-20 reps | Repetitive movements of muscle/ muscle group |
| **Power training** | Medium reps and medium load | 75% 1 RM | 12 reps | Movements in close succession |

* Consider the order of exercises performed- compound exercises before isolation exercises.
* If you train regularly- you could complete body part splits (training a different body part each session e.g. legs, back).
* If you train less regularly- you should alternate exercises between upper and lower body (e.g. chest and legs) and/ or between push and pull exercises (chest press and seated row).

Name and complete the following exercises

|  |  |
| --- | --- |
| Leg exercises | Lunges!  Sqauts! |
| Back exercise | Up right row! |
| Chest exercises | Bench/Chest press  Butterfly Press |
| Shoulder exercises | Shoulder Press  Side lateral raise. |
| Arm exercises | Tricep extensions.  Bicep Curls. |

How many reps of these exercises would you complete if you were working on strength training?

|  |
| --- |
| 1-6 reps. |

What exercises could you complete for a strength training session to help you achieve your goals? (Leg)

|  |
| --- |
| 2 leg exercises:  1. Lunges (90% 1RM. 1-6 reps) Squats (90% 1RM. 1-6 reps) |

Who would benefit from strength training?

Complete the table and identify 3 athletes that may benefit from this & reasons why.

|  |  |
| --- | --- |
| **Strength- free weights** | * **Sumo.** * **Prop in Rugby.** * **Weight Lifting.** |

## 

## **week 7**

Fitness Training Methods (B1, B2, B3) - Speed, muscular endurance and power training

(PRACTICAL & THEORY)

Speed training

Speed training is a method of training that develops a person’s speed over short distances.

* It is very high intensity training and so work periods should be short (up to about 15 seconds) and frequently interspersed with lots of short rest periods. (like interval training)
* Work to rest ratio should be 1:6.  
  E.g. work for 15 seconds and 90 seconds rest.

Identify the training methods below and complete the training sessions:

|  |  |  |  |
| --- | --- | --- | --- |
| **Hollow Sprints** | Similar to interval training broken up by a ‘hollow’ period of either rest or lower level work. | Session:   * 50m Sprint (6-7 sec) * 50m Jog (25 sec) * 50m Sprint (6-7 sec) * 50m Walk (30 sec) * 50m Sprint (6-7 sec) * 150m walk (90 seconds)   Repeated 5 times before a 10 minute rest. |  |
| **Acceleration sprints** | A form of anaerobic training where running speed is increased from jogging to striding and finally to sprinting at maximum speed. Each change usually takes place after 50m and rest periods of jogging or walking are between each sprint. Can start from a static, rolling or sport specific starting point | Session:   * Face away from finish line on ‘go’ turn and sprint to line * Lie face down on ‘go’ stand and run toward finish line * Jog to first cone, stride to second cone, sprint to third cone |  |
| **Interval training** | Can be used to develop speed. Work periods should be short and close to maximal speed and recovery periods should be longer. | Session:   * 6 x 50m sprints with 40 seconds rest |  |

Circuit training:   
Positive: Lots of variation.  
Negative: No muscle is worked to its maximum.

* A series of arranged exercises arranged in order.
* It can be used to develop strength, power, muscular endurance, agility, aerobic endurance in a limited time period.
* Involves 6-10 different exercises called stations one after another- perform each exercise for a time and then move onto the next station after a timed rest.
* When all the exercises are finished you have completed one circuit.
* You can perform more than one circuit in a session.

To ensure overload is achieved:

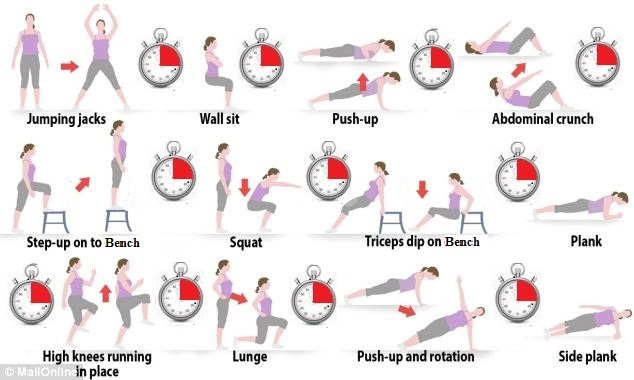
* Reduce target times to complete number of repetitions
* Reducing rest times between exercises
* Increase exercise resistance
* Increase repetitions
* Increase stations
* Increase circuits

Who would benefit from muscular endurance training?

Complete the table and identify 3 athletes that may benefit from this & reasons why.

|  |  |
| --- | --- |
| **Muscular endurance- circuit training** | * **Rowing** * **Cycling** * **Boxing (Several rounds)** |

Complete the following circuit- exercising for 45 seconds and resting for 15 seconds.



The key point to remember when designing a circuit is not to exercise the same body part in consecutive exercises- alternate body parts.

Plyometric Training – Cool down very important to remove lactic acid and stop DOMS.

* This type of training is designed to improve strength and explosive power.
* It involves performing a jumping or throwing type of exercises where the performer moves quickly.
* It involves an eccentric muscle action which lengthens the muscles followed quickly by a concentric action which shortens the muscle and produces more power.
* Think about when you stretch an elastic band- the further you stretch the band the more powerfully it contracts back.
* Exercises may include jumping, hopping, skipping, incline press ups, drop jumps, hurdles and lunging.
* You are more likely to suffer DOMS (Delayed onset of muscular soreness from plyometric training).

Complete the following plyometric exercises- 30 seconds on each exercise.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **1** | **Squat jumps** |  | **3** | **Speed skater** |  |
| **2** | **Hurdle jumps** |  | **4** | **Switch jump lunges** |  |
| **5** | **Ball slams** |  | **7** | **Ladder jumps** |  |
| **6** | **Bench jumps** |  | **8** | **Press ups** |  |
| **9** | **Hill climber** |  | **10** | **Burpees** |  |

Who would benefit from power training?

Complete the table and identify 3 athletes that may benefit from this & reasons why.

|  |  |
| --- | --- |
| **Power- plyometrics** |  |

## **week 8**

## 

## **Work on the task provided by your teacher to apply your knowledge**

## **weeks 9-12**

Fitness Testing Methods (C.1) Importance of fitness testing to performer and coach (C.2)   
Requirements for administration of fitness test (C.3) Interpreting Results (C4)

(PRACTICAL & THEORY)

Considerations prior to conducting a fitness test

What do you need to check regarding equipment?

|  |
| --- |
|  |

Why is it important to gain written informed consent?

|  |
| --- |
|  |

Choosing and carrying out fitness tests

* You need to establish which components are important for the individual and what the purpose of each test is so that they are appropriate.
* Consider the cost, practicality as well as the advantages and disadvantages of each test
* Follow the test protocol and ensure that you record the results and compare these to the normative data- this helps to identify strengths and areas for improvement.
* Reliability- can the test be repeated in the same way and give the same result.
* Validity- whether the test measures what it is supposed to test.
* Practicality- whether the tests are realistic and convenient to perform

## **SIT AND REACH TEST**

**What is tested:** Static flexibility of hamstrings and lower back muscles

**Equipment needed:** Sit and reach box or a box and measuring tape

**Purpose of test:** To test the flexibility of the hamstrings and Erector Spinae muscles

**Procedure & Measurement:**

* Warm the client up for 5 minutes using CV exercise and modified hurdlers hamstring stretch
* The test should be done with shoes off and in non- restrictive clothing
* The client sits with legs together and straight, and with feet flat against the sit and reach box.
* Client places one hand on top of the other and leans forward from the hips as far as possible reaching along the top of the box- hold position for 2 seconds.
* Record the furthest point the client reaches
* Perform the test three times and record the best measurement.

**Notes:** Doing this test with cold muscles may result in muscle strain. Ensure knees not bent!

|  |  |  |
| --- | --- | --- |
| **Expected level** | **Male footballer** | **Male gymnast** |
| Regional | 7-10cm | 10-12cm |
| National | 9-13cm | 13-17 cm |
| International/ Professional | >15cm | >18cm |

|  |  |  |
| --- | --- | --- |
|  | **Male** | **Female** |
| Average 16-19 year old | 7-10cm | 7-11cm |

(Barsby *et a*l, 2013)



## **AEROBIC ENDURANCE- MULTISTAGE FITNESS TEST (BLEEP TEST)**

**What is tested:** VO2 max- aerobic fitness level

**Equipment needed:** Stereo; bleep test CD; cones, tape measure

**Purpose of test:** To estimate VO2 max (maximal oxygen uptake) by   
administering a progressive shuttle run test.

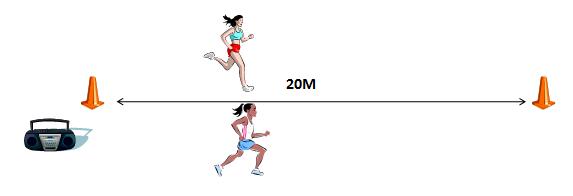
**Procedure & Measurement:**

* Measure a distance of 20 metres and mark with two cones.
* Perform a short 5 minute cardiovascular warm up
* Start the CD, the participants will run 20 metres to the furthest cone when the first 3 bleeps sound.
* When the bleep sounds on the CD the participant turns around to run back. You must reach the other line on or before the bleep.
* The participants continue to run between the cones and the time between the bleeps becomes shorter- hence the participants need to run faster to reach the cones.
* If the participant fails to get to the other end before the bleep on 3 consecutive occasions then they are out (2 chances).
* Record the level at which the participant stopped the test.
* Compare to norm tables.
* Work out your VO2max using the table.

**Notes:** As this is a **maximal** test, certain precautions should be taken. Participants should have no apparent health problems. A qualified First Aider should be present during the test.

|  |  |  |
| --- | --- | --- |
| **Expected level** | **Female footballer** | **Female gymnast** |
| Regional | Level 9 | Level 8 |
| National | Level 10 | Level 9 |
| International/ Professional | Level 12+ | Level 10 |

(Barsby *et a*l, 2013)



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Male** | | | | | |
| **Age** | **Excellent** | **Above Average** | **Average** | **Below Average** | **Poor** |
| **14 - 16** | L12 S7 | L11 S2 | L8 S9 | L7 S1 | < L6 S6 |
| **17 - 20** | L12 S12 | L11 S6 | L9 S2 | L7 S6 | < L7 S3 |
| **21 - 30** | L12 S12 | L11 S7 | L9 S3 | L7 S8 | < L7 S5 |
| **Female** | | | | | |
| **Age** | **Excellent** | **Above Average** | **Average** | **Below Average** | **Poor** |
| **14 - 16** | L10 S9 | L9 S1 | L6 S7 | L5 S1 | < L4 S7 |
| **17 - 20** | L10 S11 | L9 S3 | L6 S8 | L5 S2 | < L4 S9 |
| **21 - 30** | L10 S8 | L9 S2 | L6 S6 | L5 S1 | < L4 S9 |

(Davis, 2010)

The following table of predicted maximum oxygen uptake values (VO2 Max) for the Multistage Fitness Test continues over the next few pages and was introduced by the Department of Physical Education & Sports Science Loughborough University, 1987.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |
| 4 | 2 | 26.8 |  | 5 | 2 | 30.2 |  | 6 | 2 | 33.6 |
| 4 | 4 | 27.6 |  | 5 | 4 | 31 |  | 6 | 4 | 34.3 |
| 4 | 6 | 28.3 |  | 5 | 6 | 31.8 |  | 6 | 6 | 35 |
| 4 | 9 | 29.5 |  | 5 | 9 | 32.9 |  | 6 | 8 | 35.7 |
|  |  |  |  |  |  |  |  | 6 | 10 | 36.4 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |
| 7 | 2 | 37.1 |  | 8 | 2 | 40.5 |  | 9 | 2 | 43.9 |
| 7 | 4 | 37.8 |  | 8 | 4 | 41.1 |  | 9 | 4 | 44.5 |
| 7 | 6 | 38.5 |  | 8 | 6 | 41.8 |  | 9 | 6 | 45.2 |
| 7 | 8 | 39.2 |  | 8 | 8 | 42.4 |  | 9 | 8 | 45.8 |
| 7 | 10 | 39.9 |  | 8 | 11 | 43.3 |  | 9 | 11 | 46.8 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |
| 10 | 2 | 47.4 |  | 11 | 2 | 50.8 |  | 12 | 2 | 54.3 |
| 10 | 4 | 48 |  | 11 | 4 | 51.4 |  | 12 | 4 | 54.8 |
| 10 | 6 | 48.7 |  | 11 | 6 | 51.9 |  | 12 | 6 | 55.4 |
| 10 | 8 | 49.3 |  | 11 | 8 | 52.5 |  | 12 | 8 | 56 |
| 10 | 11 | 50.2 |  | 11 | 10 | 53.1 |  | 12 | 10 | 56.5 |
|  |  |  |  |  |  |  |  | 12 | 12 | 57.1 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |
| 13 | 2 | 57.6 |  | 14 | 2 | 61.1 |  | 15 | 2 | 64.6 |
| 13 | 4 | 58.2 |  | 14 | 4 | 61.7 |  | 15 | 4 | 65.1 |
| 13 | 6 | 58.7 |  | 14 | 6 | 62.2 |  | 15 | 6 | 65.6 |
| 13 | 8 | 59.3 |  | 14 | 8 | 62.7 |  | 15 | 8 | 66.2 |
| 13 | 10 | 59.8 |  | 14 | 10 | 63.2 |  | 15 | 10 | 66.7 |
| 13 | 13 | 60.6 |  | 14 | 13 | 64 |  | 15 | 13 | 67.5 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |
| 16 | 2 | 68 |  | 17 | 2 | 71.4 |  | 18 | 2 | 74.8 |
| 16 | 4 | 68.5 |  | 17 | 4 | 71.9 |  | 18 | 4 | 75.3 |
| 16 | 6 | 69 |  | 17 | 6 | 72.4 |  | 18 | 6 | 75.8 |
| 16 | 8 | 69.5 |  | 17 | 8 | 72.9 |  | 18 | 8 | 76.2 |
| 16 | 10 | 69.9 |  | 17 | 10 | 73.4 |  | 18 | 10 | 76.7 |
| 16 | 12 | 70.5 |  | 17 | 12 | 73.9 |  | 18 | 12 | 77.2 |
| 16 | 14 | 70.9 |  | 17 | 14 | 74.4 |  | 18 | 15 | 77.9 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |  | **Level** | **Shuttle** | **VO2 Max** |
| 19 | 2 | 78.3 |  | 20 | 2 | 81.8 |  | 21 | 2 | 85.2 |
| 19 | 4 | 78.8 |  | 20 | 4 | 82.2 |  | 21 | 4 | 85.6 |
| 19 | 6 | 79.2 |  | 20 | 6 | 82.6 |  | 21 | 6 | 86.1 |
| 19 | 8 | 79.7 |  | 20 | 8 | 83 |  | 21 | 8 | 86.5 |
| 19 | 10 | 80.2 |  | 20 | 10 | 83.5 |  | 21 | 10 | 86.9 |
| 19 | 12 | 80.6 |  | 20 | 12 | 83.9 |  | 21 | 12 | 87.4 |
| 19 | 15 | 81.3 |  | 20 | 14 | 84.3 |  | 21 | 14 | 87.8 |
| (http//:www.brianmac.com) | | |  | 20 | 16 | 84.8 |  | 21 | 16 | 88.2 |

Interpreting maximum oxygen uptake results

|  |  |  |
| --- | --- | --- |
| **Category** | **Males (ml/O2/kg/min-1)** | **Females (ml/O2/kg/min-1)** |
| Extremely high | 70+ | 60+ |
| Very High | 63-69 | 54-59 |
| High | 57-62 | 49-53 |
| Above average | 52-56 | 44-48 |
| Average | 44-51 | 35-43 |

(BTEC Level 3 Sport and Exercise Science, 2010)

## **AEROBIC ENDURANCE- forestry step test**

**What is tested:** Cardio-respiratory efficiency- how heart rate increases with steady state exercise

**Equipment needed: S**tep/bench- 33cm for females and 40cm for males;   
metronome, stopwatch; heart rate monitor

**Purpose of test:** To determine cardio-respiratory endurance- how heart rate increases with steady state exercise.

**Procedure & Measurement:**

* Participant steps up and down on a bench/ step for five minutes.
* Participant steps up and down in time with in time with the beat of a metronome set at 90bpm (approximately 22.5 steps per minute).
* Ensure feet are wholly on the bench each time. Participant is allowed to change lead leg.
* At the end of five minutes participant sits on bench. Locate pulse and start counting within 10 seconds of completion.
* Record pulse over one minute.
* Compare to VO2max tables- use your age , post exercise heart rate and body weight to calculate maximal aerobic power using the tables.
* Refer to norm chart for your age.



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **VO2max table- Forestry Non- adjusted Aerobic Fitness Values (ml/kg/ min) for Women** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Pulse count** | **HR (bpm)** | | | | **Maximal Oxygen Consumption (VO2max)** | | | | | | | | | | | | | | | | | | | | | | |
| 45 | 180 | | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | 29 | | 29 | 29 | |
| 44 | 176 | | | |  | |  | |  | |  | |  | |  | |  | | 30 | | 30 | | 30 | | 30 | 30 | |
| 43 | 172 | | | |  | |  | |  | |  | |  | |  | | 31 | | 31 | | 31 | | 31 | | 31 | 31 | |
| 42 | 168 | | | |  | |  | | 32 | | 32 | | 32 | | 32 | | 32 | | 32 | | 32 | | 32 | | 32 | 32 | |
| 41 | 164 | | | |  | |  | | 33 | | 33 | | 33 | | 33 | | 33 | | 33 | | 33 | | 33 | | 33 | 33 | |
| 41 | 160 | | | |  | |  | | 34 | | 34 | | 34 | | 34 | | 34 | | 34 | | 34 | | 34 | | 34 | 34 | |
| 39 | 156 | | | |  | |  | | 35 | | 35 | | 35 | | 35 | | 35 | | 35 | | 35 | | 35 | | 35 | 35 | |
| 39 | 152 | | | |  | |  | | 36 | | 36 | | 36 | | 36 | | 36 | | 36 | | 36 | | 36 | | 36 | 36 | |
| 37 | 148 | | | |  | |  | | 37 | | 37 | | 37 | | 37 | | 37 | | 37 | | 37 | | 37 | | 37 | 37 | |
| 36 | 144 | | | |  | | 37 | | 38 | | 38 | | 38 | | 38 | | 38 | | 38 | | 38 | | 38 | | 38 | 38 | |
| 35 | 140 | | | | 38 | | 38 | | 39 | | 39 | | 39 | | 39 | | 39 | | 39 | | 39 | | 39 | | 39 | 39 | |
| 34 | 136 | | | | 39 | | 39 | | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | 40 | |
| 33 | 132 | | | | 40 | | 40 | | 41 | | 41 | | 41 | | 41 | | 41 | | 41 | | 41 | | 41 | | 41 | 41 | |
| 32 | 128 | | | | 41 | | 41 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | 42 | |
| 31 | 124 | | | | 42 | | 42 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | 43 | |
| 30 | 120 | | | | 43 | | 43 | | 44 | | 44 | | 44 | | 44 | | 44 | | 44 | | 44 | | 44 | | 44 | 44 | |
| 29 | 116 | | | | 44 | | 44 | | 45 | | 45 | | 45 | | 45 | | 45 | | 45 | | 45 | | 45 | | 45 | 45 | |
| 28 | 112 | | | | 45 | | 45 | | 46 | | 46 | | 46 | | 46 | | 47 | | 47 | | 47 | | 47 | | 47 | 47 | |
| 27 | 108 | | | | 46 | | 46 | | 47 | | 48 | | 48 | | 49 | | 49 | | 49 | | 49 | | 49 | |  |  | |
| 26 | 104 | | | | 47 | | 48 | | 49 | | 50 | | 50 | | 51 | | 51 | | 51 | | 51 | |  | |  |  | |
| 25 | 100 | | | | 49 | | 50 | | 51 | | 52 | | 52 | | 53 | | 53 | |  | |  | |  | |  |  | |
| 24 | 96 | | | | 51 | | 52 | | 53 | | 54 | | 54 | | 55 | |  | |  | |  | |  | |  |  | |
| 23 | 92 | | | | 53 | | 54 | | 55 | | 56 | | 56 | | 57 | |  | |  | |  | |  | |  |  | |
| Weight (lb) |  | | | | 80 | | 90 | | 100 | | 110 | | 120 | | 130 | | 140 | | 150 | | 160 | | 170 | | 180 | 190 | |
| Weight (kg) |  | | | | 36.4 | | 40.9 | | 45.4 | | 50 | | 54.5 | | 59.1 | | 63.5 | | 68.2 | | 72.7 | | 77.3 | | 81.8 | 86.4 | |
| From B.J. Sharkey, Physiology of Fitness, Table B.2, p.259, 1984, Copyright © 1984 Human Kinetics Publishers, champaign, IL. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **VO2max tables- Forestry Non- adjusted Aerobic Fitness Values (ml/kg/ min) for Men** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Pulse count** | |  | **Maximal Oxygen Consumption (VO2max)** | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45 | | 33 | 33 | | 33 | | 33 | | 33 | | 32 | | 32 | | 32 | | 32 | | 32 | | 32 | | 32 | | | 32 | |
| 44 | | 34 | 34 | | 34 | | 34 | | 33 | | 33 | | 33 | | 33 | | 33 | | 33 | | 33 | | 33 | | | 33 | |
| 43 | | 35 | 35 | | 35 | | 34 | | 34 | | 34 | | 34 | | 34 | | 34 | | 34 | | 34 | | 34 | | | 34 | |
| 42 | | 36 | 36 | | 35 | | 35 | | 35 | | 35 | | 35 | | 35 | | 35 | | 35 | | 34 | | 34 | | | 34 | |
| 41 | | 36 | 36 | | 36 | | 36 | | 36 | | 36 | | 36 | | 36 | | 36 | | 36 | | 35 | | 35 | | | 35 | |
| 41 | | 37 | 37 | | 37 | | 37 | | 37 | | 37 | | 37 | | 35 | | 35 | | 35 | | 35 | | 35 | | | 35 | |
| 39 | | 38 | 38 | | 38 | | 38 | | 38 | | 38 | | 38 | | 38 | | 38 | | 38 | | 37 | | 37 | | | 37 | |
| 39 | | 39 | 39 | | 39 | | 39 | | 39 | | 39 | | 39 | | 39 | | 39 | | 39 | | 38 | | 38 | | | 38 | |
| 37 | | 41 | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | | 39 | | 39 | | | 39 | |
| 36 | | 42 | 42 | | 41 | | 41 | | 41 | | 41 | | 41 | | 41 | | 41 | | 41 | | 41 | | 40 | | | 40 | |
| 35 | | 43 | 43 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | | 42 | | | 41 | |
| 34 | | 44 | 44 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | | 43 | | | 43 | |
| 33 | | 46 | 45 | | 45 | | 45 | | 45 | | 45 | | 44 | | 44 | | 44 | | 44 | | 44 | | 44 | | | 44 | |
| 32 | | 47 | 47 | | 46 | | 46 | | 46 | | 46 | | 46 | | 46 | | 46 | | 46 | | 46 | | 46 | | | 46 | |
| 31 | | 48 | 48 | | 48 | | 47 | | 47 | | 47 | | 47 | | 47 | | 47 | | 47 | | 47 | | 47 | | | 47 | |
| 30 | | 50 | 49 | | 49 | | 49 | | 48 | | 48 | | 48 | | 48 | | 48 | | 48 | | 48 | | 48 | | | 48 | |
| 29 | | 52 | 51 | | 51 | | 51 | | 50 | | 50 | | 50 | | 50 | | 50 | | 50 | | 50 | | 50 | | | 50 | |
| 28 | | 53 | 53 | | 53 | | 53 | | 52 | | 52 | | 52 | | 52 | | 51 | | 51 | | 51 | | 51 | | | 51 | |
| 27 | | 55 | 55 | | 55 | | 54 | | 54 | | 54 | | 54 | | 54 | | 54 | | 53 | | 53 | | 53 | | | 52 | |
| 26 | | 57 | 57 | | 56 | | 56 | | 56 | | 56 | | 56 | | 56 | | 56 | | 55 | | 55 | | 54 | | | 54 | |
| 25 | | 59 | 59 | | 58 | | 58 | | 58 | | 58 | | 58 | | 58 | | 58 | | 56 | | 56 | | 55 | | | 55 | |
| 24 | | 60 | 60 | | 60 | | 60 | | 60 | | 60 | | 60 | | 59 | | 59 | | 58 | | 58 | | 57 | | |  | |
| 23 | | 62 | 62 | | 61 | | 61 | | 61 | | 61 | | 61 | | 60 | | 60 | | 60 | | 59 | |  | | |  | |
| 22 | | 64 | 64 | | 63 | | 63 | | 63 | | 63 | | 62 | | 62 | | 61 | | 61 | |  | |  | | |  | |
| 21 | | 66 | 66 | | 65 | | 65 | | 65 | | 64 | | 64 | | 64 | | 62 | |  | |  | |  | | |  | |
| 20 | | 68 | 68 | | 67 | | 67 | | 67 | | 67 | | 66 | | 66 | | 65 | |  | |  | |  | | |  | |
| Weight (lb) | | 120 | 130 | | 140 | | 150 | | 160 | | 170 | | 180 | | 190 | | 200 | | 210 | | 220 | | 230 | | | 240 | |
| Weight (kg) | | 54.5 | 59.1 | | 63.6 | | 66.2 | | 72.7 | | 77.3 | | 81.8 | | 86.4 | | 91 | | 95.4 | | 100 | | 104.5 | | | 109 | |

Normative tables for age and gender.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Maximum Oxygen consumption (ml/kg/min)** | | | |
|  | **Male** | | **Female** | |
| **Age** | **15** | **20** | **15** | **20** |
| **Superior** | 57+ | 56+ | 54+ | 53+ |
| **Excellent** | 56-52 | 55-51 | 53-49 | 52-45 |
| **Very good** | 51-47 | 50-46 | 48-44 | 47-43 |
| **Good** | 46-42 | 45-41 | 43-39 | 42-38 |
| **Fair** | 41-37 | 40-36 | 38-34 | 37-33 |
| **Poor** | 36-32 | 35-31 | 33-29 | 32-28 |
| **Very poor** | <32 | <31 | <31 | <28 |

(Barsby *et a*l, 2013)

## **SPEED- 35 METRE SPRINT**

**What is tested:** Speed

**Equipment needed:** Cones; stopwatch, flat running surface (ideally a running track), tape measure.

**Purpose of test:** To test speed.

**Procedure & Measurement:**

* Perform a full warm up prior to the test- cardiovascular and stretches for all major muscle groups.
* Measure out the 35 metres and mark with cones
* The participant will line up on the start line, in a standing start position.
* The starter will shout ‘GO’ and the participant will sprint to the end as quickly as possible.
* Time the run and record the time.
* This run should be repeated after 30 second recovery whilst walking back to the start.
* An average of the two runs taken.
* Relate the times to the normative table.

|  |  |  |
| --- | --- | --- |
| **TIME (SECS) FOR 35m SPRINT** | | |
| **Rating** | **Males** | **Females** |
| Excellent | <4.8 | <5.30 |
| Good | 4.8- 5.09 | 5.30- 5.59 |
| Average | 5.10- 5.29 | 5.60- 5.89 |
| Below average | 5.30- 5.60 | 5.90- 6.20 |
| Poor | > 5.60 | >6.20 |

(Arkinstall et al. 2010)



## **PUSH UP TEST**

**What is tested:** Muscular endurance of pectoral and triceps muscles

**Equipment needed:** Mat, stop watch and partner

**Purpose of test:** To test local muscular endurance in the pectoral and triceps muscles

**Procedure & Measurement:**

|  |  |
| --- | --- |
| For **men** the Push Up Test is conducted as follows:   * Lie on the mat, hands slightly wider than shoulder width apart & fully extend the arms - see Figure 1 * Lower the body until the chest is 2cm off the floor, maintaining a straight back - see Figure 2 * Return to the starting position with the arms fully extended - see Figure 1 * The push up action is to be continuous with no rest * Record the total number of successful push ups | Figure 1   Figure 2 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| For **women** the Push Up Test is conducted as follows:   * Lie on the mat, hands shoulder width apart, bent knee position & fully extend the arms - see Figure 3 * Lower the upper body until the elbows reach 90° - see Figure 4 * Return to the starting position with the arms fully extended - see Figure 3 * The push up action is to be continuous with no rest * Record the total number of successful push ups | | | | | | Figure 3   Figure 4 | |
| **MALES- Age** | **Excellent** | **Very good** | **Good** | **Fair** | | **Needs improvement** | |
| **15-19** | 39> | 29-38 | 23-28 | 18-22 | | <17 | |
| **FEMALES- Age** | **Excellent** | **Very good** | **Good** | **Fair** | | **Needs improvement** | |
| **15-19** | >33 | 25-32 | 18-24 | Dec-17 | | <11 | |

(The Canadian Physical Activity, Fitness & Lifestyle Approach: CSEP-Health & Fitness Program’s Health-Related Appraisal and Counseling Strategy, 2010)

## **SIT UP TEST**

**What is tested:** Muscular endurance of abdominal muscles

**Equipment needed:** Mat, stop watch and partner

**Purpose of test:** To measure local muscular endurance in abdominal muscles

**Procedure & Measurement:**

* Participant lies on mat on their back, knees bent, feet flat on the floor and arms folded across the body.
* Your feet may be held by a partner if required though needs to by noted down in results section.
* On the command of go the participant raises to a 90 degree angle and perform a sit ups.
* They return back to the start position with their head touching the floor. That will be one repetition.
* The participant repeats this for 1 minute.
* Count number of successful sit ups.
* Consult normative table.

**Notes: This test is not recommended for those with lower back problems.** Those with no apparent back problem should be careful not to perform this exercise too quickly and risk hurting the lower back.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Age** | **Excellent** | **Above average** | **Average** | **Below average** | **Low** |
| **Males** | **16-19** | >30 | 26-30 | 20-25 | 17-19 | <17 |
|
| **Females** | **17-19** | >25 | 21-25 | 15-20 | Sep-14 | <9 |
|

(Davis , 2000)



## **Illinois agility test**

**What is tested:** Agility

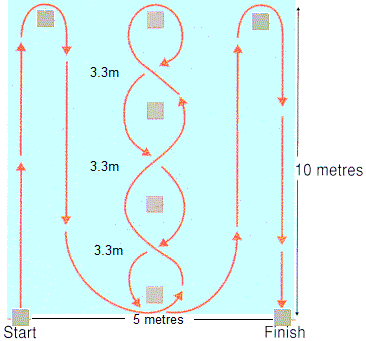
**Equipment needed:** Grip dynamometer

**Purpose of test:** To measure grip strength, which is a recognised indicator of overall muscular strength

**Procedure & Measurement:**

* Ensure to warm up prior to test
* The course is set up the course as detailed in the diagram below
* Lie face down on the floor at the “Start” cone
* On the command “GO” jump up to your feet and negotiate the course around the cones following the red line route shown in the diagram  to the finish
* An assistant stops will use a stop watch to time and record the time when you pass the “Finish” cone

**Notes:** Ensure participant moves around the cones.



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Gender** | **Excellent** | **Above Average** | **Average** | **Below Average** | **Poor** |
| **Male** | <15.2 secs | 15.2 - 16.1 secs | 16.2 - 18.1 secs | 18.2 - 19.3 secs | >19.3 secs |
| **Female** | <17.0 secs | 17.0 - 17.9 secs | 18.0 - 21.7 secs | 21.8 - 23.0 secs | >23.0 secs |

(Davis, 2010)

## **VERTICAL POWER- VERTICAL JUMP**

**What is tested:** Anaerobic power of the quadriceps muscles

**Equipment needed:** Takei jump metre

**Purpose of test:** To measure the power of the legs

**Procedure & Measurement:**

* The athlete chalks the end of his/her finger tips
* The athlete stands side on to the wall, keeping both feet remaining on the ground, reaches up as high as possible with one hand and marks the wall with the tips of the fingers (M1- standing reach)
* The athlete from a static position jumps as high as possible and marks the wall with the chalk on his fingers (M2)
* The assistant measures and records the distance between M1 and M2 (D)
* The athlete repeats the test 3 times
* The best of the three attempts is plotted on the Lewis nomogram on line ‘D’.
* Weigh yourself and record your weight in kilograms on the nomogram on line ‘W’
* Use a ruler and a sharp pencil to join up the two plots- this will cross the ‘P’ line- this is your power measured in kg/s.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Gender** | **Excellent** | **Above Average** | **Average** | **Below Average** | **Poor** |
| **Male** | >65cm | 50 - 65cm | 40 - 49cm | 30 - 39cm | <30cm |
| **Female** | >58cm | 47 - 58cm | 36 - 46cm | 26 - 35cm | <26cm |

(Davis, 2010)

## 

## 

## **VERTICAL POWER- VERTICAL JUMP**

**What is tested:** Anaerobic power of the quadriceps muscles

**Equipment needed:** Takei jump metre

**Purpose of test:** To measure the power of the legs

**Procedure & Measurement:**

* Place the rubber plate on the floor and hold the Takei Jump meter in your hand.
* Place the Takei Jump meter around your waist
* Turn the pulley to take the slack out of the rope
* Press ON/C to start the test
* Jump as high as possible and repeat the test 3 times
* **Your score is the best of three attempts**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age** | **Male** | **Female** |  | **Age** | **Male** | **Female** |  | **Age** | **Male** | **Female** |
| 10 | 34.9 | 32.8 |  | 30 | 55.5 | 38.1 |  | 50 | 44.5 | 29.7 |
| 11 | 39.0 | 36.6 |  | 31 | 54.8 | 37.4 |  | 51 | 44.0 | 29.0 |
| 12 | 43.2 | 38.5 |  | 32 | 54.0 | 37.4 |  | 52 | 43.0 | 28.5 |
| 13 | 49.2 | 41.3 |  | 33 | 53.5 | 37.1 |  | 53 | 42.6 | 28.2 |
| 14 | 54.7 | 42.5 |  | 34 | 53.1 | 36.5 |  | 54 | 42.3 | 27.8 |
| 15 | 57.5 | 42.9 |  | 35 | 52.8 | 25.9 |  | 55 | 41.6 | 27.4 |
| 16 | 60.2 | 43.2 |  | 36 | 52.4 | 36.1 |  | 56 | 40.6 | 26.8 |
| 17 | 61.6 | 43.7 |  | 37 | 51.5 | 35.5 |  | 57 | 40.1 | 26.4 |
| 18 | 60.6 | 42.9 |  | 38 | 51.1 | 35.1 |  | 58 | 39.5 | 25.9 |
| 19 | 60.2 | 42.3 |  | 39 | 51.0 | 35.0 |  | 59 | 38.5 | 25.1 |
| 20 | 59.9 | 41.8 |  | 40 | 50.4 | 34.6 |  | 60 | 37.5 | 24.0 |
| 21 | 58.6 | 41.0 |  | 41 | 49.9 | 34.1 |  | 61 | 36.5 | 23.6 |
| 22 | 58.1 | 40.2 |  | 42 | 48.6 | 33.7 |  | 62 | 35.5 | 23.6 |
| 23 | 58.3 | 40.2 |  | 43 | 48.8 | 33.3 |  | 63 | 34.5 | 23.2 |
| 24 | 58.2 | 39.7 |  | 44 | 48.0 | 32.7 |  | 64 | 33.5 | 23.0 |
| 25 | 57.8 | 39.7 |  | 45 | 47.6 | 32.2 |  | 65 | 32.7 | 22.3 |
| 26 | 57.5 | 39.2 |  | 46 | 46.7 | 31.8 |  | 66 | 31.9 | 21.3 |
| 27 | 56.7 | 39.1 |  | 47 | 46.0 | 31.2 |  | 67 | 30.8 | 20.5 |
| 28 | 56.8 | 38.8 |  | 48 | 45.8 | 30.7 |  | 68 | 30.0 | 20.0 |
| 29 | 56.2 | 38.5 |  | 49 | 45.2 | 30.4 |  | 69 | 29.0 | 19.5 |
|  |  |  |  |  |  |  |  | 70 | 28.0 | 18.5 |

## 

## **GRIP STRENGTH DYNAMOMETER**

**What is tested:** Muscular strength- forearm

**Equipment needed:** Grip dynamometer

**Purpose of test:** To measure grip strength, which is a recognised indicator of overall muscular strength

**Procedure & Measurement:**

* Switch on dynamometer.
* Adjust grip to comfortable position, to fit size of hand
* Hold dynamometer by side and squeeze as hard as you can for 5 seconds, without moving your arm and breathing out as you do so.
* Repeat test with other hand.
* Repeat 3 times on each side, there should be 1 minute rest between trials.
* Record three readings and choose the highest to refer to normative data chart.

**Notes:** It is important to breathe out with the exertion of this test.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Gender** | **Excellent** | **Good** | **Average** | **Fair** | **Poor** |
| **Male** | >56 | 51-56 | 45-50 | 39-44 | <39 |
| **Female** | >36 | 31-36 | 25-30 | 19-24 | <19 |

(Davis, 2010)



## **BODY COMPOSITION- SUM OF SKINFOLDS**

**What is tested:** Subcutaneous adipose tissue (predicts percentage of body fat)

**Equipment needed:** Skinfold calipers; marker

**Purpose of test:** Skinfold measurements give an indication of body composition- body fat percentage. It is the most commonly used field test for this component of fitness, but needs practice!

**Procedure & Measurement:**

* Ensure client is comfortable with procedure.
* Take the measurements on the **RIGHT** side of the body with subject standing upright and muscles relaxed.
* Mark each skinfold point with a pen
* Grasp the skin with the thumb and finger 1 cm above the marked site and pull the fat away from the muscle
* Place the calipers perpendicular (at right angles to) to the fold at the marked point and with the dial facing upwards
* Maintain the grasp while reading the caliper.
* Allow the calipers to settle for one or two seconds before reading and read the dial to the nearest 5.5mm and record the result.
* Allow skin to settle and repeat- take a minimum of 2 measurements per site (3 is best).
* Add up the total of the four skinfold site measurements.
* Calculate body fat percentage using the table\*\*.

**Notes: Open the calipers before you remove from** **the skin.**

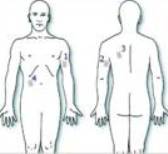
You can take the best of three for increased reliability. Take measurements at all sites, record results. Take a sum of the Skin folds and refer to norm tables for results.

Desirable Body fat ranges:

|  |  |  |
| --- | --- | --- |
| Rating | **Male** | **Female** |
| **16 – 29** | 14 – 18% | 22 – 25% |

This is done using the Durnin and Wormsley (1974) sites as follows:

|  |  |
| --- | --- |
| **Area** | **Description of Site** |
| **Triceps** | A vertical grasp, taken halfway between the shoulder and the elbow on the centre line of back of the arm. |
| **Biceps** | A vertical grasp, taken 1cm above the site for the triceps on the front of the arm. |
| **Subscapular** | A diagonal fold, at a 45 degree angle, taken 2cm below the lowest point of the shoulder blade. |
| **Suprailiac** | A diagonal fold, taken just above the iliac crest (hip bone), directly below the front of the shoulder. |



Subscapular

Triceps

Suprailiac

Biceps

|  |  |
| --- | --- |
| **Area** | **Measurement** |
| **Triceps** |  |
| **Biceps** |  |
| **Subscapular** |  |
| **Suprailiac** |  |
| **Total sum of skin folds** |  |

Sum of Skinfolds

|  |  |  |  |
| --- | --- | --- | --- |
| **Males** | | **Females** | |
| Sum of Skinfolds | Body Fat % | Sum of Skinfolds | Body Fat % |
|  |  | 14 | 9.4 |
|  |  | 16 | 11.2 |
|  |  | 18 | 12.7 |
| 20 | 8.1 | 20 | 14.1 |
| 22 | 9.2 | 22 | 15.4 |
| 24 | 10.2 | 24 | 16.5 |
| 26 | 11.2 | 26 | 17.6 |
| 28 | 12.1 | 28 | 18.6 |
| 30 | 12.9 | 30 | 19.5 |
| 35 | 14.7 | 35 | 21.6 |
| 40 | 16.3 | 40 | 23.4 |
| 45 | 17.7 | 45 | 25.0 |
| 50 | 19.0 | 50 | 26.5 |
| 55 | 20.2 | 55 | 27.8 |
| 60 | 21.2 | 60 | 29.1 |
| 65 | 22.2 | 65 | 30.2 |
| 70 | 23.2 | 70 | 31.2 |
| 75 | 24.0 | 75 | 32.2 |
| 80 | 24.8 | 80 | 33.1 |
| 85 | 25.6 | 85 | 34.0 |
| 90 | 26.3 | 90 | 34.8 |
| 95 | 27.0 | 95 | 35.6 |
| 100 | 27.6 | 100 | 36.3 |
| 110 | 28.8 | 110 | 37.7 |
| 120 | 29.9 | 120 | 39.0 |
| 130 | 31.0 | 130 | 40.2 |
| 140 | 31.9 | 140 | 41.3 |
| 150 | 32.8 | 150 | 42.3 |
| 160 | 33.6 | 160 | 43.2 |
| 170 | 34.4 | 170 | 44.6 |
| 180 | 35.2 | 180 | 45.0 |

(BTEC National Diploma Sport Development, Coaching and Fitness, 2007)

**Interpreting your results**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Age | | | | | |
| MALES | 18-25 | 26-35 | 36-45 | 46-55 | 56-65 | 65+ |
| **Very Lean** | 4-7% | 8-12% | 10-14% | 12-16% | 15-18% | 15-18% |
| **Lean** | 8-10% | 13-15% | 15-18% | 17-20% | 19-21% | 19-21% |
| **Leaner than average** | 11-13% | 16-18% | 19-21% | 21-23% | 22-24% | 22-23% |
| **Average** | 14-18% | 19-21% | 22-24% | 24-25% | 25-26% | 24-25% |
| **Fatter than average** | 18-20% | 22-24% | 25-26% | 26-28% | 27-28% | 26-27% |
| **Fat** | 22-26% | 25-28% | 27-29% | 29-31% | 28-31% | 20-30% |
| **Over fat** | 28-37% | 29-37% | 31-38% | 32-38% | 32-38% | 31-38% |
|  | Age | | | | | |
| FEMALES | 18-25 | 26-35 | 36-45 | 46-55 | 56-65 | 65+ |
| **Very Lean** | 13-17% | 13-18% | 15-19% | 18-22% | 18-23% | 16-18% |
| **Lean** | 18-20% | 19-21% | 20-23% | 23-25% | 24-26% | 22-25% |
| **Leaner than average** | 21-23% | 22-23% | 24-26% | 26-28% | 27-30% | 27-29% |
| **Average** | 24-25% | 24-26% | 27-29% | 29-31% | 31-33% | 30-32% |
| **Fatter than average** | 26-28% | 27-30% | 30-32% | 32-34% | 24-36% | 33-35% |
| **Fat** | 29-31% | 31-35% | 33-36% | 35-38% | 37-38% | 36-38% |
| **Over fat** | 33-43% | 36-48% | 39-48% | 40-49% | 39-46% | 39-44% |

## 

## **BODY MASS INDEX B.M.I.**

**What is tested:** Assessment of body composition- body fat

**Equipment needed:** Height measure or tape measure; weighing scales

**Purpose of test:** To get an indication of physical dimension

**Procedure:** Height – stand with heels against wall, with bare feet, eyes looking straight ahead.

Weight – Stand on scales in minimal clothing, ensuring scales are set to zero and standing on a hard, even surface.

**Measurement:** Height - **Measure in metres**.

Weight – **Measure in kilograms**.

Calculate **Body Mass Index** with the following equation:

**BMI = WEIGHT (Kg)**

**(HEIGHT x HEIGHT) (m)**

Relate your score to the normative tables.

**Notes:** BMI is a common way of indicating whether a client is obese- though does not actually measure body composition.

Work out your body mass index (BMI) Example

**61.6 kg\_\_\_\_  
1.74m x 1.74m**

**61.6  
2.89**

1..

Your weight in kilograms

(Height in metres x height in metres)

2.

3.

**= BMI 19**

|  |
| --- |
| **Write your calculations here:** |

**NORMATIVE TABLE FOR BMI**

|  |  |  |
| --- | --- | --- |
| BMI | **Classification** | **Associated risk** |
| **<18.5** | Underweight | Increasing health risk |
| **18.5– 24.9** | Normal weight (grade 0) | Lowest health risk |
|  |  |  |
| **25-29.9** | Overweight | Medium risk |
| **30-34.9** | Obesity (grade I) | Gradually Increasing |
| **35-39.9** | Obesity (grade II) | Health risk with |
| **40+** | Extremely obese (grade III) | Gradually increasing BMI |

(ACSM’s Guidelines for Exercise Testing and Prescription, 2010)

## **BODY composition- Bioelectrical Impedance (BIA)**

**What is tested: Subcutaneous adipose tissue (body fat)**

**Equipment needed: Body Stat Monitor**

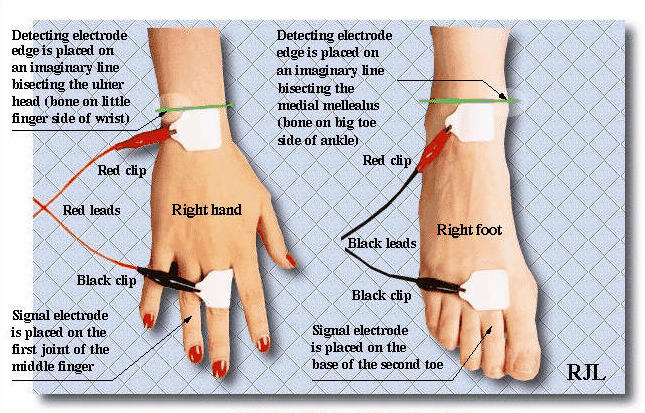
**Purpose of test:** To give an indication of body composition. Though not as accurate as the skin fold measurement as it is easier to implement and is less intrusive to the participant.

**Procedure:**

* The subject should not have exercised or taken a sauna within 8 hours of the test.
* The subject should refrain from alcohol intake for 12 hours prior to the study.
* The subject's height and weight should be accurately measured and recorded.
* The subject should lie quietly during the entire test.
* The individual must lay flat on the floor with their arms not touching their sides and their legs not touching one another.
* The electrode sites may need to be cleaned with alcohol, particularly if the skin is dry or covered with lotion.
* Electrodes are placed, two on the **RIGHT** hand and two on the **RIGHT** foot. \*See diagram below\*
* Information regarding the individual in relation to their height, weight and activity levels is inputted into the monitor.
* Within a few seconds the readings are sent through to the monitor display screen to be recorded.

**Measurement:** The theory is that muscle will conduct the electricity (due to water content), while fat will resist the path of the electricity.

Therefore the more electricity that comes out of the body, the more muscle a person has.

  
(http://www-rohan.sdsu.edu/~ens304l/bia.htm)

# Body stat Body Composition Results

Name …………………………………………………….. Date ……………………….

Age ……………………... Height …………..….…..... Weight ……………………….

|  |  |  |
| --- | --- | --- |
| Activity levels | **Very low** |  |
| **Low/ medium** |  |
| **Medium** |  |
| **Medium/ high** |  |
| **Very high** |  |

**Results**

|  |  |  |
| --- | --- | --- |
|  | **Readings** | **Recommended Range** |
| **Fat %** |  |  |
| **Fat Mass (kg)** |  |  |
| **Lean mass %** |  |  |
| **Lean mass (kg)** |  |  |
| **Total body weight (kg)** |  |  |
| **Water %** |  |  |
| **Total body water (l)** |  |  |

|  |  |
| --- | --- |
| **Estimate RMR** |  |
| **Estimated energy requirement** |  |

Comments/ Recommendations

…………………………………………………………………………………………………………………………………………………………………………………………………………

## **my results sheet**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Fitness Component** | **Name of Fitness Test** | **Result** | **Rating from Normative Data** |  | **Fitness Component** | **Name of Fitness Test** | **Result** | **Rating from Normative Data** |
| **Aerobic endurance** | **Multi Stage Fitness Test** |  |  |  | **Speed** | **35m sprint test** |  |  |
| **Flexibility** | **Sit and reach** |  |  |  | **Muscular endurance** | One minute sit ups  One minute press ups |  |  |
| **Strength** | **Hand Grip Dynamometer** | **L=**  **R=** |  |  | **Body Composition** | **Skin folds**  **BMI** | **Sum=**  **%=** |  |
| **Power** | **Vertical Jump** | Takei meter  Lewis nomogram |  |  |  |  |

## **advantages & disadvantages**

|  |  |  |
| --- | --- | --- |
| **Test** | **Advantages** | **Disadvantages** |
| **Sit and reach test** |  |  |
| **MSFT** |  |  |
| **Forestry step test** |  |  |
| **Test** | **Advantages** | **Disadvantages** |
| **35m sprint test** |  |  |
| **Push up test** |  |  |
| **Sit up test** |  |  |
| **Test** | **Advantages** | **Disadvantages** |
| **Illinois agility test** |  |  |
| **Vertical jump- 1** |  |  |
| **Vertical jump-2** |  |  |
| **Test** | **Advantages** | **Disadvantages** |
| **Grip strength** |  |  |
| **Body composition- skinfolds** |  |  |
| **Body composition- BMI/ BIA** |  |  |

## **week 13**

## 

## **Work on the task provided by your teacher to apply your knowledge**

## **notes for exam revision**

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