Tiny Building Blocks of Life

Teacher		**Class**	Grade 6
Subject	Science	**Topic**	Living things are made of cells
Date		**Room**	
Lesson length	60 minutes	**Country**	United States

Students learn living things are made of cells. They use microscopes to find cell evidence in plant and animal samples.

Curriculum links

- All living things are made up of cells, which is the smallest unit that can be said to be alive [1]
- An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular) [1]
- Use a compound microscope to locate and identify characteristics of different types of cells [1]

Learning objectives

- Students will investigate microscope evidence that living things are made of cells.
- Students will compare one-celled and many-celled organisms using observations.
- Students will explain cells as the smallest unit of life with evidence.

Success criteria

- I can show cell evidence from microscope observations.
- I can compare one cell and many cells with examples.
- I can explain why cells are the smallest unit of life.

What students already know

Show Slide 5 onion boxes. Ask: Is an onion living? Have students thumbs up or down and say one reason in 2 minutes.

Key words

cell	a very tiny building block that can be alive on its own [1]
unicellular	a living thing made from just one tiny living unit [1]
multicellular	a living thing made from many tiny living units sharing jobs [1]
microscope	a tool that makes things too small to see look larger [1][2]
evidence	something you observe or measure that helps show an idea is true [2]

Materials

- compound microscopes, pre-focused
- prepared slides of onion skin and cheek cells
- paper, pencils, colored pencils
- drawing frames with two boxes labeled what I see and what repeats
- Slides 1-5, 9-12
- Worksheet Task A and Task G, one copy per student
- Venn diagram sheet for stretch
- trash can, soap for handwashing

Before the lesson

- Print Worksheet Task A and Task G for each student and drawing frames
- Pre-focus microscopes on onion skin and cheek cell slides and test light
- Set up two stations: plant onion skin and animal cheek cells with pencils
- Check Slides 1-5 and 9-12 project clearly

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Lesson outline

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

Hook students and surface ideas about unseen building blocks of living things.

YOU DO

1. Show Slide 1 title and read lesson goals on Slide 2.
2. Ask hook: If you and an onion are both built from tiny parts you cannot see, how could we check that together?
3. Show Slide 5 mystery onion boxes and take 3 predictions: alive or not, and how to test.
4. State today we will use a microscope to show evidence that plant and animal samples are made of cells.

STUDENTS DO

1. Look at Slide 5 and share predictions with a neighbor.
2. Raise hands to vote alive or not alive and say how a microscope could help.

Say: You and an onion look very different, but both may be built from tiny parts we cannot see. Scientists use a special tool to make those tiny parts look larger. Today we will check that idea together with real evidence.

Ask: If cells are too small to see, what tool could help us check for them? (A microscope that makes small things look larger.) · What would you expect to see if an onion is made of cells? (Many small repeating units with boundaries, not just solid color.)

Check understanding: Thumbs up if you can name our tool and goal. If mixed, repeat: microscope shows evidence for cells.

Support: Show a hand lens and a microscope side by side and point to eyepiece and stage. **Stretch:** Ask what else they would test besides onion and skin to prove all living things have cells.

Use: Slides 1-2, Slide 5

5–15 min **Teaching** 10 min · Whole class

Teach core idea that cells are the smallest living unit in one-celled and many-celled life.

YOU DO

1. Show Slide 3 and explain all living things are made up of cells, which is the smallest unit that can be said to be alive [1].
2. Show Slide 4 cards for pond organism, leaf, and skin to explain one tiny unit can live alone or many units can form tissue [1].
3. Explain microbiology grew after the invention of the microscope in the 1600s, and Theodor Schwann extended cell ideas to animals [2][4].
4. Model science rule: natural science is based on empirical evidence from observation and experimentation [2].

STUDENTS DO

1. Choral repeat definitions with gestures: hold up one finger for one cell, wiggle many fingers for many cells.
2. Point to Slide 4 cards and say one or many for pond organism, leaf, and skin.

Say: A cell is the smallest unit that can be alive, and all living things are made of cells [1]. An organism may consist of one single cell or many different numbers and types of cells [1]. We trust this because many careful observations all show the same pattern.

Worked example: Pond water example, step by step: 1) Look at drop under microscope. 2) See one separate tiny unit moving alone. 3) It takes in food and moves by itself. 4) Label as one cell doing all jobs, so unicellular [1]. Human skin example: 1) See many flat units stuck together. 2) No single unit lives alone. 3) Label as many cells sharing jobs, so multicellular [1].

Ask: What is a cell? (The smallest unit that can be said to be alive [1].) · How is a tiny pond organism different from your skin? (Pond organism is one cell doing all jobs; skin has many cells sharing jobs [1].) · Why do many observations convince scientists more than one person saying it? (Science uses observation and experimentation as evidence, and repeated results are stronger [2].)

Check understanding: Hold up 1 finger or 5 fingers for: pond microbe, leaf, human. Reteach any missed with Slide 4 cards.

Support: Give word bank cards: one cell does all jobs and many cells with different jobs for students to hold up. **Stretch:** Ask students to predict what leaf cells and skin cells need to do differently and why types differ.

Use: Slides 3-4

15–40 min **Main activity** 25 min · Pairs

Investigate plant and animal slides to collect drawn evidence for cells.

YOU DO

1. Show Slide 9 task and demo focusing, drawing three repeated units, and noting boundaries.
2. Send pairs to stations to use a compound microscope to locate and identify characteristics of different types of cells [1].
3. Circulate to check focus, counting of repeating units, and labeling one cell or many cells.
4. Prompt evidence sentence starter: Our evidence is... and connect to smallest unit of life [1].

STUDENTS DO

1. In pairs, observe onion skin and cheek cell prepared slides, draw three repeated units at each station.
2. Complete Slide 9 steps and Worksheet Task A: label one cell or many cells and write evidence sentence.

Say: You are cell scientists now. At each station, find the repeating boxes, draw what repeats, and trace the boundary. You will make two labeled sketches and finish with one evidence sentence about living things being made of cells.

Worked example: Onion skin sketch, step by step: 1) Focus until brick-like boxes appear sharp. 2) Count and draw three boxes that touch edge to edge. 3) Trace dark boundary around each box with colored pencil. 4) Label: plant sample, many connected units, many cells. Evidence sentence: Our evidence is we saw repeating boxes with boundaries in onion skin, so the onion is made of many cells.

Ask: What repeats that tells you this is made of cells? (Same-shaped units with clear boundaries repeating across the view.) · How do your two samples both support that living things are made of cells? (Both plant onion and animal cheek show repeating units, so different living things both have cells [1].)

Check understanding: Collect quick show of sketches: teacher scans for three units and boundary lines. Refocus microscopes for pairs with blank drawings.

Support: Give a pre-focused microscope and a drawing frame with two boxes labeled what I see and what repeats. **Stretch:** Have students compare and contrast plant and animal cell structure and function in a Venn diagram [1].

Use: Slide 9, Worksheet Task A

40–50 min **Compare** 10 min · Groups

Sort and explain unicellular versus multicellular life using evidence.

YOU DO

1. Show Slide 10 compare chart and define one cell does all jobs and many cells share jobs [1].
2. Lead 4-minute sort: pond organism, leaf, human skin into unicellular or multicellular with evidence pointer.
3. Show Slide 11 question and run think, pair, share on different jobs for leaf and skin.
4. Tie to special structures having particular functions inside cells [1].

STUDENTS DO

1. In groups, sort three picture cards and defend one placement with cell evidence.
2. Think, pair, share Slide 11 and start Worksheet Task G table for unicellular and multicellular.

Say: Now we sort our evidence. If one tiny unit lives all by itself, it is unicellular. If many units stick together and share jobs, it is multicellular [1]. Point to the cell evidence every time you place a card.

Ask: Is the tiny pond organism unicellular or multicellular, and what is your evidence? (Unicellular, one separate unit moving and doing all jobs alone [1].) · Why would a leaf need different cell types than your skin? (Leaf cells make food and skin cells protect, so different jobs need different types.)

Check understanding: Vote agree or need more evidence for each placement. If weak, ask group to point to units or boundaries again.

Support: Start each pile with one example done and give sentence frames: I observed... This supports cells because... **Stretch:** Add two blank cards for students to add examples and justify unicellular or multicellular.

Use: Slides 10-11, Worksheet Task G

50–60 min **Plenary** 10 min · Whole class

Check understanding and secure claim that every living thing is built from cells.

YOU DO

1. Show Slide 12 true or false statements for all to answer.
2. Review success lines: show cell evidence, compare one and many, explain smallest unit.
3. Collect Worksheet Task A evidence sentences and read two strong examples aloud.
4. Set homework and preview next lesson on cell parts and jobs.

STUDENTS DO

1. Answer Slide 12 true or false on mini whiteboards and correct false statements.
2. Complete 3-question exit ticket on their own.

Say: Every living thing is built from cells. Even one-celled organisms have a cell, and it is the smallest unit of life [1]. Show me with your exit ticket that your evidence proves this claim.

Ask: Some living things have no cells at all. True or false? (False. All living things are made of cells [1].) · Even one-celled organisms have a cell. True or false and why? (True. One cell does all life jobs for that organism [1].)

Check understanding: Scan whiteboards for Slide 12. If many miss no-cells statement, restate all living things are made of cells [1].

Support: Provide sentence frames: I observed... This supports cells because... for exit ticket. **Stretch:** Ask what observation would weaken the claim and what they would observe next.

Use: Slide 12

Common mistakes

Mistake	How to spot it	How to fix it
Thinking only plants have cells because onion boxes are easy to see	Student labels onion as cells but cheek as no cells	Put both sketches side by side and trace repeating boundaries in each to show all living things are made of cells [1]
Thinking unicellular means no cell or not alive	Student says pond microbe has zero cells	Show single moving unit and state even one-celled organisms have a cell that does all jobs [1]
Thinking cells are the same as atoms or just dots on paper	Student draws random dots with no boundaries	Require three repeated units with traced boundaries and label what repeats, linking to smallest unit that can be alive [1]

Support

- Give a pre-focused microscope and a drawing frame with two boxes labeled what I see and what repeats.
- Provide sentence frames: I observed... This supports cells because... and word bank for one cell and many cells.

Stretch

- Have students compare and contrast plant and animal cell structure and function in a Venn diagram [1].
- Ask students to add inside dots for special structures and explain how structure helps function [1].

For the LSE or teaching assistant

Stay with main activity pairs. Help with focusing, counting three units, and tracing boundaries. Scribe evidence sentence if needed.

Safety

- Use a fresh toothpick for each student, do not share, throw toothpicks in the trash
- Handle glass slides by the edges, wash hands after handling slides

Check for understanding

Question	Answer
What evidence from today shows living things are made of cells?	Both onion skin and cheek samples showed repeating units with boundaries under the microscope.
Give one example of unicellular and one of multicellular life.	Unicellular: tiny pond organism; multicellular: human or leaf with many cells sharing jobs.
Why is a cell called the smallest unit of life?	Because it is the smallest unit that can be said to be alive and all living things are made of cells [1].

Homework

Finish Worksheet Task G table and write one sentence explaining your cell evidence.

Sources

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