

Grade 7 Science

Unit 5: Ecosystem Dynamics

Driving question: How does changing an ecosystem affect what lives there?

25 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: How could buying candy affect orangutan populations in the wild?	4	3 to print
☐	Lesson 2: Can we replace palm oil with something else?	1	1 to print
☐	Reading: Science Literacy Collection 1: Using Earth	1 week	1 to print
☐	Lesson 3: Can we grow oil palm trees somewhere else so that we're not cutting down tropical rainforests?	1	3 to print
☐	Lesson 4: Why do people cut down tropical rainforests when they know it is harmful to the animals that live there?	1	2 to print
☐	Lesson 5: How have changes in our community affected what lives here?	2	2 to print
☐	Lesson 6: If palm oil is not going away, how can we design palm farms to support orangutans and farmers?	1	2 to print
☐	Lesson 7: How many orangutans typically live in the tropical rainforest?	2	2 to print
☐	Lesson 8: Why do orangutans need so much forest space?	2	2 to print
☐	Lesson 9: Would planting more rainforest fruit trees help the orangutan population increase?	2	1 to print
☐	Reading: Science Literacy Collection 3: Counting and Sampling Populations	1 week	1 to print
☐	Lesson 10: How do changes in the amount of resources affect populations?	2	2 to print
☐	Lesson 11: How does planting oil palm affect other populations?	2	2 to print

	Lesson	Days	Student pages
☐	Lesson 12: What would happen if orangutans go extinct?	1	1 to print
☐	Reading: Science Literacy Collection 4: Population Dynamics	1 week	1 to print
☐	Lesson 13: How does an ecosystem change when the plants change?	2	3 to print
☐	Lesson 14: Are there ways people can grow food without harming the tropical rainforest?	1	3 to print
☐	Lesson 15: How can people benefit from growing food in ways that support plants and animals in the natural ecosystem?	1	2 to print
☐	Lesson 16: What approach to growing food works for everyone and why?	2	2 to print
☐	Reading: Science Literacy Collection 5: Valuing Ecosystems	1 week	1 to print
☐	Lesson 17: How can we redesign the way land is used in Indonesia to support orangutans and people at the same time?	3	3 to print
☐	Lesson 18: How do our designs work for orangutans and people in Indonesia?	3	3 to print
☐	Lesson 19: How can we inform others in our community about the palm oil problem and convince them to take action?	5	3 to print
☐	Lesson 20: What should we do to take care of our local land, plants, and animals?	5	5 to print
☐	Words quiz	—	—

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

Reading: Science Literacy Preface: Put Yourself in This Scene

Words to know

- **ecotourism** — responsible travel to natural areas with the goal of conservation of the environment
- **science literacy** — the ability to read, hear, and comprehend information about scientific topics and demonstrate understanding in discussion and through writing population

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 34–36: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Preface: “Put Yourself in This Scene”: PDF pages 6–9. Look at the pictures and maps together.

Check for understanding

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

Lesson 1: How could buying candy affect orangutan populations in the wild?

LESSON QUESTION

How could buying candy affect orangutan populations in the wild?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 37–64: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 7–12
- Develop an Initial Model: Candy and Orangutans — Student Work Pages, PDF pages 7–8
- Asking Question Tool—Open/Closed Questions — Student Work Pages, PDF pages 9–10

For the teacher

- Teacher Reference 1 — Teacher Guide, PDF pages 385–392
- Teacher Reference 2 — Teacher Guide, PDF pages 393–394
- Teacher Reference 3 — Teacher Guide, PDF pages 395–403

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: How could buying candy affect orangutan populations in the wild?

Lesson 2: Can we replace palm oil with something else?

LESSON QUESTION

Can we replace palm oil with something else?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 65–74: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 13–15

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Can we replace palm oil with something else?

Reading: Science Literacy Collection 1: Using Earth

Words to know

- **ecosystem dynamics** — changes within the processes and system in a living environment
- **ecotourism** — responsible travel to natural areas with the goal of conservation of the environment
- **extraction** — removal of a resource from the place of its natural occurrence
- **land cover** — the physical material covering an area of Earth’s surface, such as vegetation, water, asphalt, bare soil, sand, etc.
- **resource** — a substance taken from the natural environment to support or enhance human life

Teacher’s lesson plan

Follow the Teacher Guide, PDF pages 75–80: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 1: “Using Earth”: PDF pages 10–19. Look at the pictures and maps together.

Student pages to print

- Exercise Page 1 — Student Work Pages, PDF pages 89–90

Check for understanding

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

Lesson 3: Can we grow oil palm trees somewhere else so that we're not cutting down tropical rainforests?

LESSON QUESTION

Can we grow oil palm trees somewhere else so that we're not cutting down tropical rainforests?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 81–91: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 16–18
- Farmer's Almanac: Oil Palm Plant — Student Work Pages, PDF pages 11–12
- Can we grow oil palm trees somewhere else so that we are not cutting down tropical rainforests? — Student Work Pages, PDF pages 13–14

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: Can we grow oil palm trees somewhere else so that we're not cutting down tropical rainforests?

Lesson 4: Why do people cut down tropical rainforests when they know it is harmful to the animals that live there?

LESSON QUESTION

Why do people cut down tropical rainforests when they know it is harmful to the animals that live there?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 92–102: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 19–20
- How have people changed the land where we live? — Student Work Pages, PDF pages 15–16

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Why do people cut down tropical rainforests when they know it is harmful to the animals that live there?

Lesson 5: How have changes in our community affected what lives here?

LESSON QUESTION

How have changes in our community affected what lives here?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 103–116: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 21–23
- Observations around Our School — Student Work Pages, PDF pages 17–18

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How have changes in our community affected what lives here?

Lesson 6: If palm oil is not going away, how can we design palm farms to support orangutans and farmers?

LESSON QUESTION

If palm oil is not going away, how can we design palm farms to support orangutans and farmers?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 117–131: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 24–25
- Palm Farm Designs — Student Work Pages, PDF pages 19–20

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: If palm oil is not going away, how can we design palm farms to support orangutans and farmers?

Lesson 7: How many orangutans typically live in the tropical rainforest?

LESSON QUESTION

How many orangutans typically live in the tropical rainforest?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 132–147: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 26–30
- Orangutan Populations in Protected Areas in Indonesia — Student Work Pages, PDF pages 21–22

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How many orangutans typically live in the tropical rainforest?

Lesson 8: Why do orangutans need so much forest space?

LESSON QUESTION

Why do orangutans need so much forest space?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 148–169: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 31–39
- Why Do Orangutans Need So Much Forest Space? — Student Work Pages, PDF pages 23–28

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Why do orangutans need so much forest space?

Lesson 9: Would planting more rainforest fruit trees help the orangutan population increase?

LESSON QUESTION

Would planting more rainforest fruit trees help the orangutan population increase?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 170–190: the steps, materials and timing for this lesson.

Student pages to print

- Would planting more rainforest fruit trees help the orangutan population increase? — Student Work Pages, PDF pages 29–34

For the teacher

- Answer Key 1 — Teacher Guide, PDF pages 404–414

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Would planting more rainforest fruit trees help the orangutan population increase?

Reading: Science Literacy Collection 3: Counting and Sampling Populations

Words to know

- **population sampling** — counting organisms within a small subset of an area in order to mathematically estimate the probable size of the whole population
- **quadrat** — a designated space within an ecosystem marked for counting a population sample
- **resource** — a substance taken from the natural environment to support or enhance human life
- **transect** — a straight line through a natural area guiding

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 191–196: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 3: “Counting and Sampling Populations”: PDF pages 30–39. Look at the pictures and maps together.

Student pages to print

- Exercise Page 3 — Student Work Pages, PDF pages 93–94

Check for understanding

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

Lesson 10: How do changes in the amount of resources affect populations?

LESSON QUESTION

How do changes in the amount of resources affect populations?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 197–215: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 40–41
- Case Study Cards — Student Work Pages, PDF pages 35–42

For the teacher

- Answer Key 1 — Teacher Guide, PDF pages 415–422

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How do changes in the amount of resources affect populations?

Lesson 11: How does planting oil palm affect other populations?

LESSON QUESTION

How does planting oil palm affect other populations?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 216–231: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 42–45
- Self-Assessment for Classroom Discussions — Student Work Pages, PDF pages 43–44

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How does planting oil palm affect other populations?

Lesson 12: What would happen if orangutans go extinct?

LESSON QUESTION

What would happen if orangutans go extinct?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 232–242: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 46–48

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What would happen if orangutans go extinct?

Reading: Science Literacy Collection 4: Population Dynamics

Words to know

- **bottleneck effect** — an event in which a species undergoes a sudden reduction in population
- **extinction** — the termination of a species
- **reproduction** — the creation of offspring by organisms
- **strategy** — in biology, a behavior that occurs naturally in a population through evolutionary processes and reproduction

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 243–248: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 4: “Population Dynamics”: PDF pages 40–49. Look at the pictures and maps together.

Student pages to print

- Exercise Page 4 — Student Work Pages, PDF pages 95–96

Check for understanding

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

Lesson 13: How does an ecosystem change when the plants change?

LESSON QUESTION

How does an ecosystem change when the plants change?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 249–265: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 49–52
- Updated Rainforest System Model — Student Work Pages, PDF pages 45–46
- Southwestern Willow Flycatcher System Model — Student Work Pages, PDF pages 47–48

For the teacher

- Answer Key — Teacher Guide, PDF pages 423–428

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How does an ecosystem change when the plants change?

Lesson 14: Are there ways people can grow food without harming the tropical rainforest?

LESSON QUESTION

Are there ways people can grow food without harming the tropical rainforest?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 266–273: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 53–54
- Two-Column Notes — Student Work Pages, PDF pages 49–50
- Summarizing ways to grow food — Student Work Pages, PDF pages 51–52

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
Are there ways people can grow food without harming the tropical rainforest?

Lesson 15: How can people benefit from growing food in ways that support plants and animals in the natural ecosystem?

LESSON QUESTION

How can people benefit from growing food in ways that support plants and animals in the natural ecosystem?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 274–282: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF page 55
- Two-Column Notes — Student Work Pages, PDF pages 53–54

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How can people benefit from growing food in ways that support plants and animals in the natural ecosystem?

Lesson 16: What approach to growing food works for everyone and why?

LESSON QUESTION

What approach to growing food works for everyone and why?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 283–296: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 56–58
- Best Approaches to Growing Food for Animals, Plants, and People — Student Work Pages, PDF pages 55–56

For the teacher

- Teacher Reference — Teacher Guide, PDF page 429

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What approach to growing food works for everyone and why?

Reading: Science Literacy Collection 5: Valuing Ecosystems

Words to know

- **boycott** — an act of protest expressed by withdrawal of interaction with a party or use of a product
- **bycatch** — the incidental capture of organisms that are not targeted by a fishery or fishing gear
- **economics** — the social science concerned with the production, consumption, and distribution of resources and wealth
- **extraction** — removal of a resource from the place of its natural occurrence
- **resource** — a substance taken from the natural environment to support or enhance human life
- **subsidy** — a payment from the government to an

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 297–302: the steps, materials and timing for this lesson.

Read

Read Science Literacy Student Reader, Collection 5: “Valuing Ecosystems”: PDF pages 50–59. Look at the pictures and maps together.

Student pages to print

- Exercise Page 5 — Student Work Pages, PDF pages 97–102

Check for understanding

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

Lesson 17: How can we redesign the way land is used in Indonesia to support orangutans and people at the same time?

LESSON QUESTION

How can we redesign the way land is used in Indonesia to support orangutans and people at the same time?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 303–321: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 59–62
- Padu Banjar — Student Work Pages, PDF pages 57–58
- How can we redesign the way land is used in Indonesia to support orangutans and people at the same time? — Student Work Pages, PDF pages 59–68

For the teacher

- Teacher Reference 1 — Teacher Guide, PDF pages 430–432
- Teacher Reference 2 — Teacher Guide, PDF pages 433–434

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation: How can we redesign the way land is used in Indonesia to support orangutans and people at the same time?

Lesson 18: How do our designs work for orangutans and people in Indonesia?

LESSON QUESTION

How do our designs work for orangutans and people in Indonesia?

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

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 322–337: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 63–67
- Solutions to Redesign the Land: Evaluations — Student Work Pages, PDF pages 69–70
- Argument for the Best Redesign of Land — Student Work Pages, PDF pages 71–72

For the teacher

- Rubric 1 — Teacher Guide, PDF pages 435–436
- Rubric 2 — Teacher Guide, PDF page 437
- Rubric 3 — Teacher Guide, PDF pages 438–445

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How do our designs work for orangutans and people in Indonesia?

Lesson 19: How can we inform others in our community about the palm oil problem and convince them to take action?

LESSON QUESTION

How can we inform others in our community about the palm oil problem and convince them to take action?

Plan about **5 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 338–359: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 68–70
- PSA Communication Plan — Student Work Pages, PDF pages 73–74
- Self-Assessment: Giving and Receiving Feedback — Student Work Pages, PDF pages 75–76

For the teacher

- Teacher Reference 1 — Teacher Guide, PDF pages 446–451
- Teacher Reference 2 — Teacher Guide, PDF pages 452–454
- Teacher Reference 3 — Teacher Guide, PDF pages 455–457
- Rubric — Teacher Guide, PDF page 458

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
How can we inform others in our community about the palm oil problem and convince them to take action?

Lesson 20: What should we do to take care of our local land, plants, and animals?

LESSON QUESTION

What should we do to take care of our local land, plants, and animals?

Plan about **5 class days** for this lesson.

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 360–368: the steps, materials and timing for this lesson.

Student pages to print

- Student procedures for this lesson — Student Procedure Guide, PDF pages 71–115
- Obtaining Information Tools — Student Work Pages, PDF pages 77–78
- Analyzing and Interpreting Data Tools — Student Work Pages, PDF pages 79–84
- Mapping the _____ to the _____ — Student Work Pages, PDF pages 85–86
- Self-Assessment: Giving and Receiving Feedback — Student Work Pages, PDF pages 87–88

For the teacher

- Teacher Reference 1 — Teacher Guide, PDF pages 459–465
- Teacher Reference 2 — Teacher Guide, PDF pages 466–476

Check for understanding

- Explain your answer to the lesson question, using evidence from your investigation:
What should we do to take care of our local land, plants, and animals?

WORDS QUIZ

Ecosystem Dynamics

Name: _____ Date: _____

Circle the letter of the best answer.

1. Which word means “the physical material covering an area of Earth’s surface, such as vegetation, water, asphalt, bare soil, sand, etc.”?
 - a) resource
 - b) K-selection species
 - c) land cover
 - d) subsidy
2. Which word means “the study of the relationship between living organisms and their environment”?
 - a) ecology
 - b) ecosystem dynamics
 - c) ecotourism
 - d) strategy
3. Which word means “a straight line through a natural area guiding”?
 - a) bottleneck effect
 - b) transect
 - c) invasive species
 - d) social media
4. Which word means “counting organisms within a small subset of an area in order to mathematically estimate the probable size of the whole population”?
 - a) population sampling
 - b) reproduction
 - c) quadrat
 - d) ecology
5. Which word means “changes within the processes and system in a living environment”?
 - a) extinction
 - b) ecotourism
 - c) boycott
 - d) ecosystem dynamics
6. Which word means “the breakup of a natural habitat into smaller pieces”?
 - a) reproduction
 - b) extraction
 - c) habitat fragmentation
 - d) transect

- 7.** Which word means “a type of organism living in an area as a result of having been transported there unnaturally”?
- a) non-native species
 - b) extraction
 - c) invasive species
 - d) reproduction
- 8.** Which word means “an act of protest expressed by withdrawal of interaction with a party or use of a product”?
- a) bottleneck effect
 - b) boycott
 - c) economics
 - d) land cover
- 9.** Which word means “responsible travel to natural areas with the goal of conservation of the environment”?
- a) extraction
 - b) K-selection species
 - c) ecotourism
 - d) invasive species
- 10.** Which word means “a payment from the government to an”?
- a) endemic species
 - b) subsidy
 - c) extraction
 - d) quadrat
- 11.** Which word means “the social science concerned with the production, consumption, and distribution of resources and wealth”?
- a) subsidy
 - b) economics
 - c) resource
 - d) reproduction
- 12.** Which word means “a substance taken from the natural environment to support or enhance human life”?
- a) endemic species
 - b) resource
 - c) dynamic equilibrium
 - d) ecosystem dynamics

FOR THE TEACHER

Answers

Unit quiz key

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