Components of fitness

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

**Learning outcome:** The learner will:

LO2: Understand the components of fitness

**Assessment criteria:** The learner can:

2.1. Define the components of health-related fitness
2.2. Define the components of skill-related fitness
2.3. Identify the factors that affect health-related fitness and skill-related fitness
Components of fitness

- What is physical activity?

Pause the slide show and write down your thoughts and ideas
Physical activity

Any body movement that increases energy expenditure above resting levels.

• Everyday activities.

• Active leisure and recreation.

• Playing sport.
## Physical activity

<table>
<thead>
<tr>
<th>Activities of daily living (ADLs)</th>
<th>Active leisure and recreation (including structured exercise)</th>
<th>Sport (Social or competitive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vigorous housework</td>
<td>Gym training</td>
<td>Games, e.g. basketball, cricket, hockey</td>
</tr>
<tr>
<td>Gardening</td>
<td>Group exercise to music</td>
<td>Athletics, e.g. various track and field</td>
</tr>
<tr>
<td>Cleaning the car</td>
<td>Aqua aerobics or swimming</td>
<td>Water sports, e.g. sailing, rowing</td>
</tr>
<tr>
<td>DIY</td>
<td>Circuit training</td>
<td>Individual sports, e.g. judo, boxing, weight-lifting</td>
</tr>
<tr>
<td>Active travelling</td>
<td>Yoga</td>
<td></td>
</tr>
<tr>
<td>Active work</td>
<td>Pilates</td>
<td></td>
</tr>
<tr>
<td>Active play</td>
<td>Outdoor activities, e.g. hill walking and climbing</td>
<td></td>
</tr>
<tr>
<td>Using stairs more often</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Physical activity recommendations for health

• 150 minutes of moderate-intensity aerobic activity every week
Or
• 75 minutes of vigorous-intensity activities
Or
• An equivalent combination of both
• Plus
• At least two days a week of muscular strength and endurance training

*Move more often, sit down less*
Components of fitness

- What is exercise?

Pause the slide show and write down your thoughts and ideas.
Exercise

A form of physical activity that is **planned, structured and performed regularly** with the specific intention of maintaining or improving one or more of the components of physical fitness.
Exercise session structure

Main workout.
To train specific components of fitness

Warm up.
To prepare the body

Cool down.
To return the body to non-exercise state

Intensity curve / gradient
Components of fitness

- What is physical fitness?

Write down your ideas
Physical fitness

A potential outcome from taking part in regular physical activity and exercise.

• **Health-related fitness** – cardiorespiratory or cardiovascular endurance, muscular strength, muscular endurance, flexibility.

• **Skill-related fitness** – speed, reaction time, agility, balance, coordination, power.
Physical fitness

Definitions include:

“A state of well-being that provides optimal performance.”

“Attributes related to how well one performs physical activity.”

“The ability to carry out everyday tasks with vigour and without excess stress or fatigue”
Components of fitness

Thought storm

- What is health?

Pause the slide show and write down your thoughts and ideas
Health or total fitness

‘A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’. WHO.1948.

The main components are:

1. Physical fitness (health and skill-related)
2. Mental and emotional fitness
3. Medical fitness
4. Nutritional fitness
5. Social fitness
Define each of the following and describe activities that would improve each component:

**Group 1:** Cardiovascular fitness
**Group 2:** Muscular strength
**Group 3:** Muscular endurance
**Group 4:** Flexibility

Write down your ideas and file in your portfolio.
Cardiovascular fitness

The ability of the heart and lungs to take in, transport and utilise oxygen and remove waste products during exercise
Flexibility

The range of movement about a joint or series of joints.

The ability to move the joints through a full range of motion.
Muscular fitness

**Muscular strength** - the maximal amount of force a muscle or group of muscles can generate during one contraction, e.g. the maximum someone could lift once or for a few repetitions

**Muscular endurance** - the ability of a muscle or group of muscles to contract repeatedly for extended periods of time without fatigue
Define each of the following and describe activities that would help to develop these:

1. Speed
2. Power
3. Reaction time
4. Coordination
5. Balance
6. Agility

Write down your ideas and file in your portfolio
Skill-related fitness

1. **Speed** - quickness of movement, e.g. sprinting

2. **Power** - the combination of strength and speed, e.g. shot putt

3. **Reaction time** - the ability to respond quickly to a stimulus i.e. ‘reflexes’, e.g. goal keeping
Skill-related fitness

4. **Co-ordination** - the ability to move two or more body parts under control, smoothly and efficiently, e.g. dancing

5. **Balance** - the ability to control the body’s position - stationary or moving, e.g. gymnastics beam work

6. **Agility** - the ability to perform a series of explosive power movements in rapid succession in opposing directions, e.g. hop, skip and jump
Factors affecting fitness

Write down all the factors which you consider could influence fitness and health.

Which of these can be changed?

Record your answers in your portfolio.
Health and fitness factors

- Age
- Gender
- Body type
- Diet
- Activity level
- Illness
- Drugs
- Stress
- Environment
Exercise session structure

Warm up.
To prepare the body

Main workout.
To train specific components of fitness

Cool down.
To return the body to non-exercise state

Intensity curve / gradient

<table>
<thead>
<tr>
<th>Warm up</th>
<th>Main workout</th>
<th>Cool down</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>Cardiovascular</td>
<td>Pulse lowering</td>
</tr>
<tr>
<td>Pulse raising</td>
<td>Muscular fitness</td>
<td>Flexibility and stretching</td>
</tr>
<tr>
<td>Stretching</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Intensities:
0 1 2 3 4 5 6 7 8 9 10
Learning review

Assessment criteria: Can you now:

• Define the components of health-related fitness

• Define the components of skill-related fitness

• Identify the factors that affect health-related fitness and skill-related fitness
Principles and variables

**Unit:** Principles of exercise, fitness and health
Learning outcomes & assessment criteria

Learning outcome: The learner will:

LO3: Understand how to apply the principles and variables of fitness to an exercise programme

Assessment criteria: The learner can:

3.1. Describe the physiological implications of specificity, progressive overload, reversibility, adaptability, individuality and recovery
3.2. Explain the principles of FITT
3.3. Explain the principles of a progressive training programme in developing components of fitness
3.4. Explain how to recognise when and how to regress a training programme
3.5. Explain the principles of adaptation, modification and progression for each component of FITT
3.6. Describe the effect of speed on posture, alignment and intensity
3.7. Describe the effect of levers, gravity and resistance on exercise
3.8. Describe the differences between programming exercise for physical fitness and for health benefits
Principles and variables

Consider what is meant by the terms on the right

What are the physiological implications of these principles?

- Specificity
- Progressive overload
- Reversibility
- Adaptability
- Individuality
- Recovery
- Frequency
- Intensity
- Time
- Type
Training principles

Specificity - adaptations to the body’s muscles, organs and systems will be specific to the type of training undertaken
Specificity

If fitness goals are very specific, it will be important to consider:

• The predominant energy system and muscle fibre type used for the sport.
• The main prime movers recruited and joint actions required.
• The joint angle and range of movement used.
• The type of muscle contraction (concentric/eccentric) and speed of movement.
Training principles

**Progressive overload** - to evoke an adaptation response the stimulus must be large enough to challenge the individual, without overtraining.
Training principles

Reversibility - cessation of the stimulus which caused the adaptation to occur will result in a gradual decline

Use it, or lose it!
Training principles

Adaptability - the body will respond to the type of overload it is subjected to making it more efficient
Training principles

**Recovery** – the rest periods between exercise sessions is a vital part of any plan as this is when improvements occur.

Physiological adaptations occur in the time following the activity rather than during it.
Training principles

**Individuality** – each client must have a specific exercise plan that takes into account their individual abilities and needs, e.g. age, gender, fitness and skill level etc.

**Individual differences**
- Age.
- Gender.
- Body type.
- Heredity.
- Muscle fibre type.
- Range of motion (ROM).
- Strength.
- Cardiovascular fitness.
FITT principle

**Frequency** – how often?

- e.g. the number of exercise sessions in a given period

**Intensity** – how hard?

- e.g. the level of exercise difficulty and effort required

**Time** – how long?

- e.g. the length of time devoted to each exercise session

**Type** – what activity or component of fitness?

- e.g. the mode and method of exercise selected (specificity)
Research task

What are the recommended training guidelines (application of FITT) for:

• Physical fitness
  – Cardiovascular
  – Muscular
  – Flexibility
• Physical activity for health
Physical activity recommendations for health

- 150 minutes of moderate-intensity aerobic activity every week
Or
- 75 minutes of vigorous-intensity activities
Or
- An equivalent combination of both
- Plus
- At least two days a week of muscular strength and endurance training

Move more often, sit down less
# Cardiovascular fitness guidelines

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Three to five days a week.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>Moderate to vigorous intensity.</td>
</tr>
<tr>
<td></td>
<td>• Moderate: 50-65% of MHR or 12-14 RPE.</td>
</tr>
<tr>
<td></td>
<td>• Vigorous: 65-90% of MHR or 15-18 RPE.</td>
</tr>
<tr>
<td>Time</td>
<td>20-30 minutes or up 60 minutes of continuous or intermittent activity.</td>
</tr>
<tr>
<td></td>
<td>• Moderate intensity: 30 minutes, which can be accumulated</td>
</tr>
<tr>
<td></td>
<td>• Vigorous intensity: 20 minutes sustained.</td>
</tr>
<tr>
<td>Considerations</td>
<td>Untrained or deconditioned individuals will need to work towards these recommendations</td>
</tr>
</tbody>
</table>
# Muscular fitness guidelines

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Two-three days a week for each major muscle group on non-consecutive days. 48 hours rest between training sessions for specific muscle groups.</th>
</tr>
</thead>
</table>
| Intensity       | Percentage of one repetition maximum (1RM):  
|                 | • 40-50% of 1RM for older adults or sedentary adults.  
|                 | • 60-70% of 1RM for beginners.  
|                 | • > 80% of 1RM for experienced. |
| Time            | Repetitions  
|                 | • 8-12 repetitions.  
|                 | • 10-15 repetitions for beginners.  
|                 | • 15-20 repetitions for endurance.  
|                 | Sets  
|                 | • Single sets effective for beginners or older adults.  
|                 | • 2-4 sets for adults.  
|                 | • < 2 sets is effective for endurance.  
|                 | Rest  
|                 | • Intervals or 2-3 minutes between sets. |
### Flexibility guidelines

<table>
<thead>
<tr>
<th>Frequency</th>
<th>&gt; 2-3 days a week. Ideally every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>To the point of mild tension and mild discomfort</td>
</tr>
</tbody>
</table>
| Time            | Static stretches 10—30 seconds  
2-4 repetitions of specific muscle stretches  
PNF – static contraction for 3-6 seconds followed by 10-30 second static stretch  
NB: A total of 60 seconds per muscle group is recommended. Stretches can be repeated 2-4 times to achieve this total |
| Considerations  | Ensure the body is warm before stretching  
Lengthen all muscles before exercise (dynamic or static)  
Stretch all major muscle groups after work (static stretching – developmental or maintenance) |
Principles and variables

Task

Select FOUR exercises from your chosen exercise discipline.

Show an example of how you could alter the following
- Lever length
- Gravity
- Resistance

Describe the effect of levers, gravity and resistance on exercise (progression or regression)
Intensity factors

To increase exercise intensity (resistance):

- Lever length – increasing lever length
- Gravity – work against gravity
- Resistance – add weight
- ROM – moving through a fuller range of movement
Task

Choose six different exercises.

Perform each exercise at different speeds.

Note down the effect of speed on:

• Posture
• Alignment
• Intensity

Record in your portfolio
Speed

- Slow - muscle contracting for longer
- Fast – can exceed range of motion (ballistic)
- Posture and alignment – harder to maintain when moving quickly
Principles and variables

Task

When would you need to:

• Regress a training programme?
• Progress a training programme?
• How would you recognise when to regress or progress?

Record your ideas in your portfolio
Principles of progression

To avoid a slowing or decrease in performance, known as a plateau, the principles of progression should be applied.

![Progress Rates Over Time Diagram](image)

- **Genetic Potential**
- **Fitness Level**
- **Beginner Level**

Plateau = time for a new stimulus!
Progression

Overload should be gradual and not excessive.

Excessive overload will be counterproductive and slow down or reverse exercise-related gains.

Progression variables:

• Resistance, leverage, gravity
• Repetitions
• Range of motion
• Rest
• Rate/speed
• Type
When to regress a programme

Reasons for regression may include:

- A holiday, vacation or a break from training.
- A period of illness.
- Progression or worsening of a chronic health condition.
- The individual is unable to cope.
Overtraining

Should the overload stimulus exceed the body’s ability to adapt either injury or overtraining may result.

Be alert to the signs and symptoms of overtraining which include:

• Sudden poor co-ordination
• Lack of ability to concentrate
• Reduction in performance
• Irritability, over sensitivity to criticism
• Reported disrupted sleep patterns
• General lethargy
• Susceptibility to colds, illness
Overtraining

It is not necessary to regress every aspect of a training programme if overtraining is suspected

It may be sufficient to reduce just a few of the variables such as selecting one or two of the following:

• Increasing the rest time between sets
• Reducing the frequency from 4 exercise sessions per week to 3
• Reducing the weight or resistance on certain exercises
• Reducing the length or time of the total session
• Changing from high impact to low impact activities
• Changing exercise complexity by choosing simpler exercises
Learning review

Assessment criteria: Can you now:

• Describe the physiological implications of specificity, progressive overload, reversibility, adaptability, individuality and recovery
• Explain the principles of FITT
• Explain the principles of a progressive training programme in developing components of fitness
• Explain how to recognise when and how to regress a training programme
• Explain the principles of adaptation, modification and progression for each component of FITT
• Describe the effect of speed on posture, alignment and intensity
• Describe the effect of levers, gravity and resistance on exercise
• Describe the differences between programming exercise for physical fitness and for health benefits
TASK

• Select a range of exercises for each component of fitness
  – Cardiovascular
  – Muscular
  – Flexibility

• For each exercise selected plan:
  – Most basic version with at least TWO progressions
  – Intermediate version with at least TWO progressions
  – More advanced version with at least TWO progressions

• State the variables that have been manipulated to create the progressions
  – Resistance, leverage, gravity, range of motion, repetitions, complexity etc.
Training different components of fitness – cardiovascular fitness

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

Learning outcome: The learner will:

LO1: Understand the effects of exercise on the body
LO2: Understand the components of fitness
LO3: Understand how to apply the principles and variables of fitness to an exercise programme

Assessment criteria: The learner can:
1.6. Describe the short and long term effects of cardiovascular exercise
2.1. Define cardiovascular fitness
2.3. Identify the factors that affect cardiovascular fitness
3.3. Explain the principles of a progressive training programme in developing cardiovascular fitness
3.4. Explain how to recognise when and how to regress a training programme
3.5. Explain the principles of adaptation, modification and progression for each component of FITT
Cardiovascular fitness

Cardiovascular fitness - the ability of the heart and lungs to take in, transport and utilise oxygen during exercise

- Continuous, rhythmic, large muscle groups
- Aerobic
Cardiovascular fitness

- **Aerobic** means ‘with oxygen’.
- **Anaerobic** means ‘without oxygen’

**Task:**

Identify an exercise that would be moderate intensity and find variations to increase the intensity (vigorous)

Record your ideas in your portfolio
Variables

- Rate/speed
- Range of motion. E.g. deeper bends, longer strides
- Impact, e.g. higher jumps
- Use of large muscle groups, e.g. legs
- Use of multiple body parts, e.g. arms and legs

**Remember:** A moderate intensity exercise for one person may be vigorous for another, depending on the efficiency of their CV system.
The short-term effects of cardiovascular training:

- Heart rate increases
- More blood circulated
- Breathing rate increases
- Capillaries dilate
- Increased oxygen to muscles (depending on intensity and fitness level of individual)
- Increased body temperature
- Increased perspiration
The long-term effects of cardiovascular training:

- Stronger heart (cardiac muscle)
- Increased stroke volume
- Increased cardiac output
- More capillaries in the muscles.
- Waste products removed more efficiently
- More mitochondria
- Weight management assisted.
- Risk of cardiovascular disease (CV) is reduced
How do we train cardiovascular fitness? (using FIT / FITT / FITTA)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Three to five days a week.</th>
</tr>
</thead>
</table>
| **Intensity** | Moderate to vigorous intensity.  
• Moderate: 50-65% of MHR or 12-14 RPE.  
• Vigorous: 65-90% of MHR or 15-18 RPE. |
| **Time** | 20-30 minutes or up 60 minutes of continuous or intermittent activity.  
• Moderate intensity: 30 minutes, which can be accumulated  
• Vigorous intensity: 20 minutes sustained. |
| **Considerations** | Untrained or deconditioned individuals will need to work towards these recommendations |
Exercise session structure

**Main workout.**
To train specific components of fitness

**Warm up.**
To prepare the body

**Cool down.**
To return the body to non-exercise state

Intensity curve / gradient
Structure considerations

• Warm up before and cool down after
• Build heart rate gradually to target heart rate
  – Improve delivery of oxygen
  – Promote aerobic work
• Maintain work rate
  – Duration, type and intensity to meet individual needs
  – Training approach to meet individual needs
    • Continuous, fartlek, interval etc.
• Lower heart rate from working level
  – Reduce stress on cardiovascular system
  – Reduce risk of blood pooling
  – Promote venous return
Factors affecting cardiovascular fitness

Age
Gender
Physique / Body type
Diet
Fitness level
Activity level
Illness
Drugs
Stress
Environment, e.g. temperature

How would each of the factors listed affect cardiovascular fitness?

Record your ideas in your portfolio
TASK

• Identify a range of cardiovascular exercises, e.g. walk, swim, lunges etc. and write them down

• Consider their appropriateness for clients with different fitness and skill levels
  – Impact
  – Intensity

• Note down a range of modifications for the exercises to regress or progress
Learning review

Assessment criteria: Can you now:

- Describe the short and long term effects of cardiovascular exercise
- Define cardiovascular fitness
- Identify the factors that affect cardiovascular fitness
- Explain the principles of a progressive training programme in developing cardiovascular fitness
- Explain how to recognise when and how to regress a training programme
- Explain the principles of adaptation, modification and progression for each component of FITT
Training different components of fitness - muscular fitness

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

Learning outcome: The learner will:

LO1: Understand the effects of exercise on the body
LO2: Understand the components of fitness
LO3: Understand how to apply the principles and variables of fitness to an exercise programme

Assessment criteria: The learner can:
1.6. Describe the short and long term effects of muscular strength and endurance
2.1. Define muscular strength and endurance
2.3. Identify the factors that affect muscular strength and endurance
3.3. Explain the principles of a progressive training programme in developing muscular strength and endurance
3.4. Explain how to recognise when and how to regress a training programme
3.5. Explain the principles of adaptation, modification and progression for each component of FITT
Muscular strength and endurance

What is muscular strength?

What is muscular endurance?

Record your answers in your portfolio
Muscular strength and endurance

• **Muscular strength** - the maximal amount of force a muscle or group of muscles can generate during one contraction

• **Muscular endurance** - the ability of a muscle or group of muscles to contract repeatedly for extended periods of time without fatigue
Muscular fitness

- Maximal strength
- Muscular fitness
- Muscular endurance
- Aerobic endurance
Muscular strength and endurance

Why do we need muscular strength and endurance?

Record your answers in your portfolio
Why we need MSE

• Maintain posture and stand upright
• Perform daily tasks
• Lifting and carrying
• Physical activity and exercise
• Play sport
The short-term effects of muscular strength and endurance training include:

- Improved neuromuscular connections and motor unit recruitment.
- More capillaries in the muscles to deliver blood and oxygen (endurance training).
The long-term benefits of muscular strength and endurance training include:

- Stronger muscles, tendons and ligaments.
- Stronger bones (increased bone density).
- Improved joint stability.
- Improved muscle tone, shape and physical appearance.
- Increased hypertrophy (muscle size) of type II fibres (strength-biased training).
- Improved body composition (muscle to fat ratios).
- Improved neuromuscular connections and motor unit recruitment.
- More capillaries in the muscles to deliver blood and oxygen (endurance training).
- Improved posture.
Muscular strength and endurance

How do we train to improve muscular strength and endurance?

Record your answers in your portfolio
Muscular fitness

Maximal strength
- Higher resistance
- Lower repetitions
- 1-10 repetition maximum

Muscular fitness

Muscular endurance
- Lower resistance
- Higher repetitions
- 40-70% of 1RM

RESEARCH TASK
Which energy system and muscle fibre type will be improved by different types of muscular fitness training?

Record your answers in your portfolio
# Muscular fitness

| Frequency | Two-three days a week for each major muscle group on non-consecutive days.  
48 hours rest between training sessions for specific muscle groups. |
|-----------|-----------------------------------------------------------------|
| Intensity | Percentage of one repetition maximum (1RM):                      
• 40-50% of 1RM for older adults or sedentary adults.  
• 60-70% of 1RM for beginners.  
• > 80% of 1RM for experienced. |
| Time      | Repetitions                                                      
• 8-12 repetitions.  
• 10-15 repetitions for beginners.  
• 15-20 repetitions for endurance.  
Sets                                                 
• Single sets effective for beginners or older adults.  
• 2-4 sets for adults.  
• < 2 sets is effective for endurance.  
Rest                                                 
• Intervals or 2-3 minutes between sets. |
Types of resistance may include:

- Body weight exercises, e.g. press ups, yoga and Pilates exercises.
- Dumbbell exercises, e.g. shoulder press
- Resistance band exercises, e.g. biceps curl
- Fixed-resistance machine exercises, e.g. leg press
- Free-weight exercises, e.g. bench press, group resistance training
- Water-based resistance, e.g. using floatation devices
- Manual resistance, e.g. applied by a partner or an opposing limb.
Muscular strength and endurance

1. Select a muscular endurance biased body weight exercise.

2. Indicate the reasons why it is predominately endurance.

3. Use the principles listed to make the exercise more strength biased

4. Record the changes you have made and place in your portfolio

- Rate
- Resistance
- Leverage
- Gravity
- Range of motion
Factors affecting muscular fitness

- Age
- Gender
- Physique / Body type
- Diet
- Activity level
- Illness
- Drugs
- Stress
- Environment, e.g. temperature

How would each of the factors listed affect muscular strength and endurance?

Write down your ideas and place in your portfolio
Practical workshop

Whole body approach

- Back
- Arms
- Legs
- Abdominals
- Chest
- Shoulders

Identify an exercise for each of the body areas listed.

Name the muscles working (agonist).

Name the type of contraction.

Find modifications for each exercise.

Write down your ideas and place in your portfolio
Learning review

Assessment criteria: Can you now:

• Describe the short and long term effects of muscular strength and endurance
• Define muscular strength and endurance
• Identify the factors that affect muscular strength and endurance
• Explain the principles of a progressive training programme in developing muscular strength and endurance
• Explain how to recognise when and how to regress a training programme
• Explain the principles of adaptation, modification and progression for each component of FITT
Training different components of fitness – flexibility

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

Learning outcome: The learner will:

LO1: Understand the effects of exercise on the body
LO2: Understand the components of fitness
LO3: Understand how to apply the principles and variables of fitness to an exercise programme

Assessment criteria: The learner can:
1.6. Describe the short and long term effects of flexibility/stretching
2.1. Define flexibility
2.3. Identify the factors that affect flexibility
3.3. Explain the principles of a progressive training programme in developing flexibility
3.4. Explain how to recognise when and how to regress a training programme
3.5. Explain the principles of adaptation, modification and progression for each component of FITT
Small group task

**What** is flexibility?

*Definition*

**Why** do we need flexibility?

Benefits and effects

**How** do we train to improve flexibility?

FITT principle
Flexibility - the range of movement about a joint or series of joints
Flexibility continuum

Limited flexibility

Immobile
Stiff and inflexible

Balanced
mobility and
flexibility

Hypermobile
Risk of dislocation

Extreme flexibility

The ability to move through the full potential range of movement at specific joints.
The short-term benefits of flexibility training include:

- Improved mobility
- Reduced muscle tension and tightness.
- Improved physical and mental relaxation.
- Improved range of motion.
- More effective and efficient movements
- Reduced risk of joint or muscle strains.
- Decreased delayed onset muscular soreness (DOMS)
- Decreased muscle viscosity, enabling contractions to be easier and smoother.
The long-term benefits of flexibility training include:

- Improved mobility for the joints and muscles.
- Reduced muscle tension and tightness.
- Improved physical and mental relaxation.
- Improved range of motion.
- More effective and efficient movements
- Improved posture.
- Reduced risk of joint or muscle strains.
- Reduced risk of low back pain.
- Decreased delayed onset muscular soreness (DOMS)
- Decreased muscle viscosity, enabling contractions to be easier and smoother.
- Improved coordination by allowing for greater ease of movement.
- Improvement and development of body awareness.
## Flexibility

<table>
<thead>
<tr>
<th>Frequency</th>
<th>2-3 days a week. Ideally every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>To the point of mild tension and mild discomfort</td>
</tr>
</tbody>
</table>
| Time       | Static stretches 10—30 seconds  
2-4 repetitions of specific muscle stretches  

NB: A total of 60 seconds per muscle group is recommended. Stretches can be repeated 2-4 times to achieve this total |
| Considerations | Ensure the body is warm before stretching  
Lengthen all muscles before exercise (dynamic or static)  
Stretch all major muscle groups after work (static stretching – developmental or maintenance) |
Active static stretching

Actively contracting one muscle or muscle group (agonist) to bring about a stretch of its opposing muscle group (antagonist).

Identify an example of an active stretch

Record this in your portfolio
Passive static stretching

Using another body part or external force (a yoga strap, wall, partner or gravity) to facilitate the stretch, enabling both the agonist and antagonist to relax.

Identify an example of a passive stretch

Record this in your portfolio
Applications of static stretching

**Maintenance:**
- Short stretches - 10-15 seconds.
- Use in the warm-up or cool-down
- Maintain flexibility in muscles that are not particularly tight.
- Stretch to point of mild tension and hold.

**Developmental:**
- Held for a longer period of time - 30-60 seconds.
- Used in the cool-down
- Improve the range of motion in areas of tightness
- When the tension eases (stretch reflex) the stretch is taken further and held
Exercise session structure

Main workout.
To train specific components of fitness

Warm up.
To prepare the body

Cool down.
To return the body to non-exercise state

Lengthening muscles and moving joints through range of motion is part of preparation.

Stretching and flexibility can be one of the main components of fitness trained, e.g. yoga.

Developmental and maintenance stretches
Dynamic stretching

• Controlled movement of the limbs to lengthen muscles to the end of their range of motion
• Around eight to ten repetitions of each movement are performed under control, gradually taking the stretch further
• Helps to maintain body temperature, e.g. warm-up
• No bouncing or jerking (ballistic stretching – exceeds ROM)

Pair task:

Find and demonstrate an example of a dynamic stretch
Factors affecting flexibility

How would each of the factors listed affect flexibility?

- Age
- Gender
- Physique / Body type
- Activity level
- Illness
- Stress
- Environment, e.g. temperature

Write down your ideas and place in your portfolio
TASK

- Identify stretches for all the major muscle groups
- Consider their appropriateness for clients with different fitness and skill levels
- Identify their appropriateness for warm-up and cool down
- Say when muscle groups may need to be developed
- Find a range of modifications for the stretches to regress or progress
- You can do this as a table
Learning review

Assessment criteria: Can you now:

- Describe the short and long term effects of flexibility / stretching
- Define flexibility
- Identify the factors that affect flexibility
- Explain the principles of a progressive training programme in developing flexibility
- Explain how to recognise when and how to regress a training programme
- Explain the principles of adaptation, modification and progression for each component of FITT
The effects of exercise on the body

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

**Learning outcome:** The learner will:

**LO1:** Understand the effects of exercise on the body

**Assessment criteria:** The learner can:

1.1. Describe cardiovascular and respiratory adaptations to endurance / aerobic training

1.2. Identify the short and long term effects of exercise on blood pressure

1.3. Describe the “blood pooling” effect following exercise

1.4. Describe the effects of exercise on bones and joints including the significance of weight-bearing exercise

1.5. Describe delayed onset of muscle soreness (DOMS) and identify exercises or techniques likely to increase its risk

1.6. Describe the short and long term effects of different types of exercise on muscle

1.7. Describe different exercises that can improve posture
Revision

Identify the components of:

- Health-related fitness
- Skill-related fitness
## Components of fitness

<table>
<thead>
<tr>
<th>Health-related fitness</th>
<th>Skill-related fitness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cardiovascular fitness</td>
<td>1. Speed</td>
</tr>
<tr>
<td>2. Muscular strength</td>
<td>2. Power</td>
</tr>
<tr>
<td>3. Muscular endurance</td>
<td>3. Reaction time</td>
</tr>
<tr>
<td>4. Flexibility</td>
<td>4. Co-ordination</td>
</tr>
<tr>
<td></td>
<td>5. Balance</td>
</tr>
<tr>
<td></td>
<td>6. Agility</td>
</tr>
</tbody>
</table>
Effects of exercise

How will exercise for specific fitness components affect the following body systems:

- Cardiovascular / respiratory
- Muscular
- Skeletal

Write down your ideas and place in your portfolio
Cardiovascular adaptations (long-term)

- Stronger heart (cardiac muscle).
- Increased stroke volume.
- Increased cardiac output.
- More capillaries in the muscles.
- Waste products removed more efficiently.
- More mitochondria.
- Weight management assisted.
- Risk of cardiovascular disease (CV) is reduced.
- Blood pressure normalised.
Blood pressure

**Short term** (immediate):
- An increase in blood pressure in line with exertion

**Long term:**
- Aerobic exercise can bring about an average decrease in pressure of 10mmHg

NB: Weight training, circuits or strength work has not been shown to reduce blood pressure in isolation
Blood pooling

• During exercise there is an increased blood flow

• If activity stops suddenly the heart will continue pumping at an elevated rate

• Without skeletal muscular contraction, blood will begin to pool in the limbs, e.g. legs

• Symptoms may include nausea, dizziness and fainting

Tips:
• Cool down thoroughly to lower heart rate
• Keep legs moving during cardiovascular exercise to improve venous return
Skeletal adaptations

Short term:
- Increase in synovial fluid to lubricate joints
- Increase blood circulated (bones have blood supply)

Long term (weight-bearing exercise):
- Stronger ligaments
- Increased bone density
- Reduced bone loss associated with age
Question and answer

Can you?

• Give an example of a weight-bearing exercise?

• Give an example of a non-weight-bearing exercise?
Muscular adaptations

Short term:
• Vasodilation
• Diversion of blood to the working muscles
• A temporary ‘pump’ or increase in muscle size due to circulation

Long term:
• Improved motor fitness and greater efficiency of movement
• Enhancement of neuromuscular connections and motor unit recruitment
• Change in muscular properties, e.g. hypertrophy
• Improved flexibility
• Improved posture
Exercise effects

Aerobic exercise:
Lower intensity, long duration exercise primarily stimulates Type I muscle fibres to:
  • Increase the number and size of mitochondria
  • Increase the number of capillaries surrounding these fibres
  • Increase the amount of aerobic enzymes, stored glycogen and triglycerides within muscle tissue

Resistance training:
• Short duration, higher intensity exercise primarily stimulates Type II muscle fibres to:
  • Increase the diameter of muscle fibres (hypertrophy)
  • Increase the glycolytic activity of the muscle
Delayed Onset of Muscular Soreness (DOMS)

Soreness or stiffness experienced in muscles typically between 12-72 hours after exercise

It is particularly common:

- At the beginning of a new exercise programme
- Following increased eccentric loading
- Following an increase in intensity of a training programme
- Following the introduction of unfamiliar movement patterns
Posture

What factors will affect posture?

Note down your ideas and place in your portfolio
Factors that affect posture

- Age
- Fashion
- Sport
- Self-esteem and confidence
- Sedentary lifestyle, e.g. driving, desk
What type of exercises and activities may help to compensate and improve posture?

Note down your ideas and place in your portfolio.
General exercise for posture

To help compensate include:
- Full range of movement exercises
- Compound movement patterns
- Free-standing posture
- Free-weight and cables (gym)
- An equal number of push and pull exercises
- Dynamic stretches
- Developmental stretches
What muscles may need to be strengthened or lengthened/stretches to improve the following posture types?

- Hyperkyphotic
- Hyperlordotic
- Flat back

Note down your ideas and place in your portfolio
Exercise for postural deviations

Hyperkyphosis

• Strengthen lower and middle trapezius.
• Strengthen rhomboids.
• Lengthen pectorals, anterior deltoid.
• Lengthen upper trapezius.
• Mobilise thoracic spine.
Exercise for postural deviations

Flat back

- Strengthen deep core stabilisers.
- Strengthen and activate gluteals.
- Mobilise spine, especially extension.
- Stretch hamstrings and rectus abdominis.
Exercise for postural deviations

Hyperlordosis

• Strengthen abdominal muscles.
• Strengthen deep core stabilisers.
• Lengthen hip flexor, hamstrings and spine extensors.
• Mobilise spine, especially flexion.
Quiz

1. State one cardiovascular adaptation to endurance/aerobic training (1 mark)
2. State one respiratory adaptation to endurance/aerobic training (1 mark)
3. State one short-term effect of exercise on blood pressure (1 mark)
4. State one long-term effect of exercise on blood pressure (1 mark)
5. What is “blood pooling”? (1 mark)
6. How can the risk of blood pooling be minimised? (2 marks)
7. State one effect of exercise on bones and joints. (1 mark)
8. Give an example of a weight-bearing exercise. (1 mark)
9. Give an example of an activity that is NOT weight-bearing. (1 mark)
10. What is delayed onset of muscle soreness (DOMS)? (1 mark)
11. What type of exercises are likely to increase the risk of DOMS? (1 mark)
12. State one short-term effect of exercise on the muscles. (1 mark)
13. State one long-term effect of cardiovascular exercise on muscles. (1 mark)
14. State one long-term effect of flexibility training on muscles. (1 mark)
15. State one long-term effect of muscular strength training. (1 mark)
16. What exercises can improve posture? (2 marks)

Total marks 18 /18
Learning review

Assessment criteria: Can you now:

• Describe cardiovascular and respiratory adaptations to endurance/aerobic training
• Identify the short and long-term effects of exercise on blood pressure
• Describe the “blood pooling” effect following exercise
• Describe the effects of exercise on bones and joints including the significance of weight-bearing exercise
• Describe delayed onset of muscle soreness (DOMS) and identify exercises or techniques likely to increase its risk
• Describe the short and long-term effects of different types of exercise on muscle
• Describe different exercises that can improve posture
Monitoring Intensity

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

**Learning outcome:** The learner will:

LO5: Understand how to safely monitor exercise intensity

**Assessment criteria:** The learner can:

5.1. Describe the benefits and limitations of different methods of monitoring exercise intensity including:

- Rate of Perceived Exertion (RPE)
- Heart rate monitoring and the use of different heart rate zones
- Talk Test
What methods of monitoring intensity have you used?

Note down your answers in your portfolio.
Monitoring exercise intensity

There are different methods of monitoring exercise intensity:

• Heart Rate

• RPE (Rate of Perceived Exertion)

• Talk test

• Observation
Observation

Can observe:

• Loss of technique
• Changes in skin colour
• Sweating
• Discomfort
• Changes in posture
Talk test

- Level of talking while exercising
- Moderate intensity – breathless at end of sentence
- Harder the effort, less able to talk

Talking easily, light breathlessness

Talking easily, but more breathless

Talking becomes more difficult and breathing is heavier

Unable to talk and breathing very heavy
Talk test

- Simple
- Doesn’t require any equipment
- Gauges intensity
- Not very accurate
Heart rate monitoring

The main methods of monitoring heart rate are:

- Manually measure the pulse
- Use a heart rate monitor
Heart rate zones

An exercise intensity equivalent to between 50 – 90% of maximum heart rate (MHR or HR$_{\text{max}}$) is appropriate for most clients.

The intensity levels recommended by the ACSM (2014) are:

- **Moderate intensity:** 50-65% of MHR.
- **Vigorous intensity:** 65-90% of MHR.
- Beginners to work at lower intensities
Activity: Calculations

Step 1 – Calculate maximum heart rate (MHR)
• 220 – age = MHR

Step 2 – Calculate target heart rate zones (THR):
   a) 50% of MHR (MHR x 0.5 = 50%)
   b) 60% of MHR (MHR x 0.6 = 60%)
   c) 70% of MHR (MHR x 0.7 = 70%)
   d) 80% of MHR (MHR x 0.8 = 80%)
   e) 90% of MHR (MHR x 0.9 = 90%)
Heart rate zones

For example:

Maximum heart rate

- $220 - 20 \text{ (age)} = 200 \text{ bpm MHR}$
- $220 - 25 \text{ (age)} = 195 \text{ bpm MHR}$
- $220 - 30 \text{ (age)} = 190 \text{ bpm MHR}$
- $220 - 40 \text{ (age)} = 180 \text{ bpm MHR}$
- $220 - 45 \text{ (age)} = 175 \text{ bpm MHR}$
- $220 - 50 \text{ (age)} = 170 \text{ bpm MHR}$
- $220 - 60 \text{ (age)} = 160 \text{ bpm MHR}$
Heart rate zones

For example:

Target heart rate for a 26 year old client (MHR = 194)

194 x 0.6 = 116bpm
194 x 0.9 = 175bpm

Estimated training zone = 116 – 175bpm
Rate of perceived exertion (RPE)

Is a scale of how hard an individual feels they are working when they exercise.

The classic Borg (RPE) scale rates effort between 6 and 20.

The scale correlates with heart rate e.g.

- 9 is approximately 90bpm
- 15 is approximately 150bpm

<table>
<thead>
<tr>
<th>Borg Scale (RPE)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Very, very light</td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Very light</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Fairly light</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Somewhat hard</td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Hard</td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Very hard</td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Very, very hard</td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
## Modified RPE – CR10 scale

<table>
<thead>
<tr>
<th>Modified RPE/CR10</th>
<th>Training zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing at all</td>
<td>0</td>
</tr>
<tr>
<td>Warm-up / cool-down zone</td>
<td>Warm-up / cool-down zone</td>
</tr>
<tr>
<td>Very, very weak</td>
<td>0.5</td>
</tr>
<tr>
<td>Very weak</td>
<td>1</td>
</tr>
<tr>
<td>Weak</td>
<td>2</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
</tr>
<tr>
<td>Aerobic zone</td>
<td>4</td>
</tr>
<tr>
<td>Somewhat strong</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>High-intensity intervals</td>
</tr>
<tr>
<td>Strong</td>
<td>6</td>
</tr>
<tr>
<td>Anaerobic zone</td>
<td>7</td>
</tr>
<tr>
<td>Very strong</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>High-intensity intervals</td>
</tr>
<tr>
<td>Anaerobic zone</td>
<td>8</td>
</tr>
</tbody>
</table>
**Practical workshop activity:**

**Either:**

a) *Participation in a practical exercise session OR*
b) *Teacher directed practical activity/workshop in small groups*

**Tasks:**

• Use each of the methods to gauge the intensity as directed by teacher.
• Record the major advantages / disadvantages of each method for monitoring intensity.

**On completion:**

• Discuss with whole group at the end of task
Learning review

Assessment criteria: Can you now:

• Describe the benefits and limitations of different methods of monitoring exercise intensity including:
  
  • Rate of Perceived Exertion (RPE)
  
  • Heart rate monitoring and the use of different heart rate zones
  
  • Talk Test
Special populations – contraindications and guidelines

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

Learning outcome: The learner will:

LO4: Understand the exercise contraindications and key safety guidelines for special populations

Assessment criteria: The learner can:

4.1. Describe the exercise contraindications and key safety guidelines for working with older people (50 plus)
4.2. Describe the exercise contraindications and key safety guidelines for working with ante / post natal clients
4.3. Describe the key safety considerations for working with disabled people
4.4. Describe the exercise contraindications and key safety guidelines for working with young people
Special populations

Contraindications exist whenever there is an increased risk of harm in any given activity.

These should be identified during client screening.

Additional safety considerations should be taken into account when designing a fitness programme for:

- Older adults
- Ante / post natal
- Disabled
- Young people

Clients who respond ‘Yes’ to one or more questions on the PAR-Q should be signposted to their GP for clearance prior to exercise.
Key role boundaries

• Any medical conditions must be signposted to a GP for clearance prior to participation and work with a specialist instructor may be required.

• Apparently healthy special populations with no medical conditions can participate with appropriate adaptations.

• To work with any special population on a regular basis requires additional qualifications.
Special populations

Scenario:
A client from a special population wishes to attend your exercise class.

1. Research the exercise contraindications and key safety guidelines for the specific client group.
2. Consider the adaptations you would need to make.
3. Record your ideas in your portfolio.

Four large groups:

Group a: Older adults (50 +)
Group b: Ante/post natal
Group c: Disabled
Group d: Young people (14-16)
Older adults (50 +)
Effects of ageing

- Fewer fast twitch fibres.
- Reduced neuromuscular transmission.
- Reduced capillaries.
- Sensory decline (vision and hearing).
- Loss of bone mass.
- Increased risk of osteoporosis.
- Reduced availability of synovial fluid.
- Calcification of the joints.
- Reduced stroke volume and cardiac output.
- Less efficient cardiovascular system.
- Increased blood pressure.
Considerations

- Reduced muscular strength and endurance.
- Reduced coordination and movement speed.
- Reduced flexibility and range of motion.
- Reduced balance, coordination and postural stability.
- Bones less resilient to stress and more susceptible to fracture.
- Stiffer, less mobile joints and reduced shock absorption.
- Lower MHR and THR and lower anaerobic threshold.
- Slower recovery rate.
Older adult guidelines

• Longer, more gradual warm up and cool down
• More mobility
• Slower, controlled and simpler movements
• Focus on posture and correct technique
• Lower impact and intensity
• Longer, more gradually tapered cool down after the aerobic training component
• Less repetitions, resistance
• More time for transitions, e.g. floor to stand
• Avoid extreme spinal flexion
• Strengthen postural muscles, pelvic floor and potential fracture sites
Ante and post natal
Contraindications
ACSM, 2014

Relative
• Very sedentary lifestyle.
• Severe anaemia.
• Morbid obesity.
• Extreme underweight.
• Heavy smoker.

Absolute
• Heart or lung disease
• Persistent second or third trimester bleeding.
• Preeclampsia/pregnancy induced hypertension.
• Premature labour.

Signpost to GP
Guidelines for pre & post natal

• Guidelines relate to normal, healthy, adult women experiencing a normal, healthy, single pregnancy

• In most cases exercise is safe for both mother and baby

• Exercise at appropriate intensity is not associated with adverse pregnancy outcome
## Trimesters

<table>
<thead>
<tr>
<th>0-3 months</th>
<th>3-6 months</th>
<th>6-9 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in weight + 1-3kg.</td>
<td>Increase in weight + 6-8kg.</td>
<td>Increase in weight + 3-4 kg.</td>
</tr>
<tr>
<td>Breasts and uterus start to enlarge.</td>
<td>Postural changes</td>
<td>Tired more easily.</td>
</tr>
<tr>
<td>Hormonal changes commence, e.g. increased relaxin</td>
<td>Possible low back pain</td>
<td>Venous return may be reduced.</td>
</tr>
<tr>
<td>Morning sickness.</td>
<td>Abdominal muscles start to lengthen</td>
<td>Weight of baby presses on pelvic floor.</td>
</tr>
<tr>
<td></td>
<td>Change in centre of gravity.</td>
<td>Pelvic girdle less stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased lordotic curve.</td>
</tr>
</tbody>
</table>
Post birth

- Avoid physical stress for two weeks (ACOG).
- Return to activity:
  - Normal birth (six weeks)
  - Caesarean birth (12 weeks)
- Hormone levels still high (up to one year).
- Weaker pelvic floor.
- Pelvic girdle less stable.
- Check for diastasis rectii
- Rectus abdominis is mechanically weaker for at least 12 months.
Guidelines for ante & post natal

AVOID

• Exercising in the supine position after 16 weeks
• Prolonged, motionless standing
• Heavy, uncontrolled, isometric or prolonged resistance work above the head
• Leg adduction and abduction against a resistance
• Loaded forward flexion
• Rapid changes of direction, position and uncontrolled twisting
• Exercise with a risk of falling or abdominal trauma
• Excessive and uncontrolled de-stabilisation techniques
• Abdominal exercises (focus on posture and pelvic floor).
Guidelines for pre & post natal

- Emphasise correct posture
- Make movements slower and more controlled.
- Use full range of motion mobility exercises to warm the muscles.
- Build up intensity of movements much more gradually to avoid sudden increases in blood pressure.
- Use supported stretch positions and move to a comfortable range of motion.
- Use low to moderate intensity and low impact.
- Use more gradual build up and lowering of intensity.
- Women who are unused to exercise should start with shorter durations (begin with 15 minutes and increase to 30 minutes)
- Maintain adequate hydration.
- Avoid exercising in very hot or humid conditions.
- Avoid heart rate monitoring – use the talk test.
Other guidelines

• Include exercises for the pelvic floor muscles.
• Avoid supine and prone lying (pre-natal).
• Select comfortable starting positions.
• Avoid exercises which place too much pressure on the pelvic girdle.
• Use movements related to everyday life.
• Perform fewer repetitions.
• Use lower and less intense exercises.
• Do not use heavy abdominal exercises; sit-up, crunch or oblique cross-over exercises are not an appropriate choice for abdominal muscle re-education post birth.
• Include specific relaxation work.
• Avoid positions which may over stretch the ligaments.
• Select balanced and comfortable positions for passive stretching.
• Use shorter-hold stretches to maintain rather than develop flexibility.
Disability

‘An umbrella term covering impairments, activity limitations and participation restrictions.’

World Health Organisation.

- **Impairment**: a problem in body function or structure.
- **Activity limitation**: a difficulty encountered by an individual in executing a task or action.
- **Participation restriction**: a problem experienced by an individual in involvement in life situations.
Disability

- Wheelchair users
- Blindness or partial sightedness.
- Deafness or partial hearing.
- Down’s syndrome.
- Stroke.
- Obesity.
- Arthritic conditions.
- Mental health conditions (e.g. depression).
- Cancer.
- HIV.
- Limb amputation.
- Fibromyalgia.
- Cerebral palsy
Equality Act (2010)

Service providers must anticipate the needs of disabled clients and make reasonable changes to accommodate these.
Exercise selection:

This will be determined by specific needs and may include:

- Simplifying some exercises.
- Reducing intensity (fewer repetitions, lower resistance, appropriate range of motion, controlled rate).
- Modifying exercise positions and modalities, e.g. using wheelchair-based activities for wheelchair users or chair-based activities for individuals with physical or functional limitations or issues with balance.
Teaching style:

Teaching style and methods will need to accommodate specific needs and may include:

- Clarity of verbal instructions for blind or visually impaired.
- Clarity of demonstrations; facing the person and speaking clearly when instructing the deaf or those with partial hearing (e.g. to enable lip reading).
- Finding appropriate ways to engage and encourage people with learning disabilities, e.g. Down’s syndrome.
Health and safety:

This will include:

- Consideration to entry and access to all facilities;
- Safe evacuation procedures in emergencies
- Respect to other legislation e.g. safeguarding vulnerable adults.
Guidelines for disabled people

Because of the various kinds of disabilities, describing specific components of an exercise prescription for each condition can be difficult

• Physical disabilities
• Spasticity
• Neurological conditions
• Damage to sensory nerves
• Depression
Guidelines for disabled people

Physical disabilities

• **Progressive disorders** (e.g: multiple sclerosis) – monitor carefully to ensure that the exercise programme is not causing exacerbation.

• **Asymmetrical weakness** (e.g: stroke, cerebral palsy) - aim to improve functioning of the affected side as much possible.

• **Spasticity.** Flexibility training can be beneficial for tight and rigid muscles, but seek authorisation from a suitably trained medical authority on how to stretch a spastic muscle without causing injury.
Guidelines for disabled people

• **Neurological conditions** (e.g. muscular dystrophy). A decline in CNS functioning results in muscles becoming progressively weaker. Concentrate on maintaining general fitness.

• **Damage to sensory nerves.** This can result in a pressure sores when not attended to regularly. Vigilance is important.

• **Depression.** A disabling condition in its own right. It can sometimes be a secondary condition resulting from the challenges of living with a disability. Reduced motivation and energy levels and can contribute to drop-out. Medications have many negative side effects, including weight gain and suicide risk.
Guidelines for disabled people

If there are any doubts regarding the ability to work safely and effectively with a disabled client, seek the advice of a medical authority.
Children and young people (14-16)
Guidelines for young people

Key areas for consideration include:

• Growth-related issues
• Flexibility
• Stage of anatomical and physiological development
• Suitability of equipment
Growth-related issues

- Growth plate fractures account for up 15% of all childhood fractures.

- Greatest incidence among:
  - 14-16-year-old **boys**
  - 11-13-year-old **girls**
Growth-related issues

**Avoid:**
- Excessive training, e.g. playing too much of one sport
- Playing the wrong sport for their body type
- Using too heavy weights in resistance training
- Inappropriate size matching in pairs
- Excessive stationary high impact moves

**Always:**
- Teach an appropriate warm up and cool down
- Provide appropriate equipment for the activity (correct size, weight etc)
Flexibility

The aim should be to stretch only to the point of mild tension and to avoid overstretching.

- During growth spurts, muscle growth does not keep up with bone growth rates.
- The soft tissue around the joints is already stretched, so increased injury risk
Cardiorespiratory system

Avoid high intensity training, due to:

• Lower cardiac output and stroke volume
• Higher heart rate and respiratory rate
• Lower blood pressure

Avoid increased risk of heat stress and dehydration, by:

• Ensuring adequate hydration
• Low intensity warm up
• Incorporating active rests in-between bouts of vigorous activity
# Recommended guidelines for children and adolescents

| Frequency            | Aerobic – every day.  
|                      | Strength – three days a week.  
|                      | Bone strengthening – three days a week.  
| Intensity            | Moderate-to-vigorous-intensity aerobic exercise.  
| Time                 | 60 minutes.  
| Type                 | **Cardio** – swimming, dancing, cycling, running, walking.  
|                      | **Strength** – climbing trees, games (tug of war) as well as resistance exercises.  
|                      | **Bone strengthening** – jumping, running, skipping, hop scotch and games (basketball, tennis etc.).  

Learning review

Assessment criteria: Can you now:

• Describe the exercise contraindications and key safety guidelines for working with older people (50 plus)

• Describe the exercise contraindications and key safety guidelines for working with ante / post natal clients

• Describe the key safety considerations for working with disabled people

• Describe the exercise contraindications and key safety guidelines for working with young people
Activity and health

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

Learning outcome: The learner will:

LO6: Understand the health benefits of physical activity

Assessment criteria: The learner can:

6.1. Describe the health benefits of physical activity

6.2. Describe the effects of physical activity on the causes of certain diseases, including:
   - Osteoporosis
   - Coronary heart disease
   - Some cancers
   - Type 2 diabetes
   - Hypertension
   - Obesity
What are the benefits of physical activity?

Take a moment to think about this and note down your ideas.
Benefits include:

- Stronger heart
- Improved circulation
- Stronger muscles
- Improved posture
- Improved bone density
- Improved flexibility and mobility
- Improved balance and co-ordination
Physical activity and health

What are the recommended physical activity guidelines to maintain health?

Take a moment to think about this and note down your ideas
Physical activity recommendations for health

- 150 minutes of moderate-intensity aerobic activity every week
  Or
- 75 minutes of vigorous-intensity activities
  Or
- An equivalent combination of both
- Plus
- At least two days a week of muscular strength and endurance training

*Move more often, sit down less*
Intensity descriptions

• **Light activity** - little or no exertion. Does not normally cause a noticeable change in breathing.

• **Moderate activity** - sustained, rhythmic movements that leaves a person feeling warm and slightly out of breath.

• **Vigorous activity** - sustained, large muscle movements at 60%-70% MHR, that make a person sweaty and out of breath.
### Intensity

<table>
<thead>
<tr>
<th>Moderate</th>
<th>Vigorous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fly fishing.</td>
<td>Rowing.</td>
</tr>
<tr>
<td>Gardening.</td>
<td>Swimming.</td>
</tr>
<tr>
<td>Cricket.</td>
<td>Hard cycling.</td>
</tr>
<tr>
<td>Golf.</td>
<td>Circuit training.</td>
</tr>
<tr>
<td>Cycling for pleasure.</td>
<td>Running at 7 mph.</td>
</tr>
<tr>
<td>Walking briskly.</td>
<td>Hockey, squash and tennis.</td>
</tr>
<tr>
<td>Mowing the lawn.</td>
<td>Hill walking.</td>
</tr>
<tr>
<td>Recreational badminton.</td>
<td>Skipping.</td>
</tr>
<tr>
<td></td>
<td>Stair climbing.</td>
</tr>
<tr>
<td></td>
<td>Cross country skiing.</td>
</tr>
<tr>
<td></td>
<td>Rock climbing.</td>
</tr>
</tbody>
</table>
Question and Answer

What percentage of the population would you estimate meet the minimal activity recommendations?

Take a guess!
Percentage of adults meeting physical activity recommendations

<table>
<thead>
<tr>
<th>Home country</th>
<th>Scotland</th>
<th>England</th>
<th>Wales</th>
<th>Northern Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>43%</td>
<td>40%</td>
<td>36%</td>
<td>33%</td>
</tr>
<tr>
<td>Women</td>
<td>32%</td>
<td>28%</td>
<td>23%</td>
<td>28%</td>
</tr>
</tbody>
</table>
Less active populations

- South Asian and Chinese women and men.
- Bangladeshi men and women (reported as least physically active).
- Individuals from low income households, lower social classes and with lower levels of educational attainment.
- Individuals working in non-professional and non-managerial occupations.
- Women and girls (all age groups are less active than men).
- Older populations (activity levels decline with age).

(Department of Health, 2009).
Question and Answer

Why do you think physical activity is important for health?
Health benefits of physical activity

• Reducing the risk of premature death by 20-30%.
• Reducing the risk of developing coronary heart disease (CHD), stroke, diabetes and certain cancers by 50%.
• Improving functional capacity.
• Increasing independence in older people.
• Increasing bone density and reducing the risk of osteoporosis.
• Reducing the risk of falls in older adults.

(Department of Health, 2011).
Health benefits of physical activity

• Reducing the risk of back pain.
• Improving psychological wellbeing.
• Improving quality of life and general wellbeing.
• Reducing the risk of stress, anxiety and clinical depression.
• Reducing the symptoms of depression and anxiety.
• Improving weight loss and weight management, reducing the risk of obesity.

(Department of Health, 2011).
Physical activity and health

1. Research the causes of the listed conditions.

2. Design a poster or information leaflet that describes the effects of physical activity on the causes of these conditions.

3. File in your portfolio

Condition 1:
• Coronary heart disease

Condition 2:
• Hypertension

Condition 3:
• Osteoporosis

Condition 4:
• Cancer

Condition 5:
• Type 2 diabetes

Condition 6:
• Obesity
CVD risk factors

Modifiable
- Smoking
- Hypertension
- High cholesterol
- Inactivity
- Diet
- Stress
- Diabetes (Type 2)

Non-modifiable
- Age
- Heredity
- Gender
Physical activity and health

Physical activity assists management of modifiable risk factors

• Assists weight management
• Reduces the risk of obesity.
• Maintains optimal blood pressure.
• Improves cholesterol levels.
• Prevents or delays the development of Type 2 diabetes.
• Assists stress management
• Assists smoking cessation
Hypertension

Physical activity:

- Helps to reduce and normalise mild hypertension.
- Prevents age-related increases in blood pressure (longevity of exposure risk).
- Assists with stress management and weight management (risk factors for developing hypertension).
Osteoporosis

Physical activity helps to:

- Develop peak bone mass.
- Maintain bone mass in pre-menopausal women.
- Reduce the rate of bone loss post menopause.
- Improve strength, coordination and balance
- Reduce the risk of falls and bone fractures in people diagnosed with osteoporosis
Cancer

Physical activity:

• Reduces the overall risk.

• Has a protective effect against colon cancer.

• Reduces risk of breast cancer in post-menopausal women.

• Offers a secondary preventative effect against cancer, by reducing the risk of obesity

Diabetes – type 2

Physical activity:

• Offers a preventative effect.
• Reduces the risk of developing type 2 diabetes.
• Assists with the management of blood sugar levels and glycaemic management.
• Improves insulin sensitivity.
• Assists weight management, which may contribute to the onset of type 2 diabetes.
Obesity

Physical activity:

- Offers a preventative measure.
- Assists weight management.
- Increases calorific expenditure.
- Increases resting metabolic rate.
- Assists with reducing body fat.
- Reduces other CVD risk factors.
Learning review

Assessment criteria: Can you now:

• Describe the health benefits of physical activity

• Describe the effects of physical activity on the causes of certain diseases, including:
  • Osteoporosis
  • Coronary heart disease
  • Some cancers
  • Type 2 diabetes
  • Hypertension
  • Obesity
Learning link

**Please note:** Barriers to physical activity and strategies for overcoming these barriers are explored in the Supporting Clients unit.
The importance of healthy eating

Unit: Principles of exercise, fitness and health
Learning outcomes & assessment criteria

Learning outcome: The learner will:

LO7: Understand the importance of healthy eating

Assessment criteria: The learner can:

7.1. Identify the common dietary sources of the key nutrients
7.2. Explain the dietary role of the key nutrients
7.3. Explain the importance of adequate hydration
7.4. Describe the national food model/guide
7.5. Describe key healthy eating advice that underpins a healthy diet
7.6. Describe the energy balance equation
7.7. Explain the health risks of poor nutrition
7.8. Explain professional role boundaries in relation to offering nutritional advice
Healthy eating

Thought storm

What is healthy eating?
What is unhealthy eating?
Healthy eating ideas may include:

- Eating a balanced diet
- Eating plenty of fruit and vegetables
- Not eating junk food or processed food
- Not eating take-away meals
- Eating regular meals
- Eating natural or organic foods
- Eating breakfast
- Regular intake of all the main nutrients
Unhealthy

- Irregular meals or skipping meals
- Imbalanced diet/nutrients
- Too much salt, sugar, fat
- Not enough fruit and vegetables
- Too many cakes and pastries, take-aways
- Excess calories
- Processed food
- Not enough water
- Too many carbonated drinks, coffee, alcohol
Healthy eating

What is a healthy diet?

Note down your ideas and place in your portfolio
UK Healthy eating advice that underpins a healthy diet

The main guidelines:
• Base all meals around starchy foods (rice, pasta etc.)
• Eat lots of fruit and vegetables (at least 5 per day)
• Eat more fish (2 portions a week, 1 portion should be oily fish)
• Cut down on saturated fat and sugar (including processed food)
• Eat less salt, no more than 6g a day
• Get active and maintain a healthy weight
• Drink plenty of water (6-8 glasses per day)
• Don’t skip breakfast
• Use the Eatwell plate when planning and cooking all meals
• Check food labels (traffic light system)
• Eat only as much food as you need (energy)

‘The eatwell plate’ provides a visual aid for meal planning. It provides similar basic guidelines as those found within the US pyramid.

What may be the pros and cons of using ‘The eatwell plate’ as your food guide?
Eatwell plate

Advantages

• Starting point for healthier eating
• Basic guidelines for meal planning
• Visual image easy to follow

Disadvantages

• Does not accommodate specific dietary needs, e.g.
  – Pregnant women
  – Athletes
  – Children
  – Some medical conditions, e.g. diabetes
What are the main nutrients?

Note down your answers
Main nutrients

- Carbohydrates (and fibre)
- Proteins
- Fats
- Vitamins
- Minerals
- Water
Pair task

Each pair to take a specific nutrient.

What is the dietary role of the main nutrients?

List some dietary sources of the main nutrients?

- Carbohydrates (and fibre)
- Proteins
- Fats
- Vitamins
- Minerals
- Water
Carbohydrates

**Role:** Energy and fibre

Composed of 2 primary groups:

**Sugars and starches**
- Provide the body with energy
- Sugar can be found in fruits and sweets
- Starch can be found in bread, pasta, potatoes, vegetables and rice

**Dietary fibre**
- Provides bulk, to enable the smooth passage of food and waste products along the digestive tract.
- Can be found in whole grain foods, fruit and vegetables
Protein

Role: Proteins are composed of amino acids which have multiple functions including:

- Helping to transport important substances in the blood
- Growth and repair of human tissue

Sources:
- Animal sources include meat, poultry, fish, dairy produce, eggs
- Vegetable sources include grains, pulses, nuts and beans
Fats

Role:
- An important component of cell membranes
- Serve as a carrier of vitamins A, D, E, and K
- Provide insulation under the skin
- Provide protection for the internal organs
- Rich energy source
- Forms the cells of the brain and the spinal cord

3 primary types/sources:

- Saturated fat - found in meat, eggs, dairy products and coconut oil
- Monounsaturated fat - found in meat, olive oil and avocado
- Polyunsaturated fat - found in oily fish and plant oils
**Vitamins and minerals**

**Role:** Vital for normal growth, repair and daily functioning of the body

**Sources:**
- Almost all naturally occurring foods contain varied amounts of vitamins and minerals
- Adequate intake will best be obtained through the regular intake of a variety of foods from both plant and animal sources
Hydration

Water is required to support both intra and extracellular functions

The amount of water required will depend on varying factors:

- Environmental temperature
- Body temperature
- Humidity
- Physical activity
- Respiration rate
The concept of energy balance is related to weight management. It states that food (energy in) must be equal to energy utilised by the body to maintain weight. This can be manipulated to favour weight loss or gain.
Energy balance

What is the likely outcome if:

1. Energy in EXCEEDS energy out?

2. Energy out EXCEEDS energy in?

3. Energy in and energy out are equal?

Weight management

OR

Weight gain

OR

Weight loss
Nutrition

What are the health risks of poor nutrition?

Make a list and place in your portfolio
Poor nutrition

The following list of common health complications have all been shown to be associated with a poor diet:

- Obesity
- Heart disease
- Stroke
- Some cancers
- Metabolic syndrome
- Diabetes
- Hypertension
- High cholesterol
- Asthma
- Some types of arthritis
- Menstrual irregularities
- Infertility
- Eczema
Role boundaries

Thought storm

What are the professional role boundaries for a fitness instructor?
Professional role boundaries

Provide general healthy eating guidance (eatwell plate) to healthy individuals.

Signpost clients with specific requirements (weight loss, medical conditions etc.) to a qualified dietician or nutritional therapist (via GP)

Forge links with professionals within the local area

Must NOT:
- Advertise as a nutritional specialist
- Write diets
- Recommend supplements
Learning review

Assessment criteria: Can you now:

• Identify the common dietary sources of the key nutrients
• Explain the dietary role of the key nutrients
• Explain the importance of adequate hydration
• Describe the national food model/guide
• Describe key healthy eating advice that underpins a healthy diet
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