

Grade 6 Science

Unit 6: Cells and Systems

Driving question: How do living things heal?

19 lessons (investigations and weekly readings) and a words quiz. Use this pack with the unit's **Teacher Guide**, **Student Procedure Guide**, **Student Work Pages** and **Science Literacy Student Reader** (download them once from the course) to teach the whole unit without the internet.

What is in this pack

- A plan for each lesson: the lesson question, how many class days it takes, the Teacher Guide pages to follow, and the student pages to print.
- For each weekly reading: the Student Reader pages, words to know and the exercise page.
- The words quiz, ready to print, with its key at the back.

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Lesson schedule

Each investigation lesson takes the number of class days shown (about 45 minutes a day). Do each reading over a week alongside the lessons. Tick each one off as you go.

	Lesson	Days	Student pages
☐	Reading: Science Literacy Preface: Put Yourself in This Scene	1 week	—
☐	Lesson 1: What happened in the student’s foot so they could walk again?	4	8 to print
☐	Lesson 2: What do our bones, skin, and muscles do for us?	2	3 to print
☐	Reading: Science Literacy Collection 1: Body Parts (and Breaking Them)	1 week	1 to print
☐	Lesson 3: How can medical images and diagrams help us figure out more about the structures in our body?	1	4 to print
☐	Lesson 4: Why is there blood in all of these places in the body?	3	6 to print
☐	Lesson 5: What do nerves do, and why are they in different parts of the body?	2	5 to print
☐	Reading: Science Literacy Collection 2: Inside the Body	1 week	1 to print
☐	Lesson 6: What will we see if we look at skin, bone, and muscle with the microscope, too?	1	3 to print
☐	Lesson 7: Are all things made of cells?	1	3 to print
☐	Lesson 8: What happened as the skin on top of the foot healed?	1	2 to print
☐	Lesson 9: What is happening at the site of an injury to fill the gap?	1	3 to print
☐	Lesson 10: What do cells need to grow and make more of themselves?	2	10 to print
☐	Reading: Science Literacy Collection 3: Cells, Health, and Healing	1 week	1 to print
☐	Lesson 11: How do cells get what they need to grow?	1	6 to print

	Lesson	Days	Student pages
☐	Lesson 12: How do the structures and systems in the body work together to heal the injury?	2	4 to print
☐	Lesson 13: How is the process of growing similar to healing?	1	2 to print
☐	Lesson 14: How can shifting our perceptions of ability and disability allow us to be more thoughtful about how we make our environments more accessible?	3	5 to print
☐	Reading: Science Literacy Collection 4: Growth, Development, and Difference	1 week	1 to print
☐	Words quiz	—	—

Page numbers are PDF page numbers of each file, so they match what your PDF reader shows.

LESSON 1 OF 19

Reading: Science Literacy Preface: Put Yourself in This Scene

Words to know

- **prosthetic** — related to prostheses, artificial limbs
- **science literacy** — the ability to read, hear, and comprehend information about scientific topics and demonstrate understanding in discussion and through writing
- **skepticism** — doubt about the truth of something

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 35–38: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Preface: “Put Yourself in This Scene”: PDF pages 6–7. Look at the pictures and maps together.

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 1: What happened in the student's foot so they could walk again?

LESSON QUESTION

What happened in the student's foot so they could walk again?

Plan about **4 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 39–75: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 7–14
- Emergency Room Report — Student Work Pages, PDF pages 7–8
- Post-Operation Report — Student Work Pages, PDF pages 9–10
- Recovery Reports — Student Work Pages, PDF pages 11–14
- Evidence for Healing — Student Work Pages, PDF pages 15–16
- Healing Initial Model — Student Work Pages, PDF pages 17–18
- Healing Phenomena Stories — Student Work Pages, PDF pages 19–20
- Reference: One Cell Making Two Similar Cells — Student Procedure Guide, PDF page 77

For the teacher

- Teacher Reference 1 — Teacher Guide, PDF pages 370–371
- Teacher Reference 2 — Teacher Guide, PDF page 372

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: What happened in the student's foot so they could walk again?

Lesson 2: What do our bones, skin, and muscles do for us?

LESSON QUESTION

What do our bones, skin, and muscles do for us?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 76–102: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 15–18
- Mapping the Chicken Wing to the Human Foot — Student Work Pages, PDF pages 21–22
- Skin, Muscle, and Bone Systems — Student Work Pages, PDF pages 23–24

For the teacher

- Teacher Reference 1 — Teacher Guide, PDF pages 373–378
- Teacher Reference 2 — Teacher Guide, PDF pages 379–381
- Teacher Reference 3 — Teacher Guide, PDF pages 382–388

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: What do our bones, skin, and muscles do for us?

Reading: Science Literacy Collection 1: Body Parts (and Breaking Them)

Words to know

- **amputation** — a surgical procedure in which a limb is removed
- **collagen** — a structural protein in skin and connective tissue
- **connective tissues** — tissues, such as tendons and ligaments, that connect or support other tissues, organs, or body structures
- **healing** — the process of becoming healthy again
- **muscle fiber** — a muscle cell, generally cylindrical, that makes up skeletal muscle tissue
- **tissue** — a grouping of cells that perform a specialized function together

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 103–110: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 1: “Body Parts (and Breaking Them)”: PDF pages 8–17. Look at the pictures and maps together.

Student pages to print

- Exercise Page 1 — Student Work Pages, PDF pages 85–86

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 3: How can medical images and diagrams help us figure out more about the structures in our body?

LESSON QUESTION

How can medical images and diagrams help us figure out more about the structures in our body?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 111-126: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 19-21
- Reference: A Medical Professional's View Inside the Body — Student Work Pages, PDF pages 25-26
- Reference: Close-Up Diagrams of Skin, Muscle, and Bone — Student Work Pages, PDF pages 27-28
- Reference: Interpreting MRI — Student Work Pages, PDF pages 29-30

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How can medical images and diagrams help us figure out more about the structures in our body?

Lesson 4: Why is there blood in all of these places in the body?

LESSON QUESTION

Why is there blood in all of these places in the body?

Plan about **3 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 127–160: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 22–29
- Guidance for Reading about Blood — Student Work Pages, PDF pages 31–32
- mm Graph Paper — Student Work Pages, PDF pages 33–34
- Reading: What Is Blood? — Student Work Pages, PDF pages 35–36
- Reference: Procedures for Investigating Blood with a Microscope — Student Procedure Guide, PDF page 58
- Reference: Microscopic Images of Animal Blood — Student Procedure Guide, PDF pages 59–60

For the teacher

- Teacher Reference — Teacher Guide, PDF page 389

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Why is there blood in all of these places in the body?

Lesson 5: What do nerves do, and why are they in different parts of the body?

LESSON QUESTION

What do nerves do, and why are they in different parts of the body?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 161–185: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 30–33
- Under the Microscope: Images of Nerves — Student Work Pages, PDF pages 37–38
- Obtaining Information from Scientific Text — Student Work Pages, PDF pages 39–40
- Reading: The Body's Nervous System — Student Work Pages, PDF pages 41–42
- Reference: Microscopic Images of Nerves — Student Procedure Guide, PDF pages 61–66

For the teacher

- Teacher Reference — Teacher Guide, PDF pages 390–394

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: What do nerves do, and why are they in different parts of the body?

Reading: Science Literacy Collection 2: Inside the Body

Words to know

- **compression** — the act of placing under pressure or being compressed
- **CT scan** — a medical X-ray image produced by computed tomography
- **healing** — the process of becoming healthy again
- **metabolism** — the chemical processes that sustain life in an organism
- **MRI** — magnetic resonance imaging; a technique used to image internal structures in the body
- **placebo** — a neutral substance used in scientific investigations to test whether a tested substance works as designed
- **red blood cells** — structures that deliver oxygen to tissues via blood flow through the circulatory system
- **tissue** — a grouping of cells that perform a specialized function together
- **X-ray** — a wavelength of electromagnetic radiation that is used to produce medical imaging of structures inside the body

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 186–192: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 2: “Inside the Body”: PDF pages 18–27. Look at the pictures and maps together.

Student pages to print

- Exercise Page 2 — Student Work Pages, PDF pages 87–88

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 6: What will we see if we look at skin, bone, and muscle with the microscope, too?

LESSON QUESTION

What will we see if we look at skin, bone, and muscle with the microscope, too?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 193–208: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 34–35
- Investigating Skin, Bone, and Muscle with a Microscope — Student Work Pages, PDF pages 43–44
- Reference: Microscopic Images of Muscle, Bone, and Skin — Student Procedure Guide, PDF pages 67–75

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: What will we see if we look at skin, bone, and muscle with the microscope, too?

Lesson 7: Are all things made of cells?

LESSON QUESTION

Are all things made of cells?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 209–220: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 36–37
- DQB Questions or Parts of Questions We Have Answered — Student Work Pages, PDF pages 45–46
- Reference: Microscopic Images of Various Objects — Student Procedure Guide, PDF page 76

For the teacher

- Answer Key — Teacher Guide, PDF pages 395–399

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Are all things made of cells?

Lesson 8: What happened as the skin on top of the foot healed?

LESSON QUESTION

What happened as the skin on top of the foot healed?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 221–232: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 38–40
- Time-Lapse Video of Skin Healing Observations — Student Work Pages, PDF pages 47–48

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: What happened as the skin on top of the foot healed?

Lesson 9: What is happening at the site of an injury to fill the gap?

LESSON QUESTION

What is happening at the site of an injury to fill the gap?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 233–247: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 41–42
- Observations to Evaluate Claims — Student Work Pages, PDF pages 49–52
- Microscopic Images of Cells Splitting — Student Work Pages, PDF pages 53–54

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What is happening at the site of an injury to fill the gap?

Lesson 10: What do cells need to grow and make more of themselves?

LESSON QUESTION

What do cells need to grow and make more of themselves?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 248–272: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 43–47
- Obtaining Information from Scientific Text — Student Work Pages, PDF pages 55–56
- Reading: Algae — Student Work Pages, PDF pages 57–58
- Reading: Archaea — Student Work Pages, PDF pages 59–60
- Reading: Bacteria — Student Work Pages, PDF pages 61–62
- Reading: Yeast — Student Work Pages, PDF pages 63–64
- Reference: Secondary Data for E. coli Grown on Agar with Different Nutrient Levels — Student Procedure Guide, PDF pages 78–79
- Reference: Lifespan of Cells — Student Procedure Guide, PDF page 80
- Reference: Self-Assessment and Peer Feedback — Student Procedure Guide, PDF pages 81–82
- Reference: Peer Feedback Guidelines — Student Procedure Guide, PDF pages 83–84

For the teacher

- Teacher Reference — Teacher Guide, PDF pages 400–406
- Answer Key — Teacher Guide, PDF pages 407–408

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: What do cells need to grow and make more of themselves?

Reading: Science Literacy Collection 3: Cells, Health, and Healing

Words to know

- **amputation** — a surgical procedure in which a limb is removed
- **apoptosis** — the preprogrammed death of a cell
- **cell** — the smallest structural and functional unit of an organism
- **focus** — the center of interest or attention
- **healing** — the process of becoming healthy again
- **nerve cell** — a living structural unit that conveys electrical signals between the brain and other structures in the body
- **nucleus** — the organelle within a cell that contains genetic material
- **stem cells** — undifferentiated cells from which all other specialized cell types are generated
- **tissue** — a grouping of cells that perform a specialized function together

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 273–279: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 3: “Cells, Health, and Healing”: PDF pages 28–37. Look at the pictures and maps together.

Student pages to print

- Exercise Page 3 — Student Work Pages, PDF pages 89–90

Check for understanding

- Use one of today's words in a sentence of your own.

Lesson 11: How do cells get what they need to grow?

LESSON QUESTION

How do cells get what they need to grow?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 280–297: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 48–49
- Data from Investigating Red Onion Cells — Student Work Pages, PDF pages 65–70
- Reference: Alternate—Preparing Red Onion Skin Slides — Student Procedure Guide, PDF pages 85–86
- Reference: Procedure to Investigate Structures in Red Onion Cells — Student Procedure Guide, PDF pages 87–91
- Reference: Red Onion Investigation Images — Student Procedure Guide, PDF page 92
- Reference: Animal and Plant Cell Images — Student Procedure Guide, PDF pages 93–96

For the teacher

- Teacher Reference — Teacher Guide, PDF pages 409–411
- Answer Key — Teacher Guide, PDF pages 412–414

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How do cells get what they need to grow?

Lesson 12: How do the structures and systems in the body work together to heal the injury?

LESSON QUESTION

How do the structures and systems in the body work together to heal the injury?

Plan about **2 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 298–313: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 50–51
- Lizard and Sea Star Injury Cases — Student Work Pages, PDF pages 71–74
- Reference: Images of Swelling Due to Injury — Student Procedure Guide, PDF pages 97–98
- Reference: Doctor Report re: Swollen Finger — Student Procedure Guide, PDF pages 99–102

For the teacher

- Answer Key 1 — Teacher Guide, PDF pages 415–416
- Answer Key 2 — Teacher Guide, PDF pages 417–423

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How do the structures and systems in the body work together to heal the injury?

Lesson 13: How is the process of growing similar to healing?

LESSON QUESTION

How is the process of growing similar to healing?

Plan about **1 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 314–322: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 52–53
- Home Learning: How do we support healing? — Student Work Pages, PDF pages 75–76

For the teacher

- Answer Key — Teacher Guide, PDF pages 424–433

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How is the process of growing similar to healing?

Lesson 14: How can shifting our perceptions of ability and disability allow us to be more thoughtful about how we make our environments more accessible?

LESSON QUESTION

How can shifting our perceptions of ability and disability allow us to be more thoughtful about how we make our environments more accessible?

Plan about **3 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 323–348: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 54–57
- Transcript: Interview with Student from Lesson 1 — Student Work Pages, PDF pages 77–78
- Wheelchair Icons — Student Work Pages, PDF pages 79–80
- Transcript of Rosie King's TED Talk — Student Work Pages, PDF pages 81–82
- Transcript of Sinéad Burke's TED Talk — Student Work Pages, PDF pages 83–84

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How can shifting our perceptions of ability and disability allow us to be more thoughtful about how we make our environments more accessible?

Reading: Science Literacy Collection 4: Growth, Development, and Difference

Words to know

- **cell** — the smallest structural and functional unit of an organism
- **healing** — the process of becoming healthy again
- **MRI** — magnetic resonance imaging; a technique used to image internal structures in the body
- **plasma** — the colorless fluid part of blood
- **platelet** — a structural component of blood involved in clotting
- **regenerate** — to replace lost or injured tissue
- **tissue** — a grouping of cells that perform a specialized function together

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 349–355: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 4: “Growth, Development, and Difference”: PDF pages 38–47. Look at the pictures and maps together.

Student pages to print

- Exercise Page 4 — Student Work Pages, PDF pages 91–95

Check for understanding

- Use one of today's words in a sentence of your own.

WORDS QUIZ

Cells and Systems

Name: _____ Date: _____

Circle the letter of the best answer.

1. Which word means “the fluid within a cell surrounding the nucleus”?
 - a) sperm cell
 - b) cytoplasm
 - c) nucleus
 - d) X-ray
2. Which word means “a muscle cell, generally cylindrical, that makes up skeletal muscle tissue”?
 - a) connective tissues
 - b) muscle fiber
 - c) regenerate
 - d) healing
3. Which word means “the semipermeable membrane surrounding a cell’s cytoplasm”?
 - a) structure
 - b) single-celled organism
 - c) cell membrane
 - d) analogous
4. Which word means “referring to structures that have similar functions”?
 - a) MRI
 - b) analogous
 - c) sensory system
 - d) cell wall
5. Which word means “living structural units that make up bones”?
 - a) connective tissues
 - b) sensory system
 - c) MRI
 - d) bone cell
6. Which word means “a surgical procedure in which a limb is removed”?
 - a) amputation
 - b) cross section
 - c) platelet
 - d) cell
7. Which word means “a medical X-ray image produced by computed tomography”?
 - a) cell wall
 - b) CT scan
 - c) science literacy
 - d) structure

- 8.** Which word means “the way the parts of something are arranged”?
- a) sensory system
 - b) structure
 - c) regenerate
 - d) X-ray
- 9.** Which word means “the transition from a generalized cell into a cell of a specific type”?
- a) apoptosis
 - b) muscle cell
 - c) focus
 - d) cell differentiation
- 10.** Which word means “structures that deliver oxygen to tissues via blood flow through the circulatory system”?
- a) muscle cell
 - b) red blood cells
 - c) cell
 - d) science literacy
- 11.** Which word means “a type of blood cell, made in bone marrow, that helps the body fight infection and disease”?
- a) cell differentiation
 - b) cell wall
 - c) white blood cell
 - d) tissue
- 12.** Which word means “undifferentiated cells from which all other specialized cell types are generated”?
- a) exoskeleton
 - b) multicelled organism
 - c) stem cells
 - d) nucleus

FOR THE TEACHER

Answers

Unit quiz key

1. b 2. b 3. c 4. b 5. d 6. a 7. b 8. b 9. d 10. b 11. c 12. c