Strong, Safe, Moving Skeletons and Muscles

Teacher		**Class**	Year 3
Subject	Science	**Topic**	Skeletons and muscles
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Students learn skeletons and muscles give support, protection and movement. They make a poster to show the three jobs.

Curriculum links

- identify that humans and some other animals have skeletons and muscles for support, protection and movement [1]

Learning objectives

- Students will name support, protection and movement as jobs of skeletons and muscles.
- Students will match skull, ribs and backbone to the parts they protect.
- Students will explain muscles pull bones at joints to bend and straighten.

Success criteria

- I can name support, protection and movement as jobs of skeletons.
- I can say which bones guard brain, heart, lungs and spinal cord.
- I can show how two muscles pull to bend and straighten the elbow.

What students already know

Ask: What holds your body up so you do not flop? What helps you bend your arm? Take 3-4 quick answers.

Key words

skeleton	frame of hard bones inside the body that holds it up [4]
muscle	soft body part that shortens to tug bones [4][7]
support	holding something up so it keeps its shape [9]
protection	keeping soft body parts safe from harm [9]
movement	changing place or position [7]
joint	bendy place where two bones meet [7]

Materials

- large paper for posters
- felt tips
- support, protection and movement word cards with picture clues
- Slides 1-8, 10-12
- Video clip 1 (0:00–3:27) on slide 6
- Video clip 5 (0:00–4:30) on slide 8

Before the lesson

- Print support, protection and movement word cards with picture clues and sentence starters, one set per pair
- Test Slides 1-8, 10-12 and Video clip 1 (0:00–3:27) and Video clip 5 (0:00–4:30) with sound
- Set out large paper, felt tips and a model poster showing three boxes for the three jobs

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- sentence starters for support, protection and movement
- exit slips or notebooks
- Clear floor space so students can stand, touch skull and ribs, and bend elbows gently

Lesson outline

0–5 min **Starter** 5 min · Whole class

Hook interest in the three jobs and recall what holds us up and moves us.

YOU DO

1. Show Slide 1 Strong, Safe, Moving! Skeletons and muscles at work and welcome the class.
2. Show Slide 2 Today we will… and read objectives: learn the 3 jobs of skeletons and muscles.
3. Say hook: If your skeleton wrote a job advert, what three jobs would it list? Ask pairs to guess.
4. Take ideas and link to Slide 3 Big idea: Bones hold you up and guard you, muscles pull bones to move you.

STUDENTS DO

1. Listen to the job advert hook.
2. Think, pair, share guesses about holding up, guarding and moving.
3. Listen to the Big idea and repeat the three jobs together.

Say: Today we are learning how skeletons and muscles work together. If your skeleton wrote a job advert, what three jobs would it list? Whisper your guess to your partner, then we will see if you were right.

Ask: What do you think holds your body up so you stand tall? (Bones / skeleton holds us up and gives shape.) · What helps you bend your arm or walk? (Muscles pull on bones to move us.)

Check understanding: Hands up for who can say one guessed job. If few answer, point to yourself: tall back, head, bent arm and name hold up, guard, move.

Support: Show three pictures: standing tall, skull over brain, bent arm, and point as you name each job.
Stretch: Ask: Which job do you think is most important and why?

Use: Slides 1-2

5–17 min **Skeletons Hold and Guard** 12 min · Whole class

Teach that skeletons give support and protect soft parts.

YOU DO

1. Show Slide 3 Big idea and Slide 4 Count your bones: 206 bones in a grown-up skeleton. Explain they are different shapes and sizes and grow as you grow.
2. Teach support: the skeleton supports the body [4], gives the body shape and supports its weight [11], and without a backbone we would not be able to stay upright [3].
3. Teach protection: touch skull, ribs, backbone and say the skull guards the brain and the ribcage shields the heart and lungs [4], and the backbone is important to protect the spinal cord [5].
4. Play Video clip 1 on Slide 6 (0:00–3:27) to see bones and muscles together and the 3 jobs, then recap skull, ribs, backbone.

STUDENTS DO

1. Gently touch skull, ribs and backbone where teacher shows.
2. Watch the video to spot holding up, guarding soft parts and helping move.
3. Chant with actions: tall for hold up, hug chest for guard, march for move.

Say: Your skeleton has over 200 bones [11]. Bones hold you up and guard you. Your skull is a hard case round your brain, your ribs make a cage round your heart and lungs, and your backbone guards the cord inside.

Worked example: Ribs guard heart and lungs, step by step: 1. Find your ribs on your chest. 2. Feel the hard curved bones. 3. Inside are soft heart and lungs. 4. So ribs = cage-like structure that protects the organs inside [3][4].

Ask: Which bones guard the brain? Why do hard bones with no movement help? (Skull; bones in the skull are joined rigidly and cannot move [3], so they make a safe case.) · What would we look like without a skeleton? (We would flop and could not stand tall or keep shape, no support.) · Which bones guard the heart and lungs? (Ribs / ribcage forms a cage that protects organs inside.)

Check understanding: Hold up 1, 2 or 3 fingers: 1 = skull guards brain, 2 = ribs guard heart and lungs, 3 = backbone guards spinal cord. Reteach any with mixed answers using body touch.

Support: Give skull, ribcage and backbone labels with matching organ pictures so students point and match as you teach. **Stretch:** Ask why rigid skull bones that cannot move help protection [3].

Use: Slides 3-6, Video clip 1 (0:00–3:27)

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17–30 min **Muscles Pull at Joints** 13 min · Whole class

Teach that muscles pull bones at joints and work in pairs.

YOU DO

1. Show Slide 7 How a move happens chain: Brain sends a message, Muscle shortens and pulls, Tendon cord tugs the bone, Bone moves at the bendy joint.
2. Play Video clip 5 on Slide 8 (0:00–4:30) to watch elbows and knees bend, then students gently feel own elbow, knee and shoulder.
3. Show Slide 10 Muscles pull in pairs steps and model: bend elbow, front gets bumpy and hard; straighten, back pulls instead.
4. Teach that muscles can only pull, they cannot push, so joints are controlled by more than one muscle [11], the biceps bends the arm and the triceps straightens it [4].

STUDENTS DO

1. Follow the chain with actions: tap head, squeeze arm, tug sleeve, bend elbow.
2. Watch video then bend and straighten elbows and knees slowly, feeling tight and soft.
3. Touch shoulder, elbow and knee and say: joint is where two bones meet and can move.

Say: Muscles can only pull, they cannot push. A muscle shortens to pull a bone [4]. A joint is the place where two bones meet [7]. To bend and straighten, one muscle pulls one way and another pulls the other way [7].

Worked example: Bend elbow, step by step: 1. Hand on front of upper arm. 2. Slow bend – front gets short, bumpy and hard, it pulls. 3. Slow straighten – front goes soft, back pulls instead. 4. So bend = biceps pulls, straighten = triceps pulls [4]. Muscles are attached to bones by tendons [4].

Ask: Can a muscle push a bone? How do we straighten after bending? (No, muscles can only pull [11]; a different muscle pulls the other way.) · Which muscle pulls to bend the forearm up, which pulls it down? (Biceps pulls up to bend, triceps pulls down to straighten [4].)

Check understanding: Signal freeze: bend or straighten on your word, then point to the hard pulling muscle. Scan room; remodel with slow copy if pointing is wrong.

Support: Let students copy your slow arm bend first before trying legs, feeling one joint at a time. **Stretch:** Ask students to try a slow march and say when leg muscles feel tight and loose.

Use: Slides 7-8, 10, Video clip 5 (0:00–4:30)

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30–50 min **Three Jobs Poster** 20 min · Pairs

Apply learning by drawing and labelling support, protection and movement.

YOU DO

1. Hand out large paper, felt tips and support, protection and movement word cards. Show model with three boxes.
2. Model one box: draw backbone standing tall, write Backbone holds us up for support. Remind skeleton supports the body, protects organs and works with muscles to create movement [4].
3. Send pairs to draw: skull guarding brain and ribs round heart and lungs for protection, tall body for support, bent elbow with two muscles for movement.
4. Stop at 15 minutes for pairs to present: point to one drawing for each job and say which bones and muscles work.

STUDENTS DO

1. In pairs, draw three sections and stick or copy word cards for each job.
2. Label skull, ribs, backbone, muscle and joint, showing different shaped bones.
3. Present poster to another pair, pointing to one drawing for each job.

Say: You will make a poster for the three jobs. Draw and label support, protection and movement. Use your word cards to help you write. Show skull, ribs, backbone and a bending elbow with pulling muscles.

Worked example: Support box: 1. Draw a tall stick body. 2. Draw backbone line down middle. 3. Label: Backbone holds us up. 4. Add: Without it we flop. Protection box: draw skull circle round brain dot, ribs as curved lines round heart shape.

Ask: Which drawing shows protection? What is guarded? (Skull guards brain, ribcage shields heart and lungs, backbone guards spinal cord.) · How will you show movement on your poster? (Bent elbow with front muscle pulling to bend, back muscle pulling to straighten; muscles pull bones at joint.)

Check understanding: Pairs hold up poster and point to support, protection, movement in turn. If labels missing, give sentence starters and add together before plenary.

Support: Give the three word cards with picture clues and sentence starters to describe each job [4]. **Stretch:** Ask students to add arrows showing how muscles pull on bones at a joint to make movement.

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50–60 min **Vote and Exit** 10 min · Whole class

Return to objectives and check everyone can name jobs and examples.

YOU DO

1. Show Slide 11 Vote: most useful job? Read: Which job of skeletons and muscles could you not do without? Holding us up, Guarding soft parts, Helping us move.
2. Take vote with hands, ask two students to justify using skull, ribs or pull ideas.
3. Show Slide 12 Exit ticket and hand out slips: One job of my skeleton is..., One animal with muscles and a skeleton is..., One question I still have is...
4. Collect slips and link back: humans and most other animals have muscles throughout their bodies that help them move and balance [7].

STUDENTS DO

1. Vote and give reason, e.g. guarding because skull guards brain.
2. Complete exit ticket on their own in 4 minutes.
3. Hand in slip and keep poster for display.

Say: Time to vote. Which job could you not do without: holding us up, guarding soft parts or helping us move? Vote, then finish your exit ticket in full sentences. Remember muscles pull, never push.

Ask: Name the three jobs of skeletons and muscles? (Support / holding us up, protection / guarding soft parts, movement / helping us move.) · Name one animal with a skeleton inside and muscles that move it? (Dog / fish / bird / human; fish, reptiles, birds and mammals move with muscles connected to skeleton [6].)

Check understanding: Read 5-6 exit slips aloud. If jobs confused, reteach tomorrow with skull-ribs-backbone touch and elbow pull demo.

Support: Give word bank: skull, ribs, backbone, brain, heart, lungs, pull, joint to finish exit sentences. **Stretch:** Ask: why do we need two muscles at the elbow if muscles only pull?

Use: Slides 11-12

Common mistakes

Mistake	How to spot it	How to fix it
Thinks skeleton is one big bone all the same shape	Poster shows one bone or student says skeleton is one bone	Handle cotton buds / point to poster: a skeleton is made up of lots of bones which are different shapes and sizes [7], over 200 bones [11].
Thinks muscles push bones to straighten	Says triceps pushes arm straight	Feel again: muscles can only pull, they cannot push [11]; one pulls to bend, the other pulls the opposite way [7].
Thinks only humans have skeletons and muscles	Sorts dog or fish as without bones	Recall fish, reptiles, birds and mammals move with muscles connected to skeleton [6]; most animals have muscles to move and balance [7].

Support

- Give the three word cards with picture clues and sentence starters to describe each job [4].
- Pre-draw faint poster boxes for support, protection and movement so students only draw inside.
- Model each joint and muscle feel first so students copy one at a time.

Stretch

- Ask students to add arrows showing how muscles pull on bones at a joint to make movement.
- Ask students to explain why rigid skull bones that cannot move help protection [3].
- Ask students to explain what would happen to standing and balance without muscles to move

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bones.

For the LSE or teaching assistant

Stay with poster pairs needing writing help: read word cards, scribe labels if needed, prompt elbow feel - front hard on bend, back hard on straighten.

Check for understanding

Question	Answer
One job of my skeleton is...?	support / holding us up, protection / guarding soft parts, or movement with muscles.
Which bones protect the heart and lungs?	Ribs / ribcage shields heart and lungs [4].
How do two muscles move your elbow?	One pulls to bend, the other pulls to straighten; muscles can only pull, never push [11].

Homework

Bend and straighten your elbow for someone at home and show which side feels hard each time.

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