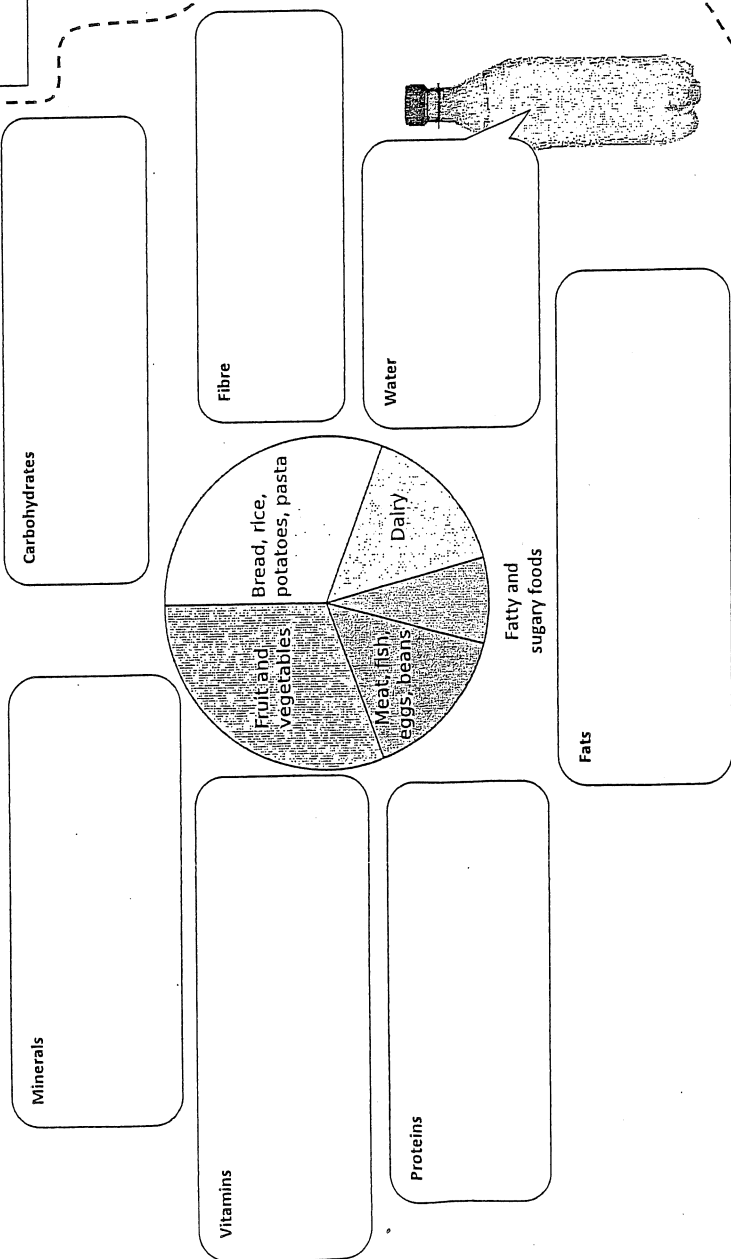


# Diet and Nutrition and Their Effect on Physical Activity and Performance

## Diet and nutrition

A healthy balanced diet consists of seven components, which when eaten in an optimal proportion can help improve sporting performance.

**A** Identify the main roles of each component of the diet and identify some food sources in which they can be found.



## Ergogenic aids

**Erythropoietin (EPO)**  
Benefit:  
Risk:

**Human growth hormone (HGH)**  
Benefit:  
Risk:

**Pharmacological aids**

**B** Identify one benefit and one risk of using the pharmacological and physiological aids listed.

**Anabolic steroids**  
Benefit:  
Risk:

**Physiological aids**

**Blood doping**  
Benefit:  
Risk:

**Cooling aids**  
Benefit:  
Risk:

**Intermittent hypoxic training (IHT)**  
Benefit:  
Risk:

**Fats**

**Amount of food**  
Athletes that exert more energy will have to eat a higher amount of food.

**C** Identify which nutritional aids are being described.

**Nutritional aids**

Replaces lost fluid.  
Maintains physiological and psychological functioning.

Buffers lactic acid.  
Risks: Nausea, unsettled stomach

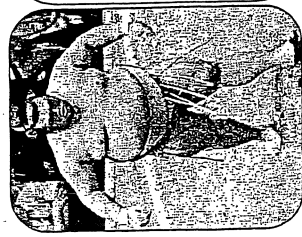
Reduces perceived effort, encourages glycogen sparing, improves muscular contraction.  
Risks: Irritability, irregular heart rate

Improves blood transport by aiding vasodilation.  
Risks: Headaches, low blood pressure.

Increases the glycogen stores available during an endurance event. Involves tailoring carbohydrate intake and exercise duration in the week prior to an event.  
Risks: Feeling bloated, nausea, issues with digestion

Increases power and strength, aids recovery.  
Risks: Kidney damage, excess water retention

## Energy intake and expenditure

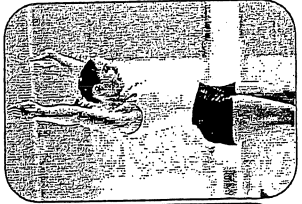


**Increasing body mass:**  
To increase body mass, the opposite needs to happen to create the other form of energy imbalance.

Expenditure < Intake

**Reducing body mass:**  
To reduce body mass, energy intake (the amount of energy provided by the sources of energy we consume) should outweigh energy expenditure.

Intake < Expenditure



USE THE LATTER TO ANSWER SECTIONS A-F ON THE SHEET BELOW

# Biomechanical Principles, Levers and the Use of Technology

**A** Research: How can the biomechanical principles on this page provide elite performers with an advantage in their sport?

**A** Describe Newton's three laws of motion.

**Newton's Laws of Motion**

**First Law:**

**Second Law:**

**Third Law:**

**B** Complete the equations below and provide units for all parts of the equation. **Biomechanical calculations**

Force	=	<input type="text"/>	x	<input type="text"/>
Momentum	=	<input type="text"/>	x	<input type="text"/>
Acceleration	=	<input type="text"/>	/	<input type="text"/>
Weight	=	<input type="text"/>	x	<input type="text"/>

**C** Draw and label the three lever systems in the space below and explain how the second class lever system has a mechanical advantage.

## Levers

**First class lever:**

**Second class lever:**

**Mechanical advantage:**

**Third class lever:**

**Load:** the weight that needs to be moved (the weight of the moving body part)

**Effort:** the force needed to move the load (the muscle)

**Fulcrum:** the location of the movement (the joint)

**Effort arm:** the distance from the fulcrum to the effort

**Load arm:** the distance from the fulcrum to the load

**D** Describe 3 factors affecting air resistance and 2 factors affecting friction.

**Weight:** The effect of gravity on an object.  $Weight = mass \times 9.81m/s^2$

**Net force:** The total force exerted on an object

**Balanced force:** Opposing forces in opposing directions are equal

**Unbalanced force:** Opposing forces in opposing directions are unequal

Affected by:

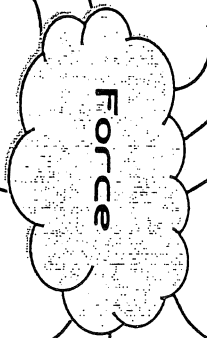
- Provide an opposite force to the force being exerted
- Reaction:

**Air resistance:** A form of friction acting between an object and the air

**Forces changing on object's centre of mass will lessen its stability**

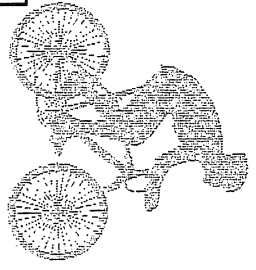
**Centre of mass:** The point at which the total body mass is concentrated

**Stability:** The object's resistance to changing position

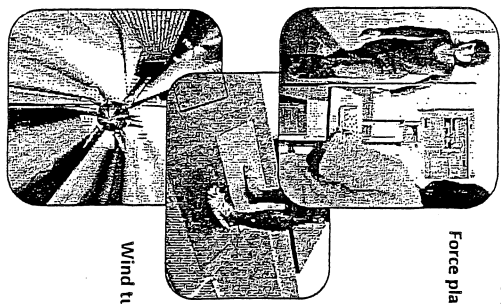


**Free body diagrams:** These show the vertical and horizontal forces being exerted on a body, and how these affect the motion of the body

**Friction:** Occurs when two surfaces interact, opposing movement



## Analysing movement through the use of technology



Force plates

Limb kinematics

Wind tunnels

**F** Describe the three ways technology can be used to analyse movement in sport.