Build-a-Cell: Jobs of Seven Parts

Teacher		**Class**	Year 7
Subject	Science	**Topic**	Cell structure and function
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Students learn the jobs of seven cell parts. They build animal and plant cells from clay and label each job.

Curriculum links

- study of living cells in Year 7 [1]
- describe scientific ideas such as the structure of cells [1]

Learning objectives

- Students will describe the functions of seven parts of cells.
- Students will compare plant and animal cells by their parts.
- Students will link each cell structure to its job in the cell.

Success criteria

- I can name a cell part from a description of its job.
- I can explain what each of the seven parts does.
- I can compare plant and animal cells using their parts.

What students already know

Ask: What are all living things made of? Listen for tiny cells [8]. Ask pairs to name any cell part they remember.

Key words

nucleus	control centre that holds DNA instructions and switches jobs on [6][8]
cell membrane	stretchy skin round the cell that picks what goes in or out [6][8]
cytoplasm	clear jelly inside where most of the chemical jobs happen [6][3]
mitochondria	tiny power stations that use food and oxygen to free energy [6][3]
cell wall	tough outer coat outside the skin, made of cellulose, that holds shape firm [3][8]
chloroplasts	green food makers that catch light to make sugar [3][8]

Materials

- modelling clay in different colours
- paper labels and toothpicks
- printed diagrams of animal and plant cells
- projector and slides 1-6, 9-12
- Video clip 1 Grand Cell Tour
- Worksheet Task D revision clock copies
- word bank with the seven jobs in simple sentences

Before the lesson

- Print diagrams of animal and plant cells, one per pair, plus paper labels
- Print Worksheet Task D revision clock, one per student
- Print word bank with seven jobs for support table
- Test Slide 6 Video clip 1 (0:00–4:30) for sound and picture
- Set out trays with modelling clay in different colours and toothpicks

Lesson outline

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

Recall that cells are building blocks and spark interest in building a cell.

YOU DO

1. Show Slides 1-3 and read the objectives from Slide 2.
2. Point to Slide 3 bullets: all living things are made of tiny cells [8].
3. Give the hook: If you had to build the smallest living thing in the world, what parts would you put inside?
4. Ask pairs to suggest one part a tiny living thing would need and take two quick ideas.

STUDENTS DO

1. Listen to objectives and look at Slide 3.
2. Discuss the hook with a partner for 30 seconds.
3. Share one idea with the class.

Say: All living things are made of tiny cells, which are the basic units of life. Today we will describe jobs of seven cell parts and compare plant and animal cells. If you had to build the smallest living thing, what parts would you put inside?

Ask: What are all living things made of? (Tiny cells, the basic units of life [8].) · Do plant and animal cells share parts? (Yes, some parts are shared, but plant cells have three extra parts [8].)

Check understanding: Cold-call three students for a cell idea; if blank, point again to Slide 3 that each part has a special job and give an example.

Support: Show the printed animal diagram so students can point instead of naming. **Stretch:** Ask what might go wrong if a built cell had no instructions inside.

Use: Slides 1-3

5–18 min **Teaching** 13 min · Whole class

Teach the jobs of the four shared parts and three plant-only parts.

YOU DO

1. Show Slide 4 cards and explain the four shared parts: nucleus holds DNA and controls activities [6], membrane controls what enters and leaves [6], cytoplasm is jelly where reactions take place [6], mitochondria provide energy [6].
2. Show Slide 5 question and let pairs discuss what happens with no strong walls.
3. Play Video clip 1 on Slide 6 and ask students to listen for each job and spot plant-only parts.
4. Summarise after the video that plant cells also have a rigid wall for support [8], a large vacuole with cell sap for support [8], and chloroplasts with chlorophyll that trap light for photosynthesis [8].

STUDENTS DO

1. Listen, look at Slide 4, and repeat each one-line job.
2. Think, pair, share on Slide 5 about missing walls.
3. Watch the video and raise a finger when they hear a plant-only part.

Say: Animal and plant cells both have a nucleus, membrane, cytoplasm and mitochondria. Plant cells have three extras: a wall, a vacuole and chloroplasts. Listen for each job and watch which parts are plant-only.

Worked example: Nucleus: it contains DNA, which stores information that controls activities [6], as chromosomes with genetic information [8]. So we say the nucleus is the control centre.

Ask: Which part contains DNA and controls the cell? (Nucleus, it holds chromosomes with instructions [8].) · What would happen to a plant if it had no strong cell walls? (It would flop and lose support, as the wall is rigid and supports the cell [8].) · Which three parts are plant-only? (Cell wall, large permanent vacuole and chloroplasts [8].)

Check understanding: Mini-whiteboards: teacher reads a job, all hold up the part name; reteach any job missed by more than a few.

Support: Give a card with four jobs matched to pictures so students follow during the video. **Stretch:** Ask what would fail first with no nucleus: growth, repair or energy release, and why.

Use: Slides 4-6, Video clip 1 (0:00–4:30)

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18–38 min **Main activity** 20 min · Pairs

Model animal then plant cells and label the function of all seven parts.

YOU DO

1. Model quickly: roll clay for nucleus, flatten cytoplasm, wrap membrane edge.
2. Hand out trays, printed diagrams, labels and toothpicks; pairs build an animal cell with four parts.
3. Tell pairs to add the three plant parts to turn it into a plant cell and talk through each job as they build.
4. Circulate, check links, and stop the class at 15 minutes to write folded-card labels with one job per part.

STUDENTS DO

1. Build the animal cell, saying each job as they add a part.
2. Add wall, vacuole and chloroplasts to make a plant cell.
3. Write and fix labels for all seven parts and peer-check against the diagram.

Say: In pairs, model an animal cell showing nucleus, membrane, cytoplasm and mitochondria. Then add the wall, vacuole and chloroplasts to make it a plant cell. Label each part with its true job on your folded card.

Worked example: Mitochondria label: uses food and oxygen as fuel to provide energy in respiration [6]. Cytoplasm label: jelly-like substance where chemical reactions happen [6]. Vacuole label: stores water and keeps turgor in the cell [3].

Ask: What does your membrane do? (Surrounds the cell and controls what enters and leaves [6].) · How do your wall and vacuole support the plant cell? (Wall is rigid and supports [8]; vacuole holds cell sap and provides support and turgor [8][3].)

Check understanding: Walk the room reading three labels per pair; if jobs are vague, point to the word bank and ask them to add the key verb.

Support: Give a word bank with the seven jobs in simple sentences for students to copy onto labels. **Stretch:** Ask students to write why a plant cell needs both a membrane and a wall, using strength and control.

Use: printed diagrams of animal and plant cells

38–50 min **Linking** 12 min · Whole class

Link chloroplasts making food to mitochondria releasing energy and fix wall errors.

YOU DO

1. Show Slide 10 chain and talk through sunlight trapped by chloroplasts to make sugar [3][8], then sugar used by mitochondria to release energy [6].
2. Show Slide 11 mystery: read I store water and sap and keep the cell firm; confirm large permanent vacuole with cell sap [8].
3. Show Slide 12 true or false and take votes on nucleus control and wall support.
4. Correct the false statement that the membrane gives rigid support: the wall gives support [8].

STUDENTS DO

1. Copy the four-step chain with arrows into books.
2. Answer the mystery in pairs and say the full name.
3. Vote true or false and correct the false one aloud.

Say: Sunlight is trapped by chloroplasts, which make sugar by photosynthesis. Sugar and oxygen are used by mitochondria, which release energy for the cell. The wall gives support, not the membrane.

Worked example: Chain in full: sunlight trapped by chlorophyll for photosynthesis [8] -> sugar produced in chloroplasts [3] -> mitochondria use food and oxygen to provide energy [6].

Ask: Where does sugar come from for mitochondria to use? (Chloroplasts make sugar by photosynthesis using trapped light [3][8].) · True or false: the cell membrane gives plants rigid support? (False; the cellulose wall gives rigid structure and support [3][8].)

Check understanding: Hands-up vote on Slide 12; if many pick membrane for support, reshape clay wall around model again.

Support: Give the chain with first two steps filled so students add the last two. **Stretch:** Ask what happens to energy release if chloroplasts get no light for days, and why.

Use: Slides 10-12

50–60 min **Plenary** 10 min · On their own

Summarise the seven jobs and check progress against the success criteria.

YOU DO

1. Hand out Worksheet Task D revision clock and ask for a few words per job around the clock.
2. Show Slide 2 success lines and ask students to tick I can name a part from its job and explain each part.
3. Take three quick answers from clocks for wall, nucleus and mitochondria.
4. Collect clocks and set homework.

STUDENTS DO

1. Complete Task D clock on their own with short job phrases.
2. Self-check against Slide 2 success criteria with thumbs up or sideways.
3. Read out one clock entry when asked.

Say: Summarise each job in a few words around your revision clock. Then check: can you name a part from its job and explain all seven? Be ready to say one job from memory.

Ask: Which part controls the cell and holds DNA? (Nucleus [6].) · Which parts provide support in a plant cell? (Cell wall and large vacuole with cell sap [8].)

Check understanding: Scan clocks for all seven entries; keep back students with gaps for a 2-minute reteach while others start homework.

Support: Allow copying three entries from the word bank, then writing the rest from memory. **Stretch:** Ask students to add what breaks if the power station or gates fail, in two short notes.

Use: Slide 2, Worksheet Task D

Common mistakes

Mistake	How to spot it	How to fix it
Thinking the cell membrane gives rigid support	Labels or votes say membrane makes the plant stiff	Show box and balloon model again: wall outside the membrane is rigid and supports [8]; membrane only controls entry and exit [6].
Mixing up mitochondria and chloroplasts	Students say mitochondria trap light or make sugar	Repeat chain: chloroplasts trap light and make sugar [8][3]; mitochondria use food and oxygen to free energy [6].
Seeing the vacuole as just a water bag with no support job	Comic or clock says stores water but misses firmness	Stress large vacuole holds cell sap which provides support and keeps turgor [8][3].

Support

- Give a word bank with the seven jobs in simple sentences to copy onto labels and clocks.
- Provide half-finished diagrams and sentence starters: It should enter because..., When the vacuole is full, the cell is...

Stretch

- Write why a plant cell needs both a membrane and a wall, using strength and control.
- Explain what breaks if gates or power station fail, and what happens with no light for chloroplasts.

For the LSE or teaching assistant

Stay with the support table during build and plenary; prompt label reading, check membrane versus wall wording, and scribe short phrases if needed.

Check for understanding

Question	Answer
Name the part: I control the cell and hold DNA instructions. What am I?	Nucleus [6].
Name two parts found in plant cells but not in animal cells, with one job each.	Cell wall supports [8]; vacuole stores sap and keeps firm [8]; chloroplasts trap light for photosynthesis [8] – any two.
Explain how food made in chloroplasts leads to energy for the cell.	Chloroplasts make sugar by photosynthesis [3]; mitochondria use sugar and oxygen to release energy [6].

Homework

Complete Worksheet Task B crossword using the seven cell jobs.

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