VCE Unit 1 AOS 2: Outcome 2

*Biomechanics Lab*

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In order to complete this outcome you will need to participate in the following tasks:

**Lab 1: Force summation (marks)**

**Lab 2: Striking observations (marks)**

**Lab 3: Throwing Observations (marks)**

All students must measure observe and evaluate the results from each lab task. Each lab task will require you to film and record results, observe a student’s performance and answer all questions with thought and in depth responses.

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Total Marks : /50 Percentage:\_\_\_\_\_\_\_ % Grade: \_\_\_\_\_\_\_

***Lab 1: Long jump and throwing***

**Introduction :**

The principles of force summation are of vital concern when performing physical skills.

In most cases the application of these principles will determine how successful an athlete is

in a wide variety of sports.

**SIMULTANEOUS FORCE SUMMATION** is where body parts contribute forces at the same

instance where as **SEQUENTIAL FORCE SUMMATION** is where body parts act one after

another to contribute to the overall movement.

**In general, force summation will be influenced by - the number of body parts used.**

- the order & timing of their use.

- the force and velocity generated.

**Aim :**

**To demonstrate the principles of force summation and their effect on :**

\* The STANDING BROAD JUMP

\* THROWING skills.

Equipment : - Tennis balls. - Tape measures.

**Procedure :**

***STANDING BROAD JUMP* - Measure the distances of the jumps with the following condtions:**

**( a )** One leg only ( no arms ).

**( b )** Two legs only ( no arms ).

**( c )** Two legs and arms ( no restrictions ).

***THROWING* - Measure the distances of the throws under the following conditions :**

**( a )** Standing with the back against a wall and using the arm only ( no part of the

trunk or legs should leave contact with the wall ).

**( b )** Step forward from the wall but still facing forwards. Use the arm and trunk only

(other students should brace the legs so that no leg movement occurs ).

**( c )** Side on position. Use the arm and trunk only ( other students should brace the

legs as in condition b ).

**( d )** Side on position. Use the arm, trunk and legs ( no transfer of weight and the feet

cannot leave the ground ).

**( e )** Side on position. Use the arm, trunk, legs, and transfer of weight ( but the feet

cannot leave the ground ).

**( f )** Side on position. Use the arm, trunk, legs, transfer of weight, and feet can leave

the ground.

**( g )** No restrictions - run up can be used.

**Results:**

|  |  |
| --- | --- |
| **Standing Broad Jump** | |
| **Condition** | **Distance (m)** |
| 1. 1 leg only |  |
| 1. 2 legs only |  |
| 1. 2 legs and arms |  |

|  |  |
| --- | --- |
| **Ball Throw** | |
| **Condition** | **Distance (m)** |
|  |  |
|  |  |
|  |  |
| **(d)** |  |
| **(e)** |  |
| **(f)** |  |
| **(g)** |  |

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**Discussion :**

**1. Which jump was the LONGEST and why ?**

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**2. Which throw was the LONGEST and why ?**

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**Conclusion:**

**Having studied the implications of force summation for jumping and throwing, explain how you would :**

1. **Hit a ball for maximum distance.**

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**2. Kick a ball for maximum distance.**

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***LAB 2: Striking***

**Introduction :**

The basic movement pattern of striking is used in many physical activities and sports.

The ability to use a correct technique to strike an object with a bat, racquet or the body is critical for successful performance.

**The correct movement pattern for striking should demonstrate the following :**

**STANCE** : Generally side on**.**

**STRIDE :** Forward step before the start of the swing.

**\* The stride is generally in the direction of the strike.**

**\* The front foot is lifted slightly and lands about 30 cm forward.**

**ORDER OF SWING** : *Hips, shoulders, elbows and wrists.*

**FOLLOW THROUGH :** *Usually in a straight line towards the target.*

**Aim :**

**Observe the striking action of a class member or watch someone hitting on a video and fill in the table below :**

|  |  |  |  |
| --- | --- | --- | --- |
| **Performance** | **Assessment** | | |
| **Clearly Evident** | **Evident** | **Not evident** |
| **Starts with a side on stance** |  |  |  |
| **Stride is forward and about 30 cm** |  |  |  |
| **Correct order of swing-** hips, shoulders, elbows, wrists. |  |  |  |
| **Follow through towards the target** |  |  |  |

**SCORING : CLEARLY EVIDENT = 3. EVIDENT = 2. NOT EVIDENT = 0**

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**Results:**

**1. Did your subject use a side on stance ? Why is it important to start with a side on stance ?**

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1. **Did your subject step forward to strike ? Why is it important to step into your hit ?**

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**3. Did your subject have the correct order for the swing ?**

**Why is it important to use the hips, then the shoulders, then the elbow and then the wrists ?**

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**4. Did your subject follow through properly ? Why is it important to follow through ?**

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**5. What was your subject's score out of 12 and do you think this is a good score? Discuss.**

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**6. How could you improve the subject's striking technique?**

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**Conclusion:**

**1. List some sports or activities where the ability to strike with a bat or racquet is important.**

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**2. How would your performance in those activities listed in question 6. be affected if you did**

**not have a good striking technique and why ?**

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***LAB 3: Throwing***

**Introduction :**

The basic movement pattern of throwing is important for success in many physical activities and sports.

**The correct movement pattern of throwing should be like this :**

**\*** *Side on stance.*

*\* Throwing arm extended behind the body with elbow bent about 90 degrees.*

*\* Step forward onto the opposite foot to the throwing arm.*

*\* Order of body parts = Hips, trunk, shoulder, elbow, wrist.*

*\* Follow through down and across the body.*

**Aim :**

**Observe the striking action of a class member or watch someone throwing on a video and fill in the table below :**

|  |  |  |  |
| --- | --- | --- | --- |
| **Performance** | **Assessment** | | |
| **Clearly Evident** | **Evident** | **Not evident** |
| **Starts with a side on position** |  |  |  |
| **Throwing arm behind body with elbow bend approx. 90degrees** |  |  |  |
| **Step forward onto opposite foot** |  |  |  |
| **After foot contact the hips and trunk**  **rotate.** |  |  |  |
| **Quick movement of shoulder, elbow and**  **wrist.** |  |  |  |
| **Follow through down and across the body.** |  |  |  |

**SCORING : CLEARLY EVIDENT = 3. EVIDENT = 2. NOT EVIDENT = 0**

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**Results:**

**1. Did the thrower start in a side on position and why is this important ?**

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**2. Did the thrower start with the arm back ready and why is this important \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**3. Did the thrower step forward onto the opposite foot and why is this important ?**

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**4. Did your subject follow through properly ? Why is it important to follow through ?**

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**Conclusion:**

**1. List some sports or activities where the ability to throw is important.**

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**2. Having watched your subject's throwing technique, do you think he/she could perform well**

**in these sports ? Why or why not ?**

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