

Topic 2

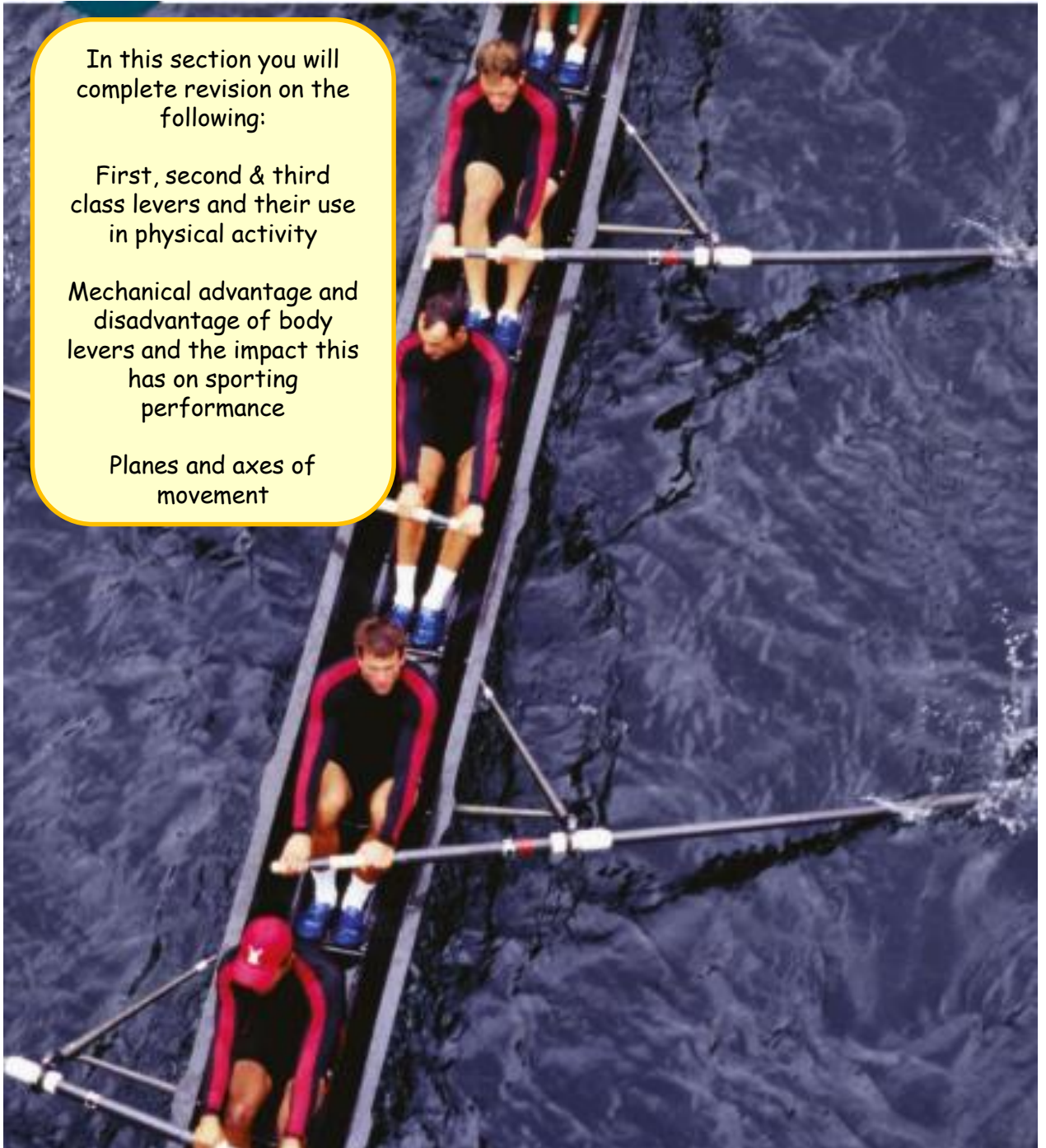
Movement Analysis

In this section you will complete revision on the following:

First, second & third class levers and their use in physical activity

Mechanical advantage and disadvantage of body levers and the impact this has on sporting performance

Planes and axes of movement



Levers

Fill in the gaps below using the following words

Size
Direction
Fulcrum
Levers
Forces
Effort

_____ are seen in everyday life as well as in sport and exercise. A lever system is a rigid bar that moves along a fixed _____ with two _____ applied to it. Levers can change the _____ or _____ of the _____ used to make a task more manageable.

Describe each of the following terms

Fulcrum

Effort

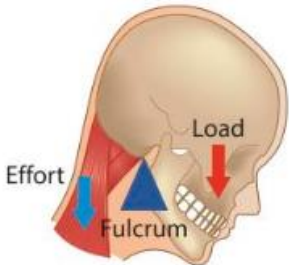


Load



Can you label the Effort Fulcrum and Load in this picture

Levers

Task - Complete the table below on levers

Class of lever	Lever Drawing	Well known example to help you remember	Best Example in the human body
	_____		
	_____		
	_____		

Task - Write down the letter in relation to where the Fulcrum, Effort and Load are to each to each other e.g. FEL

Lever Class	How to remember the order of each part of the lever
First class	
Second class	
Third class	

The Benefits Of Different Levers

There are two benefits to a lever system what are they?

Use the following words to fill in the gaps in the paragraph

- Effort
- Load
- Benefit
- Fulcrum
- Effort

To work out the _____ of a particular lever you need to have a look at the length of two arms. The distance from the load to the _____ is known as the _____ arm. The distance from the _____ to the fulcrum is known as the _____ arm.

TASK - Draw a diagram of each three levers and label the effort arm and load arm.

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Explain what lever type has mechanical advantage, why this can happen in relation to the EFL and link to a sporting example.

Mechanical advantage

Mechanical disadvantage

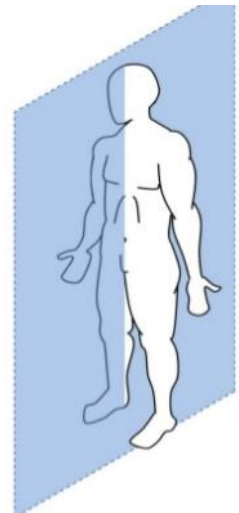
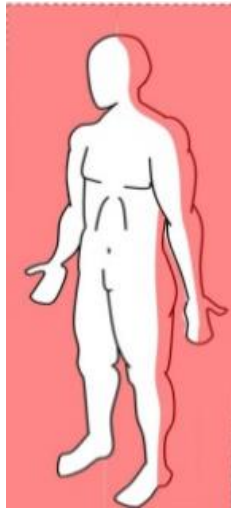
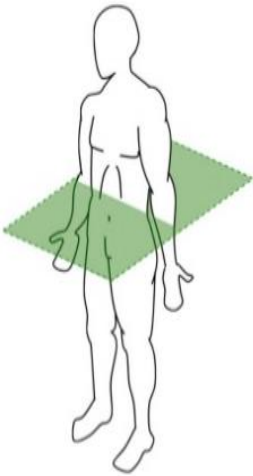
Explain what lever type has mechanical disadvantage, why this can happen in relation to the EFL and link to a sporting example.

Panes And Axes Of Movement

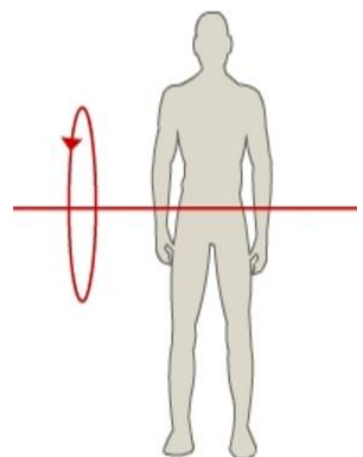
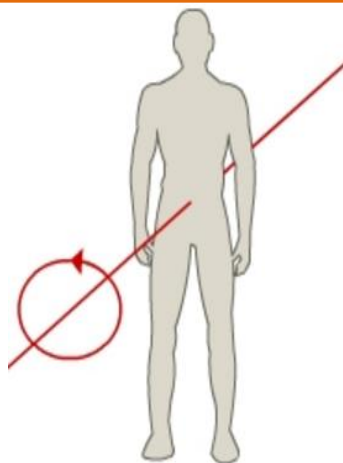
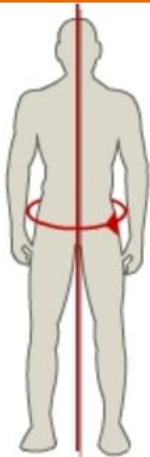
Define Plane

Define Axis

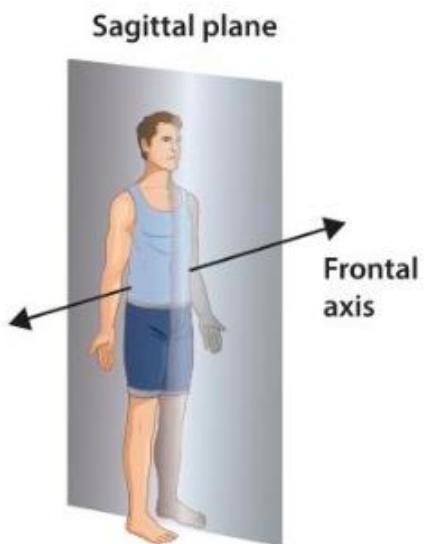
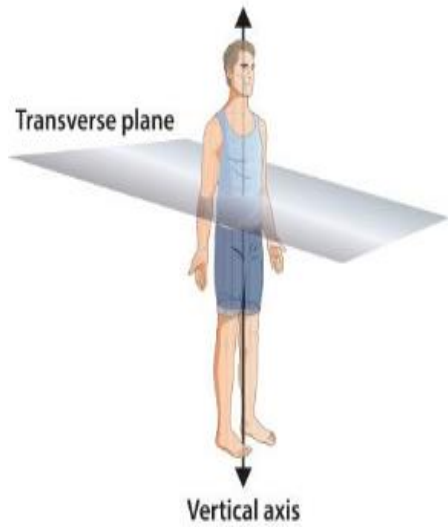
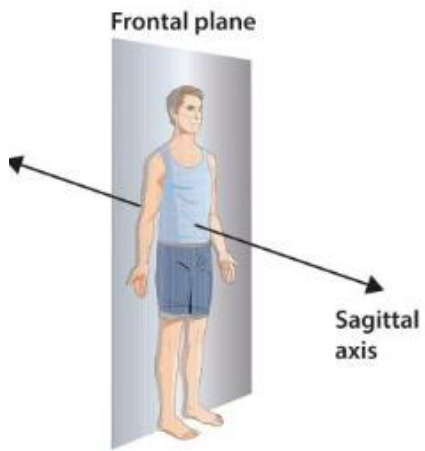
Task - label the plane in the mages below



Task - Label the Axis in the picture below



Match the Plane and axis to the movement



Exam questions

- 1 Which one of the following describes a third class lever? (1)
- A The load is to the right of the fulcrum
 - B The effort is in the middle of the lever
 - C The load is in the middle of the lever
 - D The fulcrum is on the left of the lever

- 2 Which one of the following is an example of a first class lever? (1)
- A A car jack
 - B A nutcracker
 - C A wheelbarrow
 - D A pair of tweezers

- 3 Which one of the following puts the correct plane and axis together? (1)
- A Sagittal plane with vertical axis
 - B Sagittal plane with frontal axis
 - C Transverse plane with sagittal axis
 - D Frontal plane with frontal axis

- 4 Which one of the following levers provides mechanical advantage? (1)
- A First class lever where the fulcrum is exactly in the middle
 - B First class lever where the fulcrum is nearer the effort
 - C Third class lever
 - D Second class lever

- 5 Identify the axis of movement for the cartwheel shown in **Figure 1**. (1)



▲ **Figure 1**

- A Vertical axis
- B Frontal axis
- C Sagittal axis
- D Transverse axis

- 6 **Figure 2** shows a high jumper during take off.



▲ **Figure 2**

Analyse how the following parts of the lever system, in the leg and where the foot contacts the ground, allow the high jumper to drive up and over the bar.

- a) Fulcrum (2)
 - b) Effort (2)
- 7 When sprinting, the knee joint of a footballer uses a third class lever system. Examine the role of the lever in a footballer's running performance. (3)
- 8 Using examples, describe how mechanical advantage or disadvantage is determined in a lever system. (4)
- 9 Evaluate the extent to which second and third class levers impact the performance of a sprinter. (9)
- 10 Using examples, evaluate how knowledge of different movement planes and axes can assist a gymnast in performing specific movements correctly. (9)

