The Muscular System

The unit in brief
This unit covers the names and function of the main muscles.

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| Standard Grade | Area – A: Structure and function, body structure |

Key ideas
úmeros diferentes tienen diferentes acciones.

Key vocabulary

El nombre de los diferentes grupos musculares, si es relevante para el curso que siguen.

Skills practised in the questions

Creative thinking is required to apply knowledge.
Several questions and the Discussion work require reflection.

Unit outcomes

By the end of this unit most students should:
know the different names and functions of some of the main muscles.

Ideas for a starter

Divide the class into four or five groups and hand out unlabelled diagrams of the muscular system, one to each group. At the front have the students’ book open to page 88, and mask page 89 so as not to be a distraction. Groups nominate one person to come to the front and look at the labelled diagram for one minute, and then return to the group to tell them the muscle names they have remembered. A second person then goes up to fill in the gaps and then a third. At the end, groups swap diagrams and mark them.

The activity could be made more challenging by groups having to describe the main action of each muscle group as well as remembering the names.

Answers to the questions

1  a  The pectorals are on the chest and they pull the arms towards the centre line of the body.
b  The biceps are in the top of the arms and they bend or flex the elbow.
c  The triceps are in the top of the arm and they straighten or extend the elbow.
d  The deltoids are around the shoulders and they help raise or abduct the arms at the shoulders and bring the shoulders forwards and backwards, i.e. flexion and extension.
e  The hamstrings are at the back of the thigh and they help bend or flex the knee.
f  The quadriceps are at the front of the thigh and they help straighten or extend the knee.
2  When performing a jump shot in basketball the gluteus maximus will straighten or extend the hips, and the quadriceps will straighten or extend the knees.
3  The trapezius must contract for you to look upwards.
4  a  When running the muscle that is used to flex the knee is the hamstring.
b  The muscle used to pull the hip back after the step is the gluteus maximus.
c  The muscle that straightens or extends the knee is the quadriceps.
5  Discussion work: the answers for this will depend upon which stance your students have chosen. Use the badminton picture from Unit 6.2 of the students’ book as a guideline as many of the muscles will do the same thing whatever the stance, e.g. the trapezius pulling the head back to look at something.
Muscles and Movement

The unit in brief
This unit covers how muscles are attached and how they work.

Specification coverage

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Key ideas
- Muscles usually work in pairs or groups.
- Exercise improves muscle tone.

Key vocabulary
- origin, insertion, agonist, antagonist, synergist, muscle tone

Skills practised in the questions
- Creative thinking is required to apply knowledge.
- Several questions and the Discussion work require reflection.

Unit outcomes
By the end of this unit most students should:
- know how muscles are attached;
- understand that many muscles work in pairs.

Ideas for a starter
- Explain that muscles often work in pairs, one contracting and the other relaxing to allow movement. Tell students to get into pairs, decide who is going to be the agonist and who the antagonist (or contracting muscle and relaxing muscle) and then act out an action that shows how muscles work in pairs. Any over-violent action may need to be classed as a pulled muscle and that pair will have to sit down!
- You could extend this by adding a third person to selected pairs to be a synergist, contracting at the same time as the agonist to assist the movement.

Ideas for plenaries
- The Discussion work question could be a useful plenary activity for this unit.

Answers to the questions

1. a. The main pair of muscles helping to move the knee is the quadriceps and hamstrings.
   b. When muscles work in pairs it is called antagonistic muscle action.

2. In any running or jumping example your students should have said that to bend the knee the hamstrings are the agonist and that the quadriceps are the antagonists. If they are talking about straightening the legs at the knee then the quadriceps are the agonists and hamstrings are the antagonists.
   The other antagonistic pair they make talk about will be the biceps and triceps. To bend the elbow the biceps is the agonist and the triceps the antagonist. To straighten the elbow the triceps is the agonist and the biceps the antagonist.

3. a. When doing a sit-up the prime movers are the abdominals.
   b. In the upwards phase of the press-up the prime movers are the triceps.

4. a. See diagrams on page 90 of the students’ book.
   b. The reason the scapula does not move is that it is being held in place by other muscles.

5. Poor muscle tone results in some muscles being stronger than others. This means the person may stand unevenly. Over time this can lead to bad posture.

6. Discussion work: virtually any movement the students choose will involve the biceps and triceps or quadriceps and hamstrings. Try to encourage them to say which one is the agonist and which one is the antagonist. A way to help them remember this may be to say that if they are working hard they are in agony so the muscle working is the agonist!
   In a lay-up in basketball the quadriceps and hamstrings will be working antagonistically to allow the knee to flex (agonist hamstring, antagonist quadriceps) and extend (agonist quadriceps, antagonist hamstring) to run and then to jump. Likewise the biceps and triceps will be working antagonistically to allow the elbows to flex (agonist biceps, antagonist triceps) and extend (agonist triceps, antagonist biceps) particularly when lifting the ball to lay it off on to the backboard.