



A-Level PE

Y11-12

Introductory

Transition Lesson

PHYSIOLOGY AND BIOMECHANICS

# Physiology & Biomechanics

## Applied Anatomy & Physiology

- ▶ Cardiovascular system
- ▶ Respiratory system
- ▶ Neuromuscular system
- ▶ Musculoskeletal system
- ▶ Energy systems

## Exercise Physiology

- ▶ Diet & nutrition
- ▶ Preparation & training
- ▶ Injury





# Biomechanical Movement

- ▶ Biomechanical principles
- ▶ Levers
- ▶ Linear motion
- ▶ Angular motion
- ▶ Projectile motion
- ▶ Fluid mechanics



# Health, Fitness and Lifestyle Factors

THE IMPACT OF PHYSICAL  
ACTIVITY, SMOKING AND DIET

# Learning Objectives

- ▶ Define health and fitness and understand the differences and links between them.
- ▶ Introduce the cardiovascular and respiratory systems, and relate them to health and fitness.
- ▶ Investigate the impact of lifestyle factors on health and fitness

# Health & Fitness

Consider the following questions:

- ▶ What is health?
- ▶ What is fitness?



# Health & Fitness

- ▶ Health - a state of complete physical, emotional and social well-being and not merely the absence of disease or infirmity.
- ▶ Fitness - the ability to cope with the demands of the environment without undue fatigue.
- ▶ Consider the relationship between health and fitness. Can you be fit, but unhealthy? Can you be healthy, but unfit? Explain.



# What are the problems with defining fitness?





# Problems Defining Fitness

- ▶ Fitness is subjective - it means different things to different people.

Consider:

- ▶ Athletes/non-athletes
- ▶ Children/adults/pensioners
- ▶ Manual labour/sedentary office work

# Components of Fitness

► There are 11 components of fitness that we can train to improve sports performance:

- Cardiovascular fitness / aerobic endurance / stamina
- Strength
- Speed
- Muscular endurance
- Flexibility
- Power
- Agility
- Balance
- Coordination
- Reaction time
- Body composition

# Cardiovascular Fitness

- ▶ The ability to participate in sustained, whole body, sub maximal activity.
- ▶ For movement our bodies need  $O_2$  and produce  $CO_2$
- ▶ CVF is related to the ability to take in  $O_2$ , get it to the muscles and remove the  $CO_2$  produced.
- ▶ The heart, lungs and blood all have to work together.
- ▶ Cardiovascular and respiratory systems.

# Cardiovascular System

The body's transport system.

Includes:

- ▶ Heart
- ▶ Blood vessels
- ▶ Blood



# Cardiovascular System

## Key Terms:

- ▶ Heart rate
- ▶ Stroke volume
- ▶ Cardiac output
- ▶ Cardiac hypertrophy
- ▶ Bradycardia
- ▶ Maximum heart rate
- ▶ Heart rate range





# Respiratory System

- ▶ Respiration – taking in of  $O_2$ , and removal of  $CO_2$
- ▶ Includes:
  - ▶ Ventilation
  - ▶ External respiration
  - ▶ Gas transport
  - ▶ Internal respiration
  - ▶ Cellular respiration



# Respiratory System

Key terms:

- ▶ Lung structure
- ▶ Mechanics of breathing
- ▶ Lung volumes
- ▶ Gas exchange



# Lifestyle Factors

Relevant lifestyle factors:

- ▶ Physical activity
- ▶ Diet
- ▶ Smoking



# Task



- ▶ Research and explain the impact of the three lifestyle factors on the health and fitness of an individual.
- ▶ You need to consider:
  - ▶ the long term adaptations caused by regular physical activity and how this benefits health and fitness, as well as the risks caused by a sedentary lifestyle and how these can negatively affect health and fitness.
  - ▶ The health and fitness benefits of a balanced diet and the risks associated with over consumption and poor diet choices.
  - ▶ The benefits of not smoking, from a health and fitness perspective, compared to the dangers of smoking.

# Task



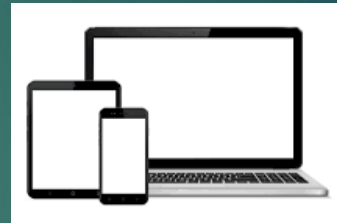
## ► Remember:

- Health - physical, mental and social - not just - heart disease, high blood pressure, effects of cholesterol, stroke etc.
  - Fitness - ability to meet the needs of the environment without undue fatigue, not just sport and exercise.
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- ## ► You will present your findings to the class in September:
- Your presentation can be written, a poster, a PowerPoint or a video.
  - You will produce a handout, to go with your presentation, that you will need to provide to each class member.



# Resources

- ▶ <https://www.nhs.uk/live-well>
- ▶ <http://www.getbritainstanding.org>
- ▶ <https://www.nutrition.org.uk>
- ▶ <https://www.livestrong.com>
- ▶ <https://smokefree.gov>
- ▶ <https://www.blf.org.uk>
- ▶ <https://www.bhf.org.uk>



- ▶ The above links are to give you a starting point for your research, but there are plenty of other sources to use.
- ▶ Please do not just copy and paste from websites!

# Contact

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- ▶ Please get in touch if you have any questions about the A-level PE course in general or if you need some support with the transition task.
- ▶ I look forward to seeing you in September!