Layup: **Shoulder**= ball and socket joint. **Movement**= shoulder flexion. **Anterior deltoid** and pectorals. When you use shoulder flexion you use your pectorials which is the antagonist and the anterior deltoid which is the agonist to build up force to apply the force up and above your head to fire the ball up and above your head when taking the layup. This movement occurs to push the ball up and above your head during a layup when you are going in for the shot.

Layup: It depends on how tall you are and how big your leg muscles are like your quads and hamstrings. You will need to apply more force into the ground to get a bigger jump to go for the lay up. When you are taller you don’t need to jump as high to get off the ground and to get closer to the basket.

**Free throw:** Newton’s 2\(^{nd}\) Law – when a force acts upon a mass, the result is acceleration of that mass. This means that the greater the force I apply to the ball in the free throw, the further it will go. The greater the force from my muscles, the greater the acceleration the ball will have in the air. So for my shot to be successful, I need to consider how much force I apply to the ball because if it is too much, it will hit the backboard and fire straight back, or possibly go over the backboard. If it is too less, it will not even go near the hoop. I would need to take into account how heavy the basketball is when thinking about how much force to apply, eg, Force = mass x acceleration.

**Layup:** 3\(^{rd}\) Law. For every action there is an equal and opposite reaction. You are applying downwards force, the action force into the ground, and when you are jumping up to take the layup you are using the reaction force. And when you are jumping up you are using your arm and leg which are attached like a string when you are pushing the ball up in a layup.

**Free throw:** The 2\(^{nd}\) law again – if you were taller, and heavier, your muscles would exert greater amount of force, and the speed of the ball, therefore you will not need to throw it as high or as hard.

**Layup:** The 3\(^{rd}\) law applying action force into the ground. For every action has an equal and opposite reaction and this will, when you are using action force you are pushing into the ground and when you jump up into the lay up - you are applying reaction force its like the ground is pushing back at you.

**Demonstrate comprehensive understanding** of how exercise physiology is involved in basketball.

The short term physiological changes happening while playing basketball was your breathing rate increasing. This occurred because …

You are using all 3 energy systems which are the aerobic, lactic and phosphate systems. An example of using these energy systems is when I …

If you were wanting to play basketball at the highest level and you have trained for 6 months, the changes that you would see to your respiratory system is your breathing rate dropping before and during your exercise because your lung capacity would become greater meaning you can inhale more oxygen. This means that you can transfer more oxygen into the blood because you are inhaling more oxygen with every breath you take. Another change that you would see is your cardiovascular system change. Your heart rate would drop before and during exercise. This is because the left ventricle will grow in size. This is the part of the heart that grows in size because it is the part of the heart that pumps the oxygenated blood through the aorta. It also grows in size because after you have been training for 6 months your muscles will want more oxygenated blood transferred through them though the capillaries so that your muscles will work at a higher level of intensity which then creates more energy. Another change is that …

The functional anatomy and biomechanical principles were completed verbally by the student. The assessor asked the student the verbal questions that were completed during class time. The assessor videoed each student, and has supplied a summary of evidence for each student. For the purpose of providing detailed annotated exemplars, some aspects of the student work have been fully transcribed. The exercise physiology principles were completed as a report (in class, supervised).
## Summary of Verbal Assessment

**Achievement**
- Demonstrate understanding of the function of the body as it relates to the performance of physical activity.
- Demonstrate understanding involves giving an account of, and/or giving details of, characteristics. For example, anatomical movement is considered a description of the way the joint moves.

**Merit**
- Demonstrate in-depth understanding of the function of the body as it relates to the performance of physical activity.
- Demonstrate in-depth understanding involves explaining how and why the function of the body is related to the performance of the physical activity.

**Excellence**
- Demonstrate comprehensive understanding of the function of the body as it relates to the performance of physical activity.
- Demonstrate comprehensive understanding involves depth and/or breadth of knowledge, including:
  - the relationship between anatomical structure and the performance of a physical activity
  - the use of biomechanical principles to explain the performance of a physical activity
  - the relationship of physiological responses to the intensity of the exercise

### Questions to Ask Students

1. Consider the movement that occurs at the **knee** or **elbow** for a **FREE THROW** in basketball.
   - Explain how this movement occurs
   - Explain why this movement occurs (include the key movement, joint used, agonist and antagonist muscle)

2. Consider the biomechanical principles involved in a **FREE THROW** in basketball
   - Explain in how they are used to produce a successful free throw
   - Explain why they are used to produce a successful lay up

### Anatomy

**Summary of Verbal Response**

- **Joints**: Elbow = hinge
- **Movement**: Elbow flex + ext.
- **Agonist**: Flex = bicep
- **Antagonist**: Ext = tricep

- Elbow ext. occurs when you are applying force to the ball to shoot it up.
- Elbow flex. occurs because you need to move from elbow flex to ext to apply force to ball to shoot.

- Shows breadth/depth in anatomical structure and the performance (attempt). [STUDENT 2]

### Biomechanics

**Summary of Verbal Response**

- **Chosen Biomechanical Principle**: Newton's 2nd Law - correctly defined

- Depends on the area of the ball.
- Shows breadth/depth in biomechanical principles and the performance

### Questions to Ask Students

1. Consider the movement that occurs at the **hip** or **shoulder** for a **LAY UP** in basketball.
   - Explain how this movement occurs
   - Explain why this movement occurs (include the key movement, joint used, agonist and antagonist muscle)

2. Consider the biomechanical principles involved in a **LAY UP** in basketball
   - Explain in how they are used to produce a successful lay up
   - Explain why they are used to produce a successful lay up

### Anatomy

**Summary of Verbal Response**

- **Joints**: Shoulder = Ball + Socket
- **Movement**: Shoulder flexion
- **Agonist**: Anterior deltoid
- **Antagonist**: Pectorals

- Shows breadth/depth in anatomical structure and the performance

### Biomechanics

**Summary of Verbal Response**

- **Chosen Biomechanical Principle**: 3rd Law - correctly defined

- You are applying downward force, other force into the ground when jumping using reaction force.
- Shows breadth/depth in biomechanical principles and the performance

### Physiological Responses

- **Short term physiological responses**
- **Long term physiological responses**
- **Energy systems**

- Shows breadth/depth in physiological responses

### Teacher Comment

- *An outstanding effort in the physiological section (real depth with fantastic examples). Solid understanding of anatomy + biomechanics, but more depth required in these two sections in order to move to the next level.*

### Final Grade

- *A+*

*Final grades will be determined using professional judgement based on the holistic examination of the evidence provided against the criteria of the achievement standard.*