Can you match the term with its definition and example?

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<th>Example</th>
</tr>
</thead>
<tbody>
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<td>Gliding joints e.g. carpal bones</td>
</tr>
<tr>
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<td>Movement around one axis</td>
<td>Hinge joints e.g. elbow and pivot joints e.g. radioulnar</td>
</tr>
<tr>
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<td>Two axes of rotation</td>
<td>Saddle joint e.g. base of thumb</td>
</tr>
<tr>
<td>Triaxial</td>
<td>Three axes of rotation</td>
<td>Ball and socket joint e.g. hip</td>
</tr>
</tbody>
</table>
Learning Objectives

Everyone should

Identify the 3 planes of movement
State the different axes of rotation for each type of synovial joint

Most will

Define the following terms:
flexion, extension,
elevation, depression
abduction, adduction,
pronation, supination,
plantarflexion, dorsiflexion,
eversion, inversion
Group thought – What is an axis of rotation?

Now complete the table in your workbook!

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Individual Activity – Can you draw along with the video? Annotate the drawings in your workbook!

*USE PENCIL!*
Body sections are divided by planes

- Sagittal plane (median plane)
- Transverse plane (horizontal plane)
- Coronal plane (frontal plane)
Sagittal plane

Transverse axis

Anteroposterior axis

Vertical axis

Transverse plane

Frontal plane
Movements
Movements
Now go back and review your drawings – can you improve them? Have you used all the terms in the box?
**Group activity** – which planes are the following movements occurring in?
Types of Joint Movements

- Hyperextension
- Extension
- Flexion
- Dorsiflexion
- Plantar flexion

- Adduction
- Abduction

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Types of Joint Movements

- Rotation
- Supination
- Pronation
- Circumduction
Types of Joint Movements

- Protraction
- Retraction
- Elevation
- Depression
- Eversion
- Inversion

Now try and label the diagrams in your workbook
Body Movements

1. abduction
2. adduction
3. supination
4. pronation
5. inversion
6. eversion
7. circumduction
8. adduction
9. abduction
Body Movements
Lateral View

1. flexion
2. extension
3. flexion
4. extension
5. flexion
6. extension
7. rotation
8. rotation
9. dorsiflexion
10. plantarflexion
STARTER:

Work out the joint action of this runner, focussing on his:
- Shoulder
- Elbow
- Hip
- Knee
- Ankle
Learning Objectives

Everyone should

**Define** the following terms:
flexion, extension,
elevation, depression
abduction, adduction,
pronation, supination,
plantarflexion, dorsiflexion,
eversion, inversion

Most will

**Identify** which movements listed above occur at named joints
Movements Possible at the Elbow

Flexion

Extension
Group Thought: Basketball Set Shot

• What is the movement at the elbow?
• In which plane does this movement occur?
Group Activity — Label the Knee Joint

- a.
- b.
- c.
- d.
- e.
- f.
- g.
- h.
Movements Possible at the Knee

Flexion

Extension

Try and fill in the table in your workbook as we go through the following slides
Group Thought Kicking a Football

- What movement occurs at the knee?
- In which plane does this movement occur?
The Ankle Joint
Movements Possible at the Ankle

Eversion

Inversion

Dorsiflexion

Plantarflexion

Name the plane – for each movement
Group Thought

Take Off in the Long Jump

- What movement occurs at the ankle?
- In which plane does this movement occur?
The Wrist Joint
Movements Possible at the Wrist

- Flexion
- Extension
Group Thought
Basketball Slam Dunk

- What movement occurs at the wrist?
- In which plane does this movement occur?
The Spine

Spine anatomy

Your spinal column is made up of five sections and consists of 33 bones known as the vertebrae. Discs separate the first 24 vertebrae bones, giving the spine the ability to flex and bend. The spinal column provides an interior structure for your body and protects your spinal cord.

Spinal Column:
- Cervical (C1 to C7)
- Thoracic (T1 to T12)
- Lumbar (L1 to L5)
- Sacrum
- Coccyx

Vertebrae Structures:
- Pedicle
- Vertebra body
- Spinal cord
- Disc
- Spinal cord canal
- Superior articular facet
- Nerve root
- Lamina
- Transverse process
Movements Possible in the Spine

In which plane do each of these movements occur?
• What movement is occurring in the spine?
• In which plane does this movement occur?
The Radio-ulnar Joint
Movements Possible at the Radio-ulnar Joint
Group Thought

Top Spin Forehand

- What movement occurs at the radio-ulnar joint?
- In which plane do these movements occur?
The Shoulder Joint
Movements Possible at the Shoulder Joint

- Flexion
- Extension
- Horizontal Flexion and Extension
- Circumduction
- Lateral, Medial Rotation
- Adduction
- Abduction
- Medial rotation
- Lateral rotation
• What movement occurs in both shoulders?
• In which plane does this movement occur?
The Hip Joint
Movements Possible at the Hip Joint

- Inward and Outward Rotation
- Circumduction
- Medial Rotation
- Lateral Rotation
- Extension
- Flexion
- Abduction
- Adduction
Group Thought Sprinting

• What movements occur at the hip joint during sprinting?
• In which plane does this movement occur?
Individual Activity

• Complete the table in your workbook

• Try the practical activity
Starter: Individual Activity

Try the Joints and movements matching exercise!
Learning Objectives

Everyone should

Describe the movements associated with the following terms in sporting examples:
flexion, extension,
elevation, depression
abduction, adduction,
pronation, supination,
plantarflexion, dorsiflexion,
eversion, inversion
Tasks for the rest of the lesson..

Pairs Activity

• Complete the sporting movements in your workbook
• Discuss the answers in pairs but everyone must write their own answers!

Whole class activity

• Speed dating muscles and movements review!
• 1 min with each partner and then you move on!
• Answer the questions in your workbook
Answers for the speed dating review quiz!

What movement does iliopsoas produce?

*Hip flexion*

Label the 4 parts of quadriceps

*Rectus femoris, vastus intermedius, vastus lateralis, vastus medialis.*

What movement does the quadriceps produce at the knee?

*Extension*

Label the 3 parts of the hamstrings

*Biceps femoris, Semitendinosus, semimembranosus.*

Which muscles produce plantarflexion – pointing toes?

*gastrocnemius and soleus*
Which muscle produces inversion?

**Tibialis anterior.**

What are the movements of the Trapezius?

**Raise the head, pull shoulders back, raise the scapula, drop the scapula**

When you turn your head to look at someone next to you – what is this called?

**Rotation**

Which are the only two joints that can perform circumduction? Why?

**Shoulder/ Hip – Ball and socket.**

What muscle is being used as you straighten out from a pike dive?

**Erector Spinae**
What two movements does the Triceps Brachii produce?

**Elbow and shoulder extension**

In knee flexion which muscle is working?

**Hamstrings**

In hip extension which muscle is working?

**Hamstrings**

Describe the six key parts of the spine? How many vertebrae are at each section

**Cervical (7), Thoracic (12), Lumbar (5), Intervertebral Discs, Sacrum, Coccyx**
Starter – Paired discussion

What factors affect the Range of Motion (ROM) at a joint?

• Shape of the surfaces of the articulating bones in the joints
• Position and length of the restraining ligaments
• Effects of the muscles and the tendons at a joint
• Amount of soft tissue, (skin, fat, muscle) at the joint

Now copy this into your workbook.
Learning Objectives

Everyone should

Outline the different types of muscle contraction

Most will

• Identify which muscle contraction are related to specific joint movements
• Explain the concept of reciprocal inhibition
Types of muscle contractions

Muscle contraction

*Isometric* contraction
- meaning "same distance"
- Tension but no movement

*Isotonic* contraction
- meaning "same tension"

*Isokinetic* contraction
- meaning "same speed"
ISOMETRIC:-

- Muscle contracts but it doesn’t end in movement e.g. a rugby scrum
Strength tests in competitions such as world strongest man

Disadvantages:
• Increase blood pressure in head (dangerous!!)
• Not “specific” to many sporting events since there no muscle movement involved.

Advantages:
* A proven way of increasing muscle size quickly.
Types of muscle contractions

- **Isometric contraction**
  - Distance between origin and insertion decreases
  - Joint angle decreases
  - Usually against gravity

- **Isotonic contraction**

- **Isokinetic contraction**

- **Concentric contraction**
  - Distance between origin and insertion decreases
  - Joint angle decreases
  - Usually against gravity

- **Eccentric contraction**
  - Distance between origin and insertion increases
  - Joint angle increases
  - Usually with gravity
ISOTONIC.

• Muscle length shortens under tension ie **concentric**.

• Muscle changes from “long +Thin” to “Short + Fat”.

• (Press ups or bench pressing using weights).
Types of muscle contractions

- **Isometric** contraction
- **Isotonic** contraction
- **Isokinetic** contraction

Tension remains constant throughout range of movement
ISOKINETIC

• Muscle tension remains constant (the same) throughout the full range of movement. i.e Outer – mid + inner range

Disadvantages: developed only available on hi-tech expensive machines
Types of muscle contractions

Muscle contraction

- **Isometric** contraction
  - Tension but no movement
- **Isotonic** contraction
- **Isokinetic** contraction
  - Tension remains constant throughout range of movement
- **Concentric** contraction
  - Distance between origin and insertion decreases
  - Joint angle decreases
  - Usually against gravity
- **Eccentric** contraction
  - Distance between origin and insertion increases
  - Joint angle increases
  - Usually with gravity

Now copy this into your workbook and add an example of the movement for each one.
Role of muscles in joint movements

• Muscles work in pairs

• The muscles on the front of a limb are usually matched by muscles on the back

• The main muscle that contracts to bring about a movement is called the **prime mover** or **agonist**

• the opposite muscle that relaxes as the prime mover contracts is called the **antagonist**

Write definitions for the terms in bold above and then try the Antagonistic Pairs exercise in yoru workbook
• When performing an exercise, other muscles may join in and **assist** the prime mover.

• These muscles are called **synergists**.

• Muscles can also **contract isometrically** to **fix** parts of the body in order to maintain a correct or stable position.

• When a muscle performs this function it is called a **fixator**.

*Write definitions for the terms in bold above.*
Reciprocal inhibition

A process that inhibits the stretch reflex in antagonistic pairs of muscles.

When one muscle contracts it sends inhibitory nerve impulses to its opposing muscle causing it to relax
Core Stability
Core stability muscles contract to act as stabilisers, prior to movement.

**Which are the core stability muscles?**

**A strong core stability gives you:**
A more stable centre of gravity/mass
Reduced risk of injury/pain (especially lower back)
Improved posture and body/spine alignment
Creates a more stable platform allowing more efficient movement

**Weak core muscles** can make you susceptible to poor posture, muscular instability/injuries, nerve irritation & lower back pain

**Give some examples of training you can do to help improve core stability...**
Group Task

• Try and fill in the table in your workbooks looking at specific sporting movements

• Discuss the answers in your group but complete your table individually
STARTER – Individual Activity

Matching exercise

Complete the Movement at Joints – matching exercise on your desks
Learning Objectives

Everyone should

Define DOMS

Most will

• Evaluate the effects of stretching before exercise
Individual Activity

- Which muscles is Penny stretching?
- Why is stretching before you run good for you?
DOMS reading – individual activity

1. Read the article about DOMS individually

2. Highlight any key terms that you have met in the SEHS course so far

3. Divide the text mentally into 4 main themes

4. Using the graphic organiser, give each theme a main heading

5. In the space below the heading, summarise the information form the text that fits into your theme using no more than 3 BULLET POINTS

6. To finish your analysis, write 3 full meaningful sentences that summarise the text in the final box provided
Group activity – True or False?

1. Stretching is a good way to warm up before exercising

2. Cardio burns the most calories

3. The more exercise – the better!

4. Sit ups (crunches) are not very effective at toning abdominal muscles

5. Muscle and fat weigh the same

6. Women will develop big bulky muscles if they lift weights
1. Muscle and fat weigh the same - **True.** 1 kg of muscle is the same as 1 kg of fat but muscle is **more dense**

2. Stretching is a good way to warm up before exercising – **False.** You should never stretch cold muscles. Stretching cold muscles can cause injury, and several studies have shown that stretching cold muscles slightly decreases muscle strength and power for up to an hour after stretching.

3. The more exercise – the better! – **False.** Too much exercise can lead to injury and/or burnout. When it comes to exercise, you need an appropriate balance of training and rest.

4. Sit ups (crunches) are not very effective at toning abdominal muscles – **True.** Sit-ups are actually one of the more ineffective ab exercises you can do because they work the hip flexor muscles more than the ab muscles.

5. Women cannot develop big bulky muscles if they lift weights – **True.** Women don't have enough of the hormone testosterone (a key hormone for building muscle) to develop big, bulky muscles.

6. Cardio burns the most calories – **False.** If you want to burn more fat overall -- and keep burning it long after your workout is over -- weight training is the way to go.
List all the benefits of stretching before exercise as you watch this video clip
ToK in SEHS

Individual Activity
• Read the article in your workbook about the benefits of stretching
• Make sure you know the meanings of the words in bold
• Underline/highlight any points of interest

Group Activity
Discuss the following statement..

“Stretching is an essential part of any warm up routine before exercise”

Using the notes you made from the video and the article, try and fill in the table in your workbook.