Cells Through Time

Trace how tools and evidence shaped cell theory.

FB.1.2 "Trace and model the historical development of scientific ideas and theories (e.g., creation of the microscope, discovery of cells/cell theory, discovery of DNA/RNA, double helical shape of DNA, evolution/natural selection..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each dated event, circle the tool or scientific claim linked to it, and number the events in time order to trace how evidence built cell theory.

How Did Cell Theory Develop?

1. In 1665, Robert Hooke examined thin slices of cork with a compound microscope and saw tiny boxlike spaces. He named them cells, although the cork tissue was dead and he was seeing cell walls rather than living cells. In the 1670s, Antonie van Leeuwenhoek built powerful single-lens microscopes and described living microorganisms in pond water. His observations added something Hooke's cork could not show: some cells were entire living organisms. The order matters. First, a new tool made tiny structures visible; then powerful lenses revealed living things too small to see unaided. Neither scientist had yet proposed a complete cell theory.

2. Nearly two centuries later, scientists used observations of many organisms to make broader claims. In 1838, Matthias Schleiden argued that plants are made of cells. In 1839, Theodor Schwann extended the claim to animals. Taken together, these claims suggested that cells are a basic unit of living things, not just a feature of cork or pond water. One question remained: Where do new cells come from? In 1855, Rudolf Virchow argued that new cells arise from existing cells, drawing on earlier work by other researchers. Cell theory developed in steps, as later claims expanded the range of organisms and processes it could explain.

3. The timeline did not end when cell theory took shape. In 1931, Ernst Ruska and Max Knoll built an early electron microscope. Later electron microscopes let researchers examine cell structures that ordinary light microscopes could not resolve clearly. These instruments did not replace the earlier evidence for cell theory. Instead, they revealed details inside cells that earlier scientists could not see. A timeline of these events shows two linked paths: improvements in tools changed what scientists could observe, while new explanations connected those observations. Scientific theories grow when evidence is gathered, compared, and revised across generations.

2 ANSWER WITH EVIDENCE

Use the passage

1. How did Leeuwenhoek's observation in the 1670s extend what Hooke had observed in 1665?

2. Why does Schwann's 1839 claim belong after Schleiden's 1838 claim on a timeline of cell theory?

3. What question did Virchow's 1855 claim address that the claims from 1838 and 1839 had left open?

4. Compare the roles of the microscope in 1665 and the later electron microscopes made possible by the 1931 invention. What new evidence did each make available?

3 YOUR TURN

Your own words

Build a five-row timeline using five dated events from the passage. Give each event your own brief headline and explain how it builds on earlier evidence; for your first event, write “Starting point” in the last column.

DATE	YOUR HEADLINE	LINK TO EARLIER EVIDENCE

ANSWER KEY

Cells Through Time

HIGH SCHOOL · FB.1.2

PART 1 · READ AND MARK

Underline each dated event, circle the tool or scientific claim linked to it, and number the events in time order to trace how evidence built cell theory. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How did Leeuwenhoek's observation in the 1670s extend what Hooke had observed in 1665?	**Hooke saw spaces bounded by cell walls in dead cork. Leeuwenhoek later observed living microorganisms, showing that some cells are entire living organisms.**
2	Why does Schwann's 1839 claim belong after Schleiden's 1838 claim on a timeline of cell theory?	**Schleiden argued that plants are made of cells, and Schwann extended that claim to animals a year later.**
3	What question did Virchow's 1855 claim address that the claims from 1838 and 1839 had left open?	**The earlier claims identified cells in plants and animals but did not explain where new cells come from. Virchow argued that they arise from existing cells.**
4	Compare the roles of the microscope in 1665 and the later electron microscopes made possible by the 1931 invention. What new evidence did each make available?	**Hooke's microscope made tiny spaces in cork visible. Later electron microscopes revealed details of cell structures that light microscopes could not resolve clearly.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

DATE	YOUR HEADLINE	LINK TO EARLIER EVIDENCE
1665	Tiny spaces in cork	Starting point
1670s	Living cells come into view	Added living organisms to Hooke's observation of dead cork.
1838	Cells found throughout plants	Moved from observations of particular specimens to a claim about plants.
1839	Cell claim extends to animals	Broadened Schleiden's claim about plants to include animals.
1855	New cells have a source	Added an explanation for where new cells come from.

Accept any five correctly dated events in chronological order. Links should describe how each event adds to an earlier observation or claim, not merely repeat its headline.