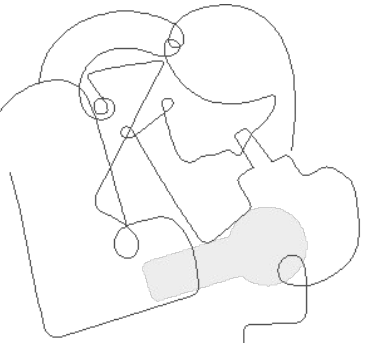
Amplify Science

Grade Level Orientation and Refresher Workshop

Gr 6: Launch Unit, Microbiome



LAUSD

Date

Presented by Your Name

TOP RATED BY EDREPORTS

PLPG CERTIFIED PROVIDER

Amplify's Purpose Statement

Dear teachers,

You do a job that is nearly impossible and **utterly essential.**

We are in your corner – extending your reach, saving you time, and enhancing your understanding of each student.

Thank you for working with us to craft rigorous and riveting learning experiences for your classroom.

We share your goal of **inspiring all students to think deeply, creatively, and for themselves.**

Sincerely,
Amplify

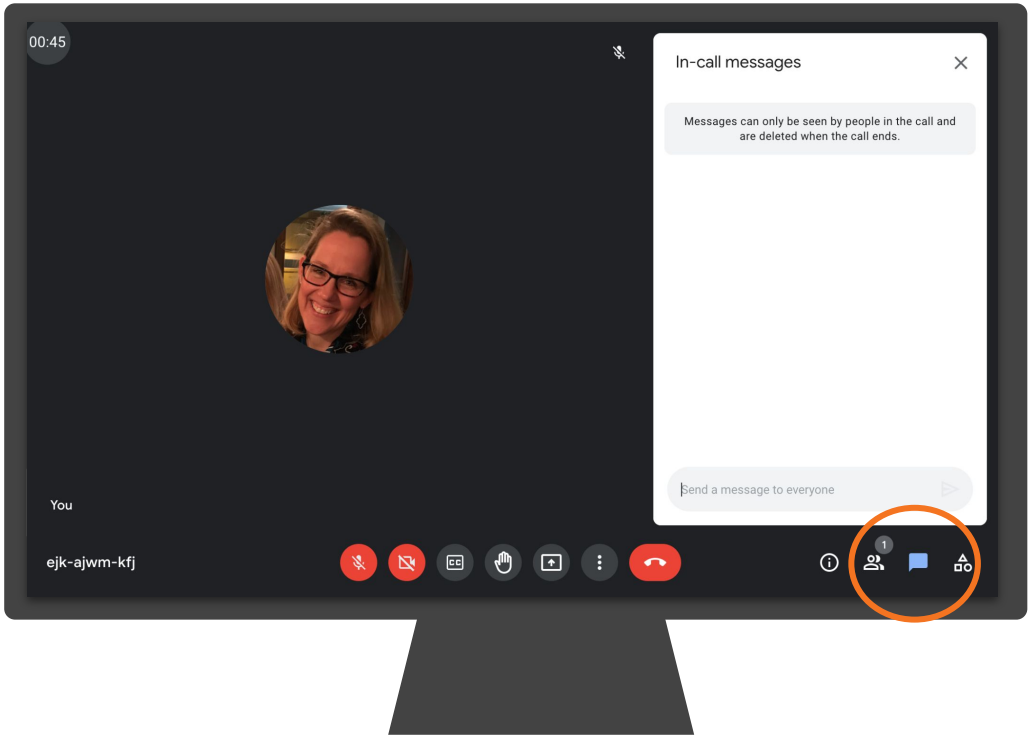
Plan for the day

- **Framing the day**
- Introduction to the Launch Unit
- Unit Internalization
- Experiencing the Launch Unit
- Planning with the Classroom Slides
- Closing

Ice Breaker!

Reflecting

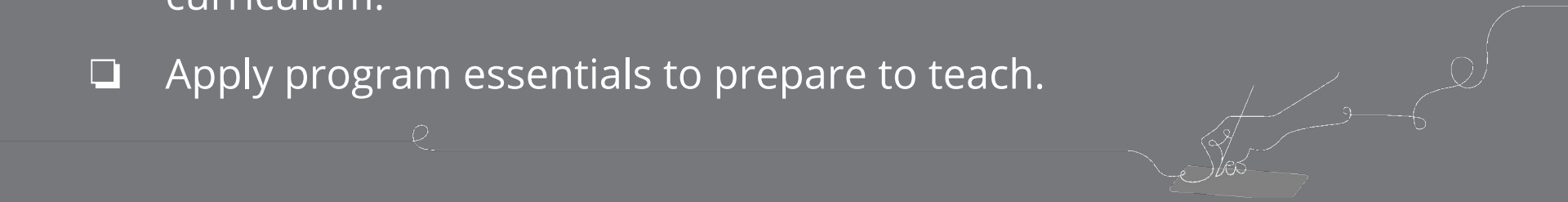
- **Round 1:** Share a key takeaway from the 2020-21 school year.
- **Round 2:** Share something you're looking forward to as you start a new school year.



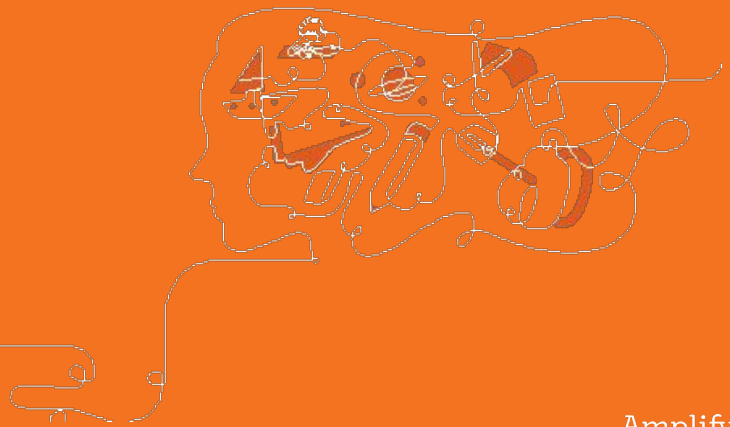
Overarching goals

By the end of this series, you will be able to:

- ❑ Leverage successes and learnings from remote and hybrid teaching in your transition back to school for the 2021-22 school year.
- ❑ Experience what teaching and learning look like in Amplify Science.
- ❑ Understand the benefits of teaching the standard Amplify Science curriculum.
- ❑ Apply program essentials to prepare to teach.



Introducing Amplify Science



Course curriculum structure

Integrated model*

Grade 6

- Launch: **Microbiome**
- **Metabolism**
- Engineering Internship: **Metabolism**
- **Traits and Reproduction**
- **Thermal Energy**
- **Ocean, Atmosphere, and Climate**
- **Weather Patterns**
- **Earth's Changing Climate**
- Engineering Internship: **Earth's Changing Climate**

Grade 7

- Launch: **Geology on Mars**
- **Plate Motion**
- Engineering Internship: **Plate Motion**
- **Rock Transformations**
- **Phase Change**
- Engineering Internship: **Phase Change**
- **Chemical Reactions**
- **Populations and Resources**
- **Matter and Energy in Ecosystems**

Grade 8

- Launch: **Harnessing Human Energy**
- **Force and Motion**
- Engineering Internship: **Force and Motion**
- **Magnetic Fields**
- **Light Waves**
- **Earth, Moon, and Sun**
- **Natural Selection**
- Engineering Internship: **Natural Selection**
- **Evolutionary History**

Key takeaways:

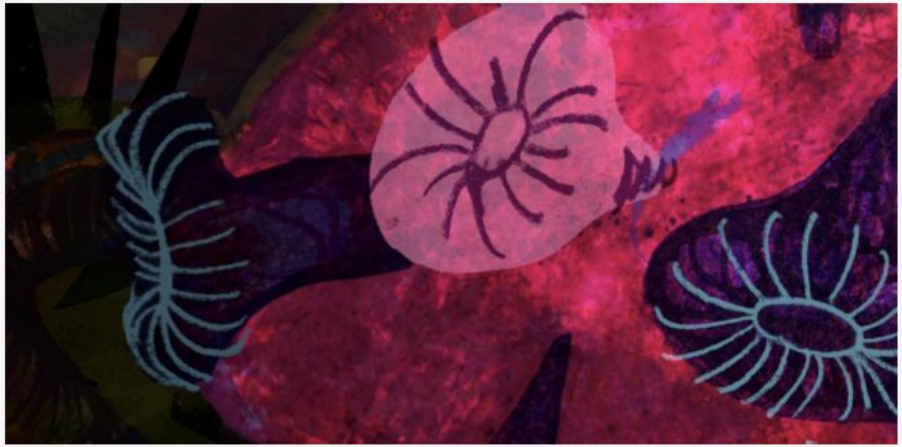
- 9 units per grade level
- 145 lessons total per year
- Lessons are 45 minutes long

6-8 Curriculum: Unit types

Launch units

Each year starts with an 11-day Launch unit.

Launch units introduce instructional routines and norms as well as key science practices students will leverage in every Amplify Science unit.



11 Lessons

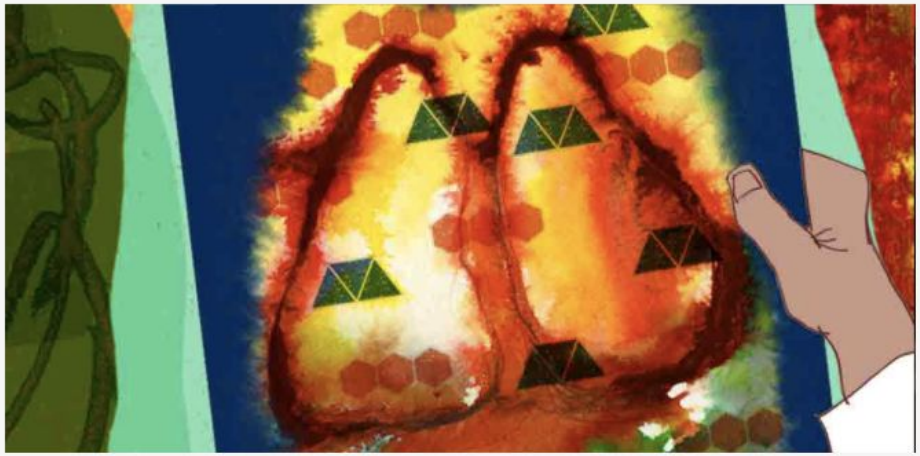
Microbiome

6-8 Curriculum: Unit types

Core units

Each year has six Core units. Core units are 19 days long.

In each Core unit, students take on the role of a scientist or engineer and work to solve a real-world problem.



19 Lessons

Metabolism

6-8 Curriculum: Unit types

Engineering Internships

Each year has two Engineering Internships. Engineering Internships are 10 days long.

In these units, students work as interns for a fictional company, Futura Engineering. They focus on designing solutions to real-world problems.

6-8 Curriculum: Unit types

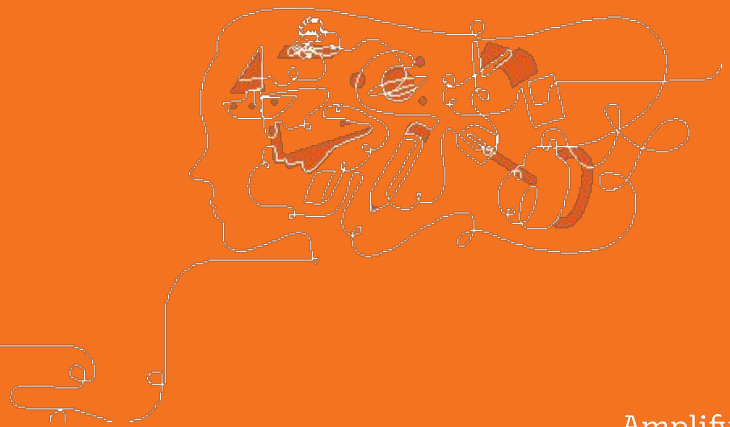
Today's workshop will focus on your Launch unit: Microbiome.

You should have watched the Navigating Program Essentials asynchronous session before attending this workshop.

11 Lessons

Microbiome

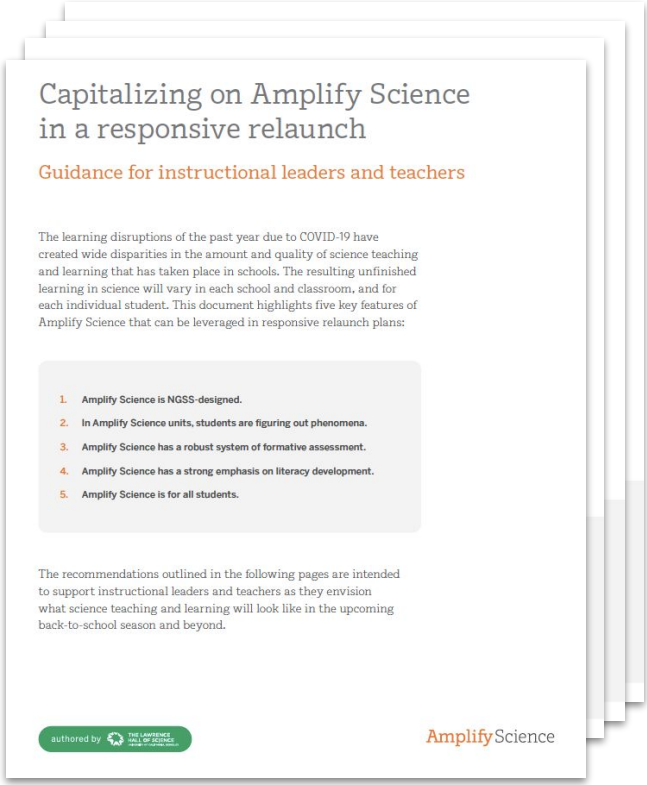
Capitalizing on Amplify Science in a responsive relaunch



Capitalizing on Amplify Science in a responsive relaunch

Amplify Science...

- Is **NGSS-designed**
- Engages students in figuring out **phenomena**
- Has a robust system of **formative assessment**
- Has a strong emphasis on **literacy** development
- Is for **all** students



“As you transition back to in-person learning, it’s time to shift back to the standard Amplify Science curriculum to fully meet the NGSS.”

-Capitalizing on Amplify Science in a responsive relaunch

Capitalizing on Amplify Science in a responsive relaunch

Amplify Science…

- Is **NGSS-designed**
- Engages students in figuring out **phenomena**
- Has a robust system of **formative assessment**
- Has a strong emphasis on **literacy** development
- Is for **all** students

1. Amplify Science is NGSS-designed.

The Next Generation Science Standards (NGSS) are not a list of discrete pieces of knowledge for students to acquire; rather, the **three dimensional structure of the NGSS** supports students in deepening their understanding of disciplinary core ideas across grade bands, by engaging in science and engineering practices and using Crosscutting Concepts. Thus, our systems of relaunch should emphasize helping students continue to progress in their ability to figure out, like a scientist, using all three dimensions.

How can this feature of Amplify Science support our responsive relaunch plans?

- Amplify Science learning experiences are three dimensional.
- The Science and Engineering Practices (SEP) and Crosscutting Concepts (CCC) are not specified at each grade level but rather defined with increasing sophistication in each grade band (K–2, 3–5, 6–8). Therefore there is no "loss" of these dimensions, only opportunities to strengthen them in the upcoming year.
- The content in the Disciplinary Core Ideas (DCI) spirals and is not taught in each grade level, but rather in each grade band (K–2, 3–5, 6–8). This means there are no direct dependencies in teaching one grade level's content from the grade level prior.
- Each Amplify Science unit can be taught independently and includes supports to make sure all students can succeed regardless of their prior instruction. For unit-specific information, see the Standards and Goals Unit Guide document in the section called, "How This Unit Fits into the Amplify Science Curriculum." This section provides useful information about where a unit's ideas fit in the trajectory of core ideas, as well as guidance around prerequisite knowledge for accessing the unit.

What are recommendations for capitalizing on this feature of Amplify Science?

- Move forward with this year. Focus on the current grade level standards and units rather than working to identify "missing" content or trying to backfill discreet science ideas from the previous year.
- Continue strengthening the use of the Science and Engineering Practices and Crosscutting Concepts. Authentic engagement and development of these scientific critical thinking skills is what allows students to apply their knowledge to real-world situations in and out of the classroom.
- Use a system of formative assessment to monitor student understanding (see more details in the next feature).

Can I continue to use the Amplify Science @Home Units in my responsive relaunch plans?

As you transition back to in-person learning, it's time to shift back to the standard Amplify Science curriculum to fully meet the NGSS. The @Home Units were designed only for use in remote and hybrid teaching settings. During the year of disrupted schooling, they provided a way for all students, regardless of time constraints or materials access, to be exposed to activities related to figuring out phenomena. To create these instructional materials, about 50% of activities were cut, resulting in learning experiences that do not fully engage students using all three dimensions. Examples include: less explicit instruction in disciplinary literacy practices, modifications to hands-on investigations, limited opportunities for student-to-student discourse, and a reduction of opportunities to apply and reflect. Because these are core components of students' engagement in deep learning towards figuring out phenomena, we do not recommend using the @Home Units for in-person instruction. As needed, the materials can be used in instances where a student is absent, as they can be completed asynchronously.

Amplify Science...

is NGSS-designed

Key points:

- Students progress in their ability to figure out using three dimensions across multiple years.
- Disciplinary Core Ideas spiral across grade bands (K-2, 3-5, 6-8).
- Amplify Science units are not dependent on specific science concepts from previous grades.

Key recommendations:

- Focus on standards and **units at your grade level** instead of revisiting “missing” content.

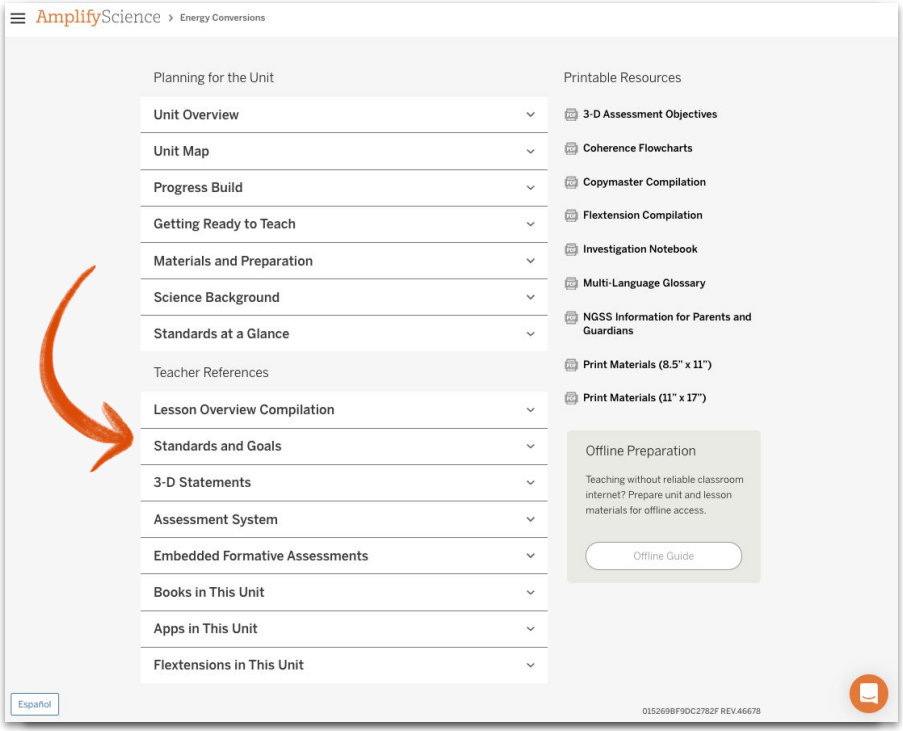
Amplify Science

is NGSS-designed

Navigate to the **Standards and Goals** document in your unit's Unit Guide.

Skim the following subsections:

- Trajectory of Core Ideas
- Prerequisite Knowledge



Amplify Science

engages students in figuring out phenomena

Key points:

- Figuring out phenomena increases student motivation and makes learning relevant.
- Students construct increasingly complete explanations of anchor phenomena throughout Amplify Science units.

Key recommendations:

- Prioritize **teaching units fully** so students can come to a complex explanation of the unit phenomenon.

Key takeaway

Teaching **complete units at your grade level** is the best way to ensure your students progress along the Next Generation Science Standards as you return to onsite teaching.

Amplify Science

has a robust system of formative assessment

Key points:

- Formative assessments in Amplify Science allow frequent insight into student learning in all three dimensions.
- Formative assessments include “Now what” suggestions for providing more support when needed.

Key recommendations:

- Use unit resources to get familiar with the Assessment System. Formatively assess your students and adjust instruction as needed.

Amplify Science

has a strong emphasis on literacy development

Key points:

- Amplify Science supports students with scientific reading, writing, speaking, and listening
- Literacy and discourse are key aspects of the work professional scientists do

Key recommendations:

- Use the standard curriculum as written to develop students' disciplinary literacy
- Attend to the CCSS-ELA standards addressed in Amplify Science lessons

Amplify Science

is for all students

Key points:

- Multimodal instruction provides multiple entry points into complex science ideas, and allows for multiple means of expression.
- Amplify Science prioritizes representation of diverse scientists.

Key recommendations:

- Leverage lesson-specific **differentiation resources** to support all learners in your class.

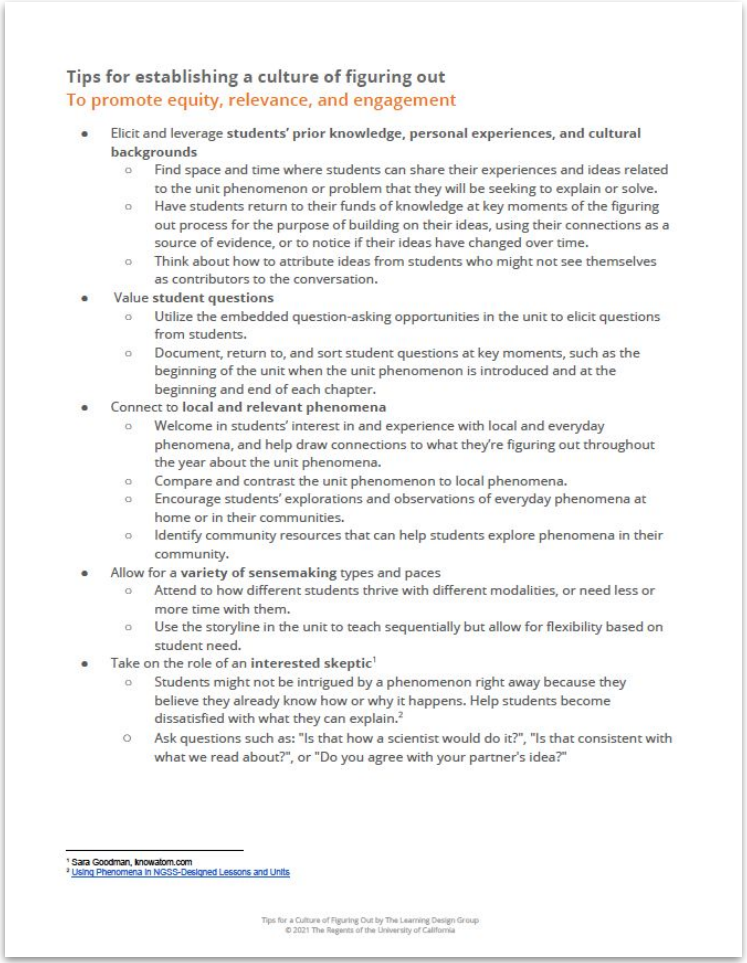
Key takeaway

Formative assessments, explicit literacy instruction, and lesson-specific differentiation suggestions are **built-in tools** for ensuring your students have equitable access to rigorous science learning.

Amplify Science

is for all students

Empower student scientists by establishing a **culture of figuring out** in your classroom.



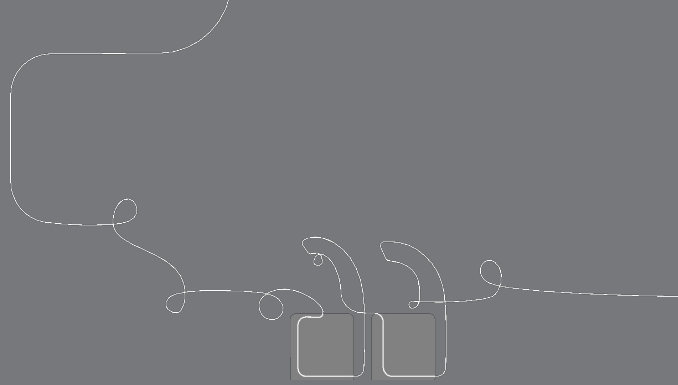
Tips for establishing a culture of figuring out

To promote equity, relevance, and engagement

- Elicit and leverage **students' prior knowledge, personal experiences, and cultural backgrounds**
  - Find space and time where students can share their experiences and ideas related to the unit phenomenon or problem that they will be seeking to explain or solve.
  - Have students return to their funds of knowledge at key moments of the figuring out process for the purpose of building on their ideas, using their connections as a source of evidence, or to notice if their ideas have changed over time.
  - Think about how to attribute ideas from students who might not see themselves as contributors to the conversation.
- Value **student questions**
  - Utilize the embedded question-asking opportunities in the unit to elicit questions from students.
  - Document, return to, and sort student questions at key moments, such as the beginning of the unit when the unit phenomenon is introduced and at the beginning and end of each chapter.
- Connect to **local and relevant phenomena**
  - Welcome in students' interest in and experience with local and everyday phenomena, and help draw connections to what they're figuring out throughout the year about the unit phenomena.
  - Compare and contrast the unit phenomenon to local phenomena.
  - Encourage students' explorations and observations of everyday phenomena at home or in their communities.
  - Identify community resources that can help students explore phenomena in their community.
- Allow for a **variety of sensemaking** types and paces
  - Attend to how different students thrive with different modalities, or need less or more time with them.
  - Use the storyline in the unit to teach sequentially but allow for flexibility based on student need.
- Take on the role of an **interested skeptic**[1]
  - Students might not be intrigued by a phenomenon right away because they believe they already know how or why it happens. Help students become dissatisfied with what they can explain.[2]
  - Ask questions such as: "Is that how a scientist would do it?", "Is that consistent with what we read about?", or "Do you agree with your partner's idea?"

[1] Sara Goodman, knowatom.com
[2] Using Phenomena in NGSS-Designed Lessons and Units

Questions?



Plan for the day

- Framing the day
- **Introduction to the Launch Unit**
- Unit Internalization
- Experiencing the Launch Unit
- Planning with the Classroom Slides
- Closing

Middle school curriculum course structure

Integrated model*

Launch Unit
11 lessons

Grade 6

- Launch: **Microbiome**
- **Metabolism**
- Engineering Internship: **Metabolism**
- **Traits and Reproduction**
- **Thermal Energy**
- **Ocean, Atmosphere, and Climate**
- **Weather Patterns**
- **Earth's Changing Climate**
- Engineering Internship: **Earth's Changing Climate**

Grade 7

- Launch: **Geology on Mars**
- **Plate Motion**
- Engineering Internship: **Plate Motion**
- **Rock Transformations**
- **Phase Change**
- Engineering Internship: **Phase Change**
- **Chemical Reactions**
- **Populations and Resources**
- **Matter and Energy in Ecosystems**

Grade 8

- Launch: **Harnessing Human Energy**
- **Force and Motion**
- Engineering Internship: **Force and Motion**
- **Magnetic Fields**
- **Light Waves**
- **Earth, Moon, and Sun**
- **Natural Selection**
- Engineering Internship: **Natural Selection**
- **Evolutionary History**

AmplifyScience

authored by THE LAWRENCE HALL OF SCIENCE UNIVERSITY OF CALIFORNIA, BERKELEY

What is a launch unit?

- First unit of the year
- Interesting, immersive, and often surprising problem-context
- Introduces **practices** that are integral to science, such as:
  - **Argumentation**
  - **Reading**
  - **Writing**
  - **Talking about science ideas**
  - **Using models**
- Introduces **routines** such as:
  - **Active reading**
  - **Discourse routines**

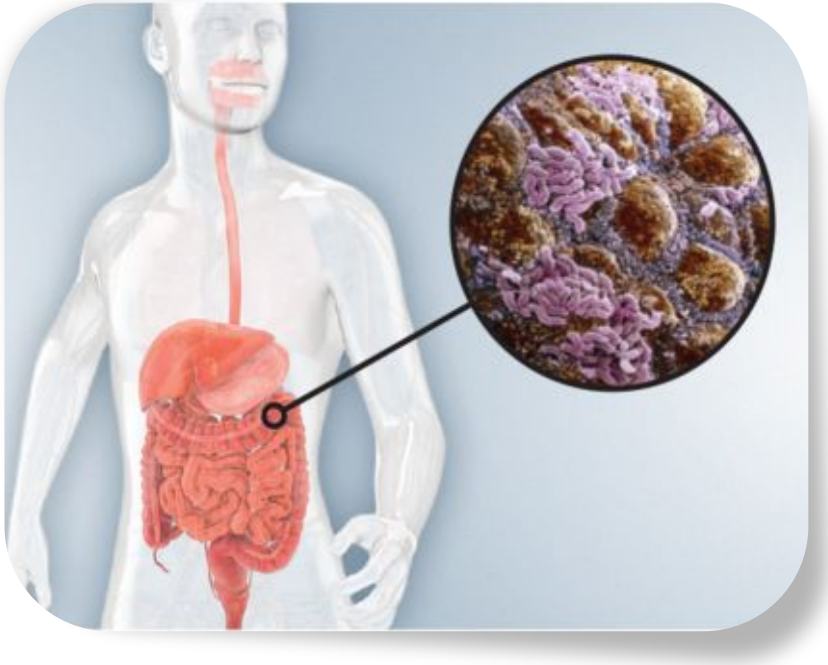
Launch unit: Grade 6 Microbiome

Opportunities for students to extend their scientific thinking and practices outside the traditional realms of the science classroom.

Launch Units Introduce:

- **Scientific Argumentation**
- **Active Reading**
- **Writing**
- **Talking about science ideas**
- **Using Amplify Science Tools**

Launch Unit: Microbiome



Problem: The scientific community is interested in further investigating the human microbiome as a result of developments made in a treatment called fecal transplant.

Role: Student Researchers

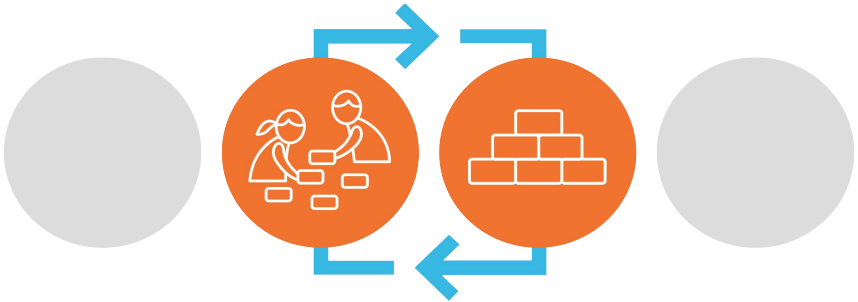
Students consider living things at multiple scales and examine data in order to figure out why a fecal transplant cured a patient suffering from a *C. difficile* infection.

Unit question

How can having 100 trillion microorganisms on and in the human body keep us healthy?

Goals for argumentation in Amplify Science

- To provide students an authentic opportunity to engage in the practice of argumentation
- To make clear to students the purpose of argumentation and the role it plays in building and communicating scientific knowledge
- To help students build their own knowledge through argumentation



Specific goals for argumentation in launch units

- Introduce the **practice of argumentation** in science
- Introduce **tools** that will be used throughout the year to support students in getting better at specific aspects of oral and written argumentation:
  - **Card sorts**
  - **Evidence gradient**
  - **Reasoning tool**

Argumentation Wall

The Argumentation Wall is built in the launch unit, used throughout the year.

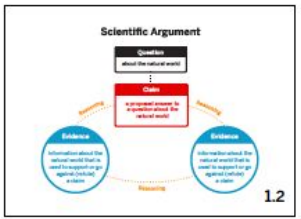
Completed Scientific Argumentation Wall Diagram

Scientific Argumentation 1.2

The purpose of a scientific argument is to convince others, using evidence and reasoning. 1.2

Evaluating Evidence 3.3

Evidence is higher quality if it comes from a reliable source. 3.3



1.2

Reasoning Tool

Evidence	This matters because . . . (How does this evidence support the claim?)	Therefore, . . . (claim)

1.2

A scientific argument . . .

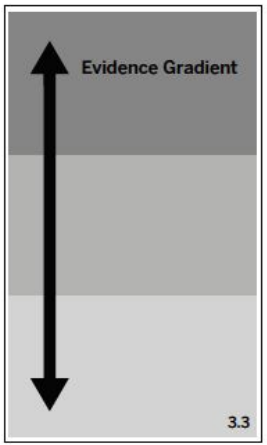
- begins with a question.
- has a claim that proposes an answer to the question.
- has evidence that supports the claim.
- clearly explains how the evidence supports the claim (reasoning).

1.2

Argumentation Sentence Starters

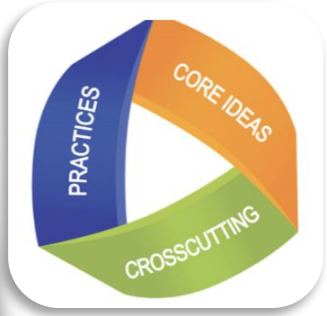
- I think this evidence supports this claim because . . .
- I don't think this evidence supports this claim because . . .
- I agree because . . .
- I disagree because . . .
- Why do you think that?

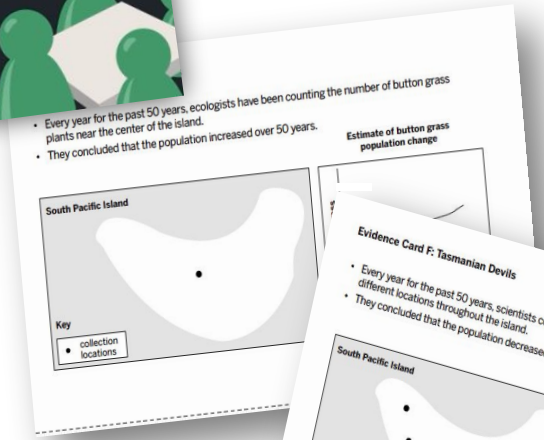
1.2

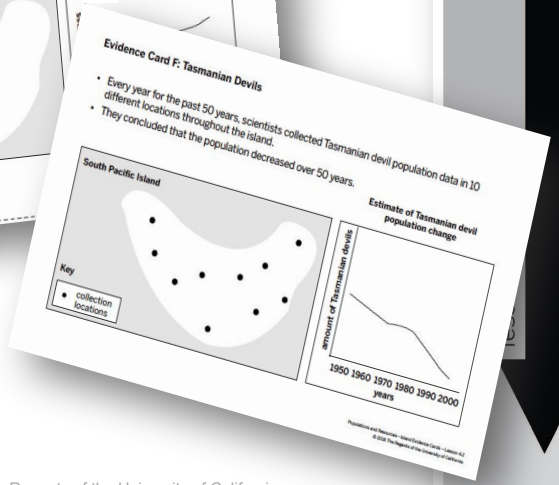


3.3

Example Student Arguments 3.3

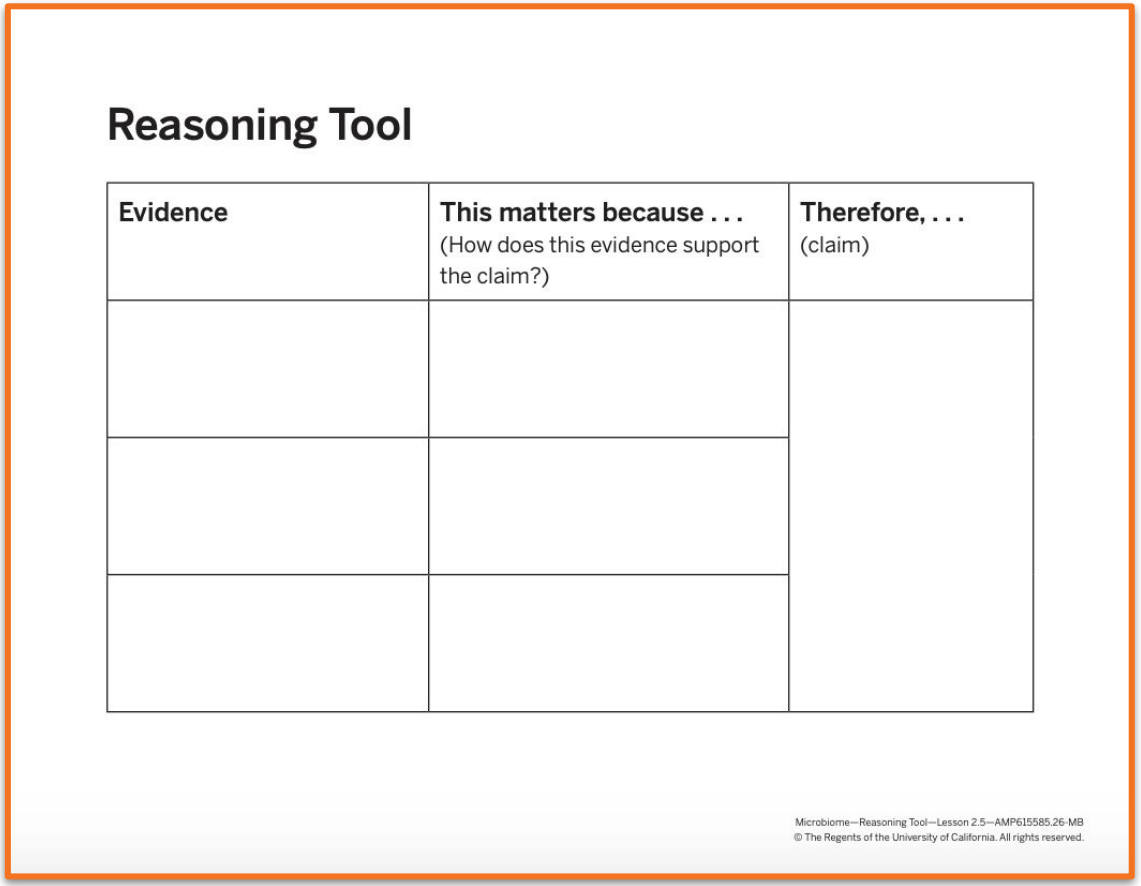






How can visualizing help students understand the nature of evidence?

Reasoning Tool



Reasoning Tool

Evidence	**This matters because . . .** (How does this evidence support the claim?)	**Therefore, . . .** (claim)

Students read each article twice
The first read is always to annotate
(questions, connections, comments, etc.

Subsequent reads are for a particular purpose

- **To examine a specific visual representation**
- **To answer a question**
- **To find evidence to support a claim, or**
- **To draw conclusions across texts, etc.**

Plan for the day

- Framing the day
- Introduction to the Launch Unit
- **Unit Internalization**
- Experiencing the Launch Unit
- Planning with the Classroom Slides
- Closing

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title: Microbiome

What is the phenomenon students are investigating in your unit?

a fecal transplant cured a patient suffering from a potentially deadly *C. difficile* infection.

Unit Question:

Student role:

Student researchers

By the end of the unit, students figure out ...

What science ideas do students need to figure out in order to explain the phenomenon?

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title: Microbiome

What is the phenomenon students are investigating in your unit?

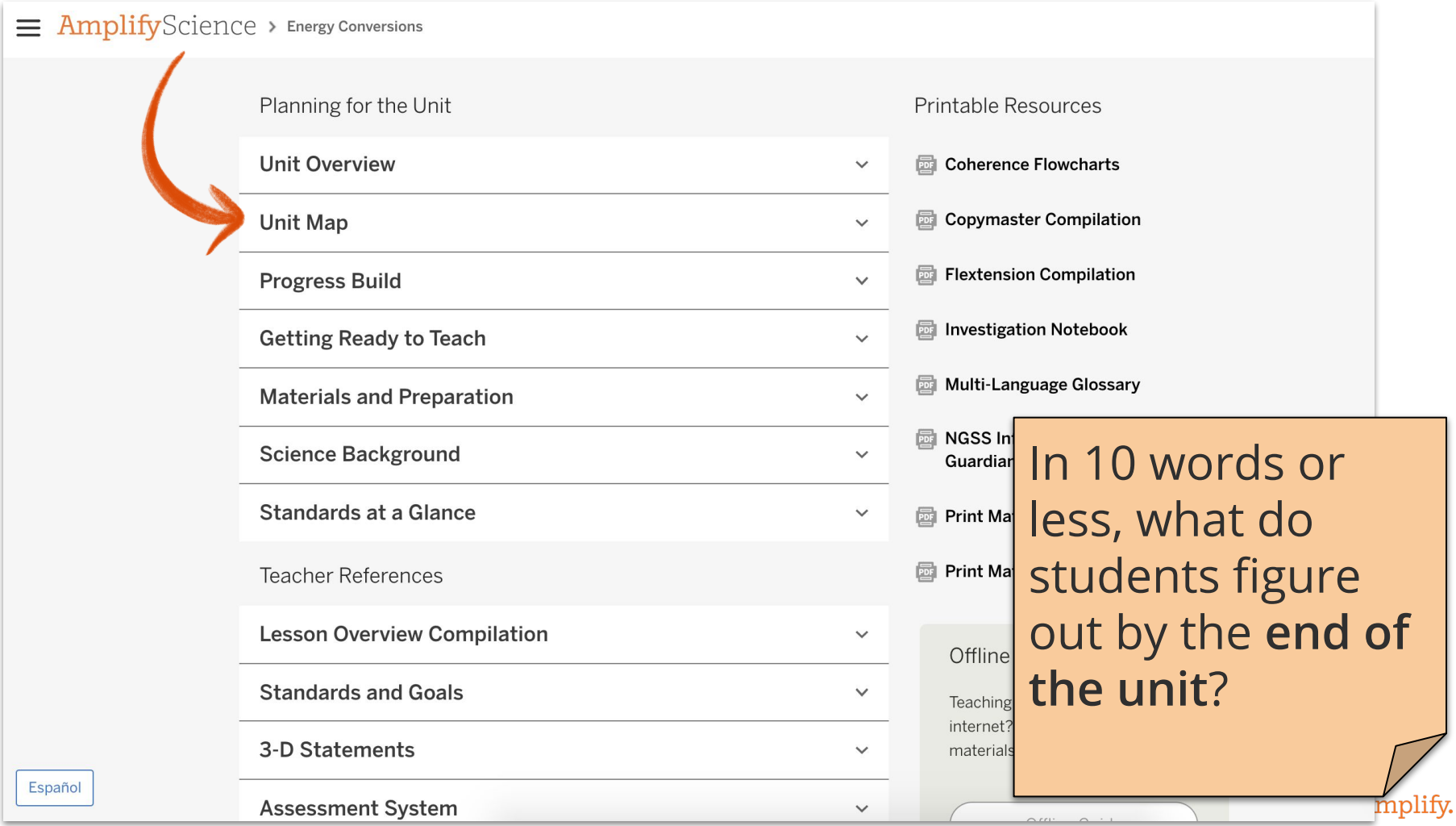
a fecal transplant cured a patient suffering from a potentially deadly *C. difficile* infection.

Unit Question:
How can having 100 trillion microorganisms on and in the human body keep us healthy?

Student role:
Student researchers

By the end of the unit, students figure out ...

What science ideas do students need to figure out in order to explain the phenomenon?


AmplifyScience
Energy Conversions
Planning for the Unit
Unit Overview
Unit Map
Progress Build
Getting Ready to Teach
Materials and Preparation
Science Background
Standards at a Glance
Teacher References
Lesson Overview Compilation
Standards and Goals
3-D Statements
Assessment System
Printable Resources
Coherence Flowcharts
Copymaster Compilation
Flextension Compilation
Investigation Notebook
Multi-Language Glossary
Offline
Español
In 10 words or less, what do students figure out by the end of the unit?

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title: Microbiome

What is the phenomenon students are investigating in your unit?

a fecal transplant cured a patient suffering from a potentially deadly *C. difficile* infection.

Unit Question:

How can having 100 trillion microorganisms on and in the human body keep us healthy?

Student role:

Student researchers

By the end of the unit, students figure out ...

All living things are made of microscopic cells. A healthy microbiome has various types of bacteria. A fecal transplant can replenish the helpful bacteria in a person's gut.

What science ideas do students need to figure out in order to explain the phenomenon?

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title: Microbiome

What is the phenomenon students are investigating in your unit?

a fecal transplant cured a patient suffering from a potentially deadly *C. difficile* infection.

Unit Question:

How can having 100 trillion microorganisms on and in the human body keep us healthy?

Student role:

Student researchers

By the end of the unit, students figure out ...

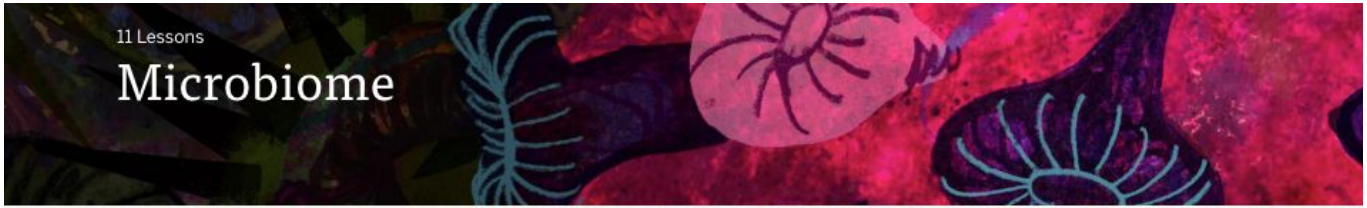
All living things are made of microscopic cells. A healthy microbiome has various types of bacteria. A fecal transplant can replenish the helpful bacteria in a person's gut.

What science ideas do students need to figure out in order to explain the phenomenon?

understanding issues of scale in life science, the human microbiome contains approximately 100 trillion microorganisms which are mostly bacteria, living things with fewer helpful bacteria than normal in their guts can become infected more easily because there is more food and space available for harmful bacteria, a fecal transplant can replenish helpful bacteria

Plan for the day

- Framing the day
- Introduction to the Launch Unit
- Unit Internalization
- **Experiencing the Launch Unit**
- Planning with the Classroom Slides
- Closing



JUMP DOWN TO UNIT GUIDE

GENERATE PRINTABLE TEACHER'S GUIDE

Chapter 1: Microorganisms On and In the Human Body

3 Lessons

Chapter 1 Question

How small are the microorganisms that live on and in the human body?

- Scale is introduced
  - some things are too small to see
- Microorganisms live on and in the body

Amplify.

Classroom Wall

Unit Question
How can having 100 trillion microorganisms on and in the human body keep us healthy?

Chapter 1 Question
How small are the microorganisms that live on and in the human body?

Key Concepts

1. Many organisms are microscopic – so small that they cannot be seen with the naked eye.
2. All living things are made of cells.
3. Almost all cells are microscopic.
4. Even though they are both too small to see, cells are much bigger than molecules.

Vocabulary

- **organism**
- **microorganism**
- **scale**
- **microscopic**
- **cells**

Chapter 2: Arguing for the Benefits of Fecal Transplants

JUMP DOWN TO CHAPTER OVERVIEW

Lesson 2.1: Reading "The Human Microbiome"

Lesson 2.2: Beginning a Case Study of Patient 23

Lesson 2.3: Investigating Antibiotics

Lesson 2.4: Analyzing Experiments with Mice

Lesson 2.5: Analyzing Evidence About Fecal Transplants

Lesson 2.6: Evaluating Evidence About Bacteria

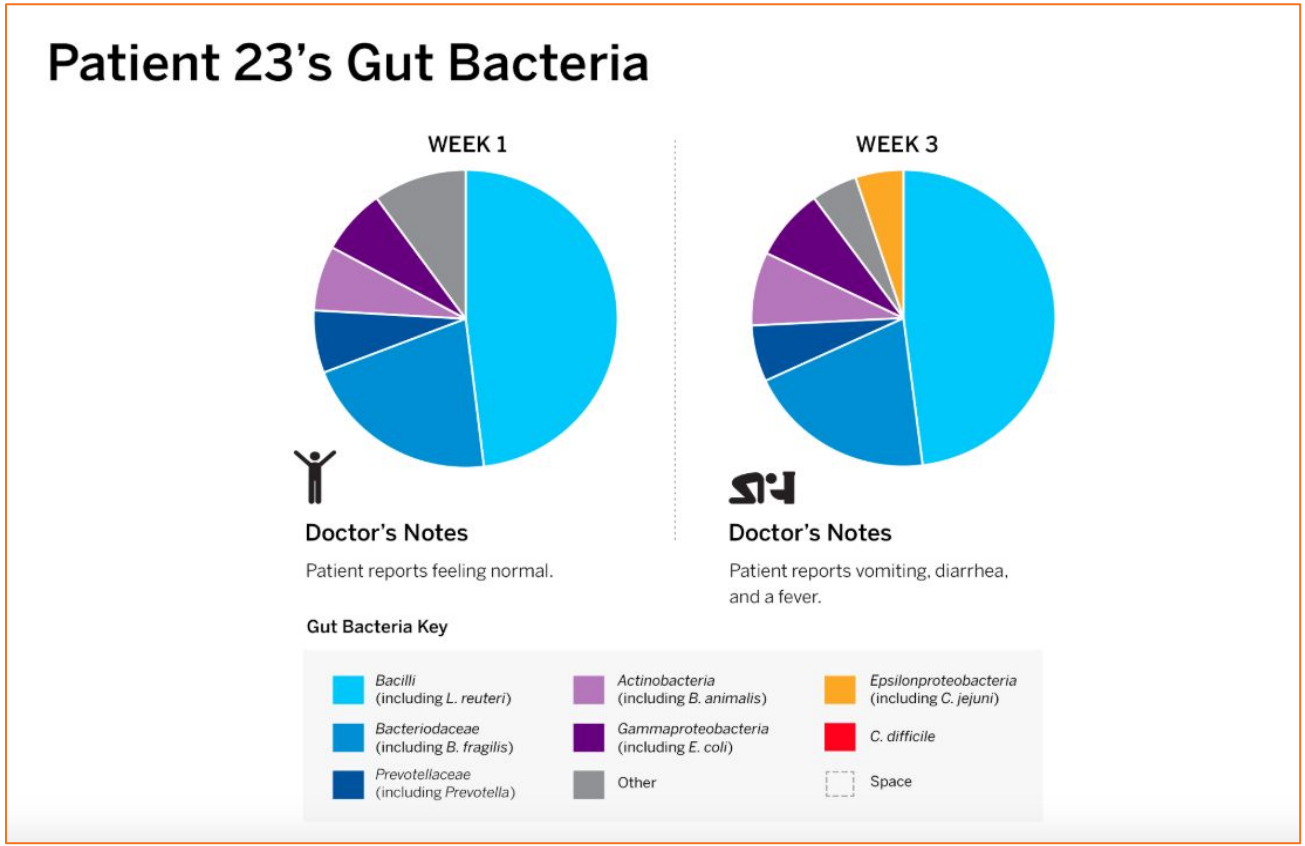
Lesson 2.7: Writing a Final Argument

Lesson 2.8: End-of-Unit Assessment

Chapter 2 Question

How can fecal transplants cure patients infected with harmful bacteria?

Lesson 2.1



- *follow progress over a 9-week period*
- *symptoms change with various treatments*
- *students analyze this data in lesson 2.2*

Lesson 2.2

In lesson 2.2 students also read this article. They learn that C. Jejuni is a bacteria that causes food poisoning.

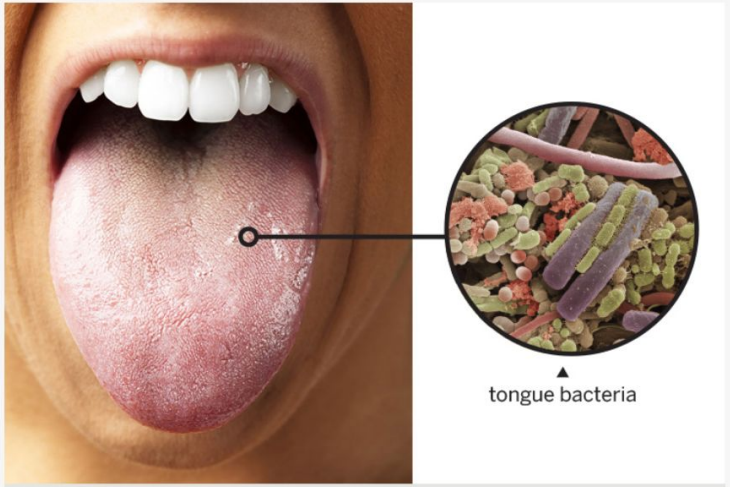
Students start to develop an understanding that there are both "good" and "not so good" bacteria that can live in the human gut microbiome, and that different bacteria affect the body in different ways.

The Human Microbiome

A World Inside You

There's a world filled with strange creatures. The creatures of this world are invisible, and they're not human. Aliens sometimes threaten to invade the world these creatures call home.

This world is not a far-off planet: it's your body! The creatures are called microorganisms, and your body is home to more than 100 trillion of them. Microorganisms live on your skin, in your gut, in your nose and mouth, and pretty much everywhere else on and in your body.

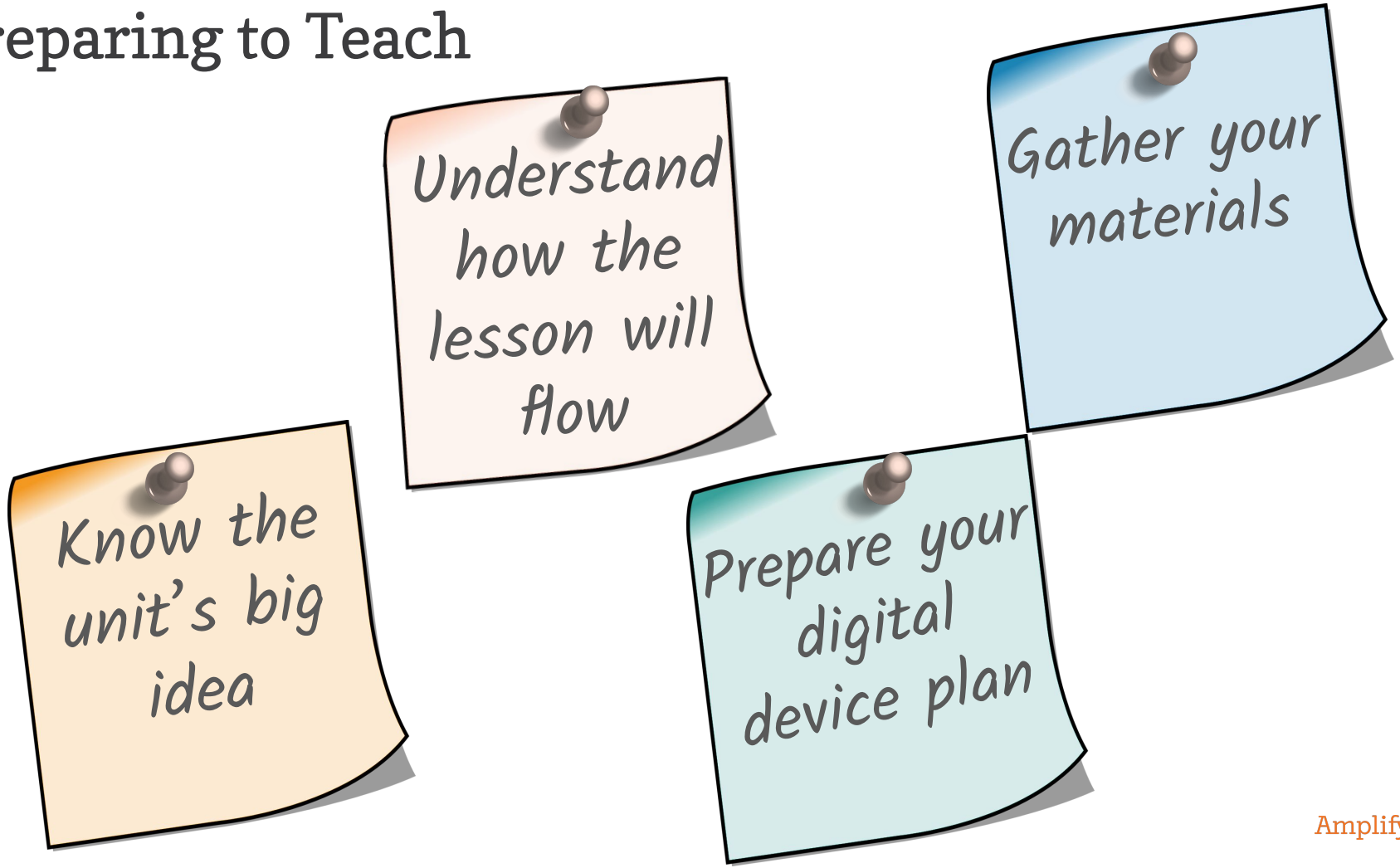


Your tongue is covered with bacteria like the ones in this photo, which was taken through a microscope. Bacteria are some of the smallest microorganisms that live in and on your body: these bacteria are actually

Model Lesson

Lesson 2.3:
Investigating Antibiotics

Preparing to Teach



Microbiome

Lesson 2.3: Investigating Antibiotics

AmplifyScience

5 MIN

Activity 1

Warm-Up

Warm-Up

1. Read the arguments below.

2. Then, answer the question about the arguments.

Argument One: Patient 23 felt sick during week 3 because he was infected with the *C. jejuni* bacteria. From "The Human Microbiome" article, I know that "this kind of *C. jejuni* infection can cause diarrhea, vomiting, and fever—all the symptoms of food poisoning." These symptoms match the doctor's note for Patient 23 for week 3. When Patient 23 felt healthy during week 1, the *C. jejuni* bacteria was not present in his gut microbiome. In week 3, when he felt sick, *C. jejuni*

These two arguments both answer the question *Why did Patient 23 feel sick during week 3?*

Which of these arguments is more convincing? Explain your thinking below.

10 MIN

Activity 2

Introducing Argumentation

Warm-Up

Argument One: Patient 23 felt sick during week 3 because he was infected with the *C. jejuni* bacteria. From "The Human Microbiome" article, I know that "this kind of *C. jejuni* infection can cause diarrhea, vomiting, and fever—all the symptoms of food poisoning." These symptoms match the doctor's note for Patient 23 for week 3. When Patient 23 felt healthy during week 1, the *C. jejuni* bacteria was not present in his gut microbiome. In week 3, when he felt sick, *C. jejuni* was present. Therefore, *C. jejuni* is probably the cause of his sickness.

Argument Two: Patient 23 felt sick during week 3 because he was infected with the *C. jejuni* bacteria. *C. jejuni* is very bad for you. He probably ate something spoiled. My sister got food poisoning once.

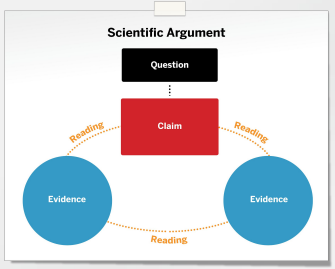
Which argument from the Warm-Up did you decide was **stronger**, and why?

Scientists ask questions and make observations. Then, when they think they have an idea about how something works, they make an argument to support that idea.

Scientific argumentation is the way that scientists communicate, evaluate, and revise their explanations about the natural world.

Scientific Argumentation

The purpose of scientific argument is to convince others, using evidence and reasoning.



A scientific argument . . .

- begins with a question.
- has a claim that proposes an answer to the question.
- has evidence that supports the claim.
- clearly explains how the evidence supports the claim (reasoning).

Argumentation Sentence Starters

- I think this evidence supports this claim because . . .
- I don't think this evidence supports this claim because . . .
- I agree because . . .
- I disagree because . . .
- Why do you think that?

Evaluating Evidence

Scientists use relevant evidence to support a claim.

The purpose of scientific argument is to convince others, using evidence and reasoning.

How do you use **argumentation** in your everyday life?

A scientific argument...

- begins with a question.

Question: Why did Patient 23 feel sick during week 3?

Question: Why did the plants on one side of the mountain survive, while the plants on the other side died?

Question: What is the explanation for why so many people became sick in one city?

A scientific argument...

- begins with a question.
- has a claim that proposes an answer to the question.

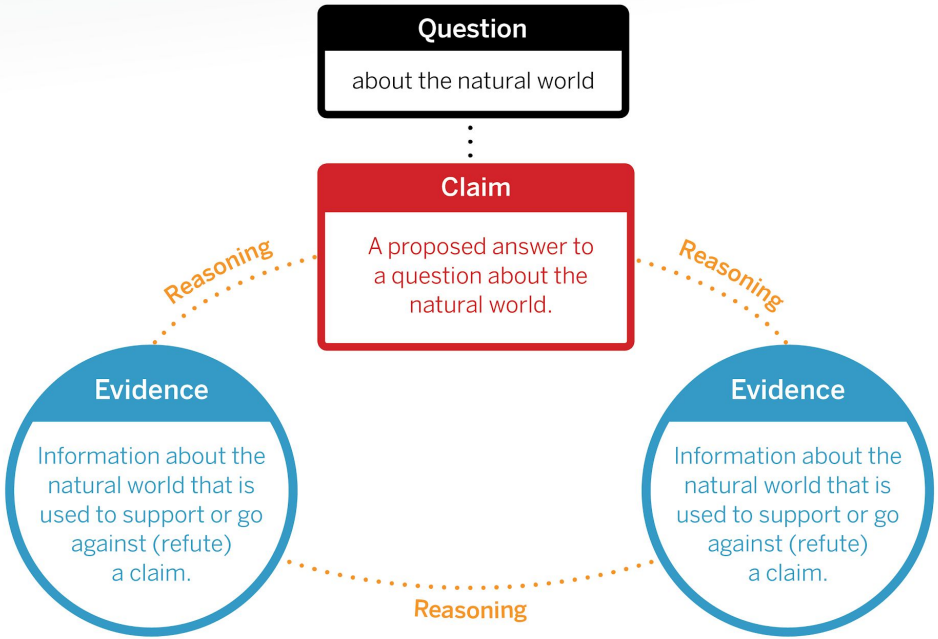
Question: Why did Patient 23 feel sick during week 3?

Claim: Patient 23 felt sick during week 3 because he was infected with the *C. jejuni* bacteria.

A scientific argument...

- begins with a question.
- has a claim that proposes an answer to the question.
- has evidence that supports the claim.
- clearly explains how the evidence supports the claim (reasoning).

Scientific Argument



Microbiome—Scientific Argument Diagram—Lesson 2.3— AMP615585.23-MB

Vocabulary

claim

a proposed answer to a question about the natural world

Vocabulary

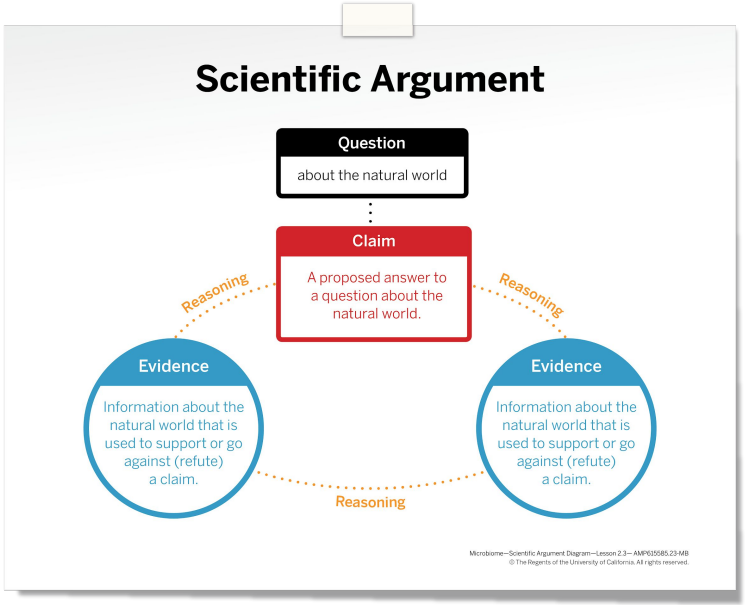
evidence

information about the natural world that is used to support a claim

Vocabulary

reasoning

the process of making clear how your evidence supports your claim



Let's take another look at the arguments from the Warm-Up.

Do these arguments have a **claim, evidence** that supports the claim, and **reasoning?**

Introducing Argumentation

Evaluating Arguments

These two arguments both answer the question *Why did Patient 23 feel sick during week 3?*

Which of these arguments is more convincing?

Argument One: Patient 23 felt sick during week 3 because he was infected with the *C. jejuni* bacteria. From "The Human Microbiome" article, I know that "this kind of *C. jejuni* infection can cause diarrhea, vomiting, and fever—all the symptoms of food poisoning." These symptoms match the doctor's note for Patient 23 for week 3. When Patient 23 felt healthy during week 1, the *C. jejuni* bacteria was not present in his gut microbiome. In week 3, when he felt sick, *C. jejuni* was present. Therefore, *C. jejuni* is probably the cause of his sickness.

Argument Two: Patient 23 felt sick during week 3 because he was infected with the *C. jejuni* bacteria. *C. jejuni* is very bad for you. He probably ate something spoiled. My sister got food poisoning once.

25 MIN

Activity 3

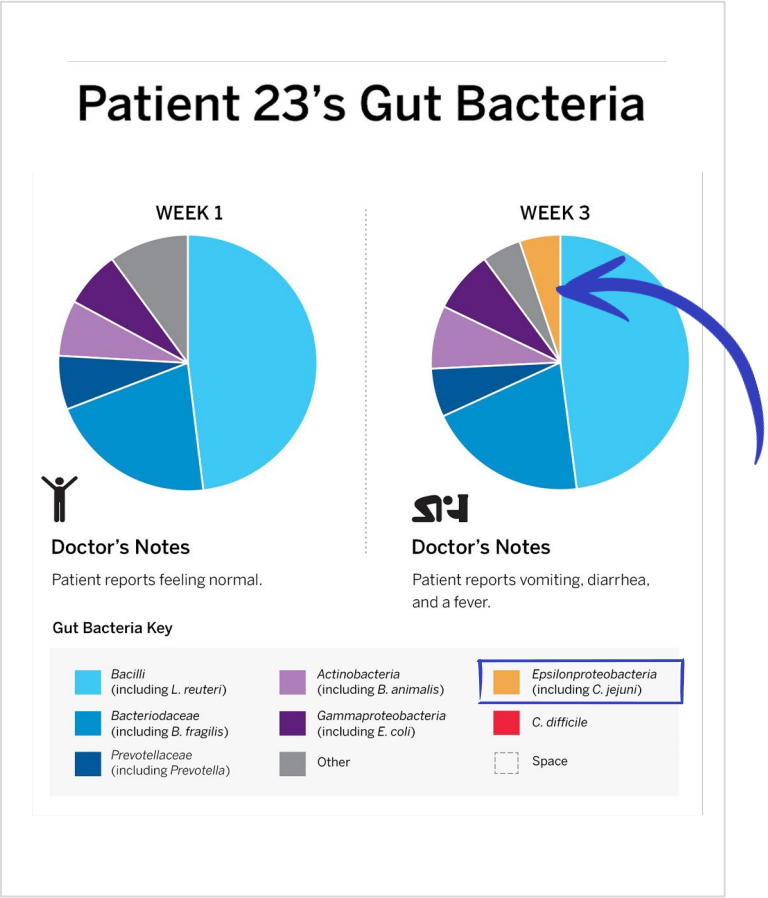
Evaluating Evidence About Antibiotics

Key Concept

7. A healthy microbiome has various helpful types of bacteria.

Key Concept

8. An infection of harmful bacteria in the human microbiome can make a person sick.



We have a lot of evidence that Patient 23 was **infected** with *C. jejuni* during week 3.

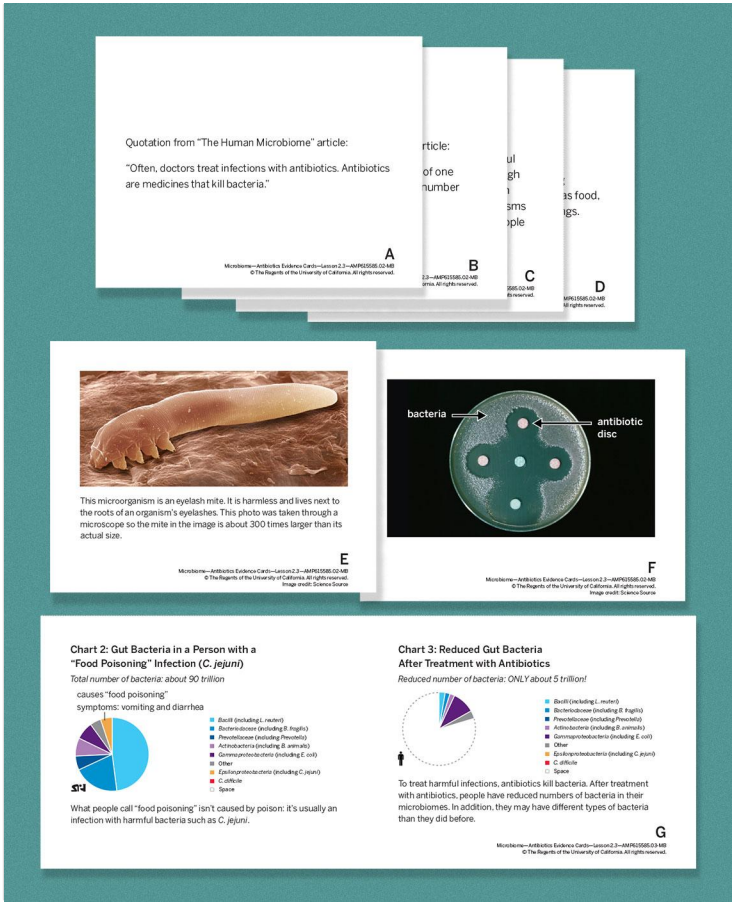
After week 3, the patient was given **antibiotics** to treat the infection.

Next, we will investigate this question:

Investigation Question:
How do antibiotics affect the microbiome?

Here is a possible claim that answers our Investigation Question.

Claim: Antibiotics cure infection by killing all types of bacteria in the body, including the harmful bacteria that cause the infection.

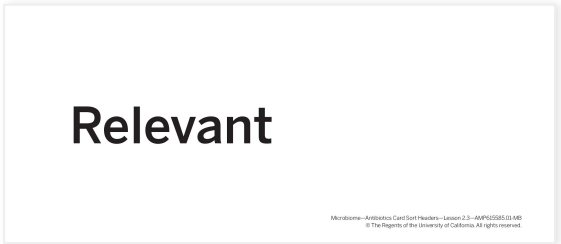


Now, we are going to look at some **evidence** to see if this claim is supported.

We will use these cards.

When scientists are making an argument, they evaluate evidence to see if it is **relevant** or **irrelevant** to the question they're investigating.

Let's think about some examples.



Claim:

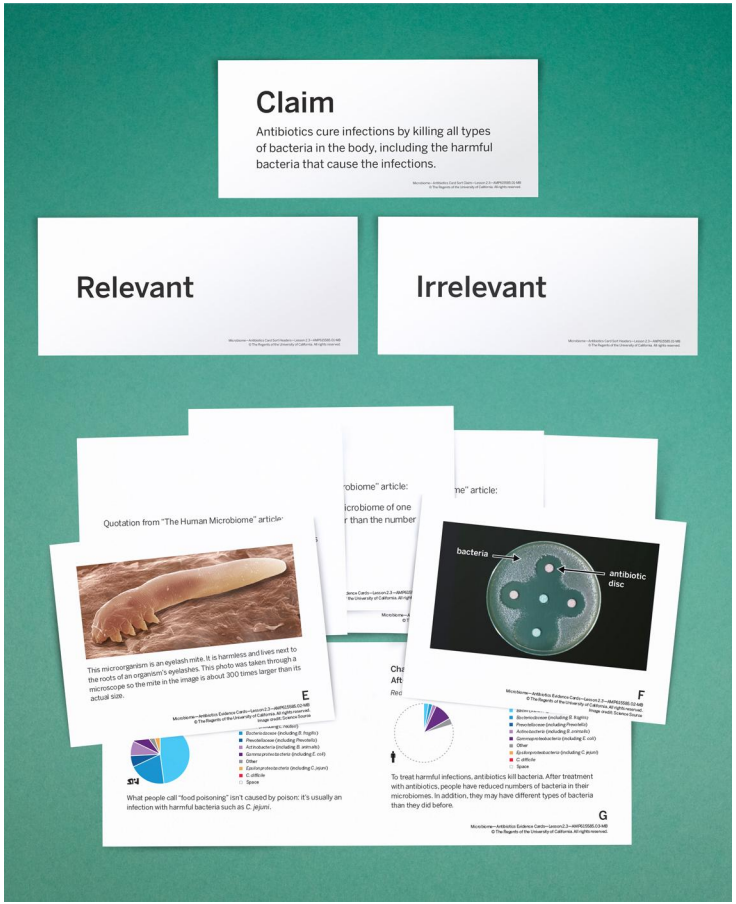
Antibiotics cure infections by killing all types of bacteria in the body, including the harmful bacteria that cause the infections.

Relevant or Irrelevant?

1. One patient, who used an antibiotic, found that the bacterial infection on her arm went away in five days.

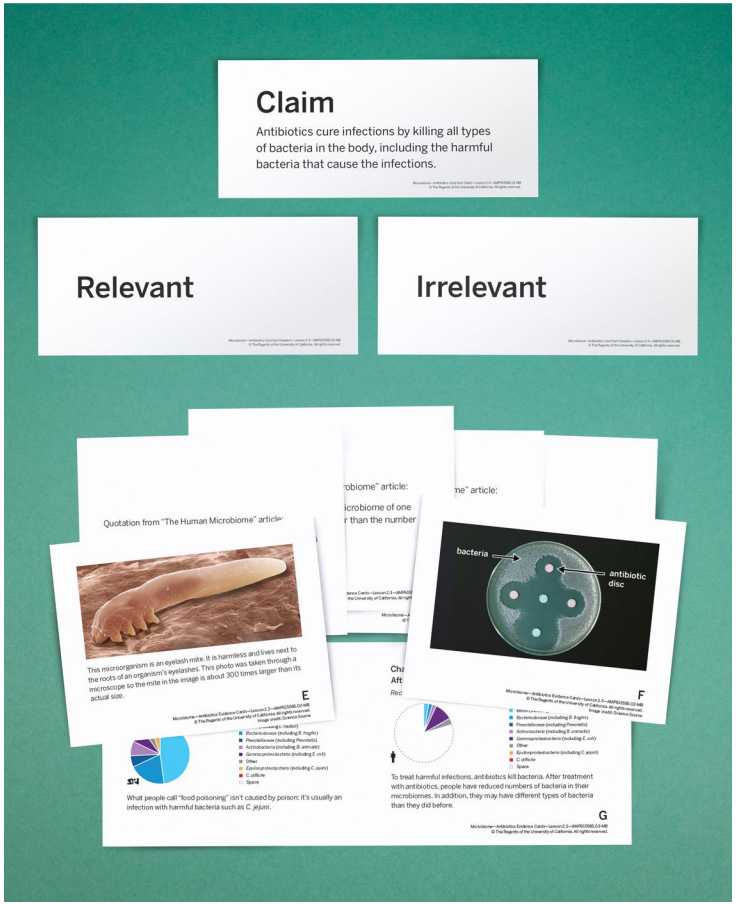
2. Bacteria can live on rocks.

3. When people exercise a lot they usually feel healthier.



You and a partner will work with a set of cards.

You'll put the **Claim** card at the top of the desk and the **Relevant** and **Irrelevant** headers beneath it, side by side.

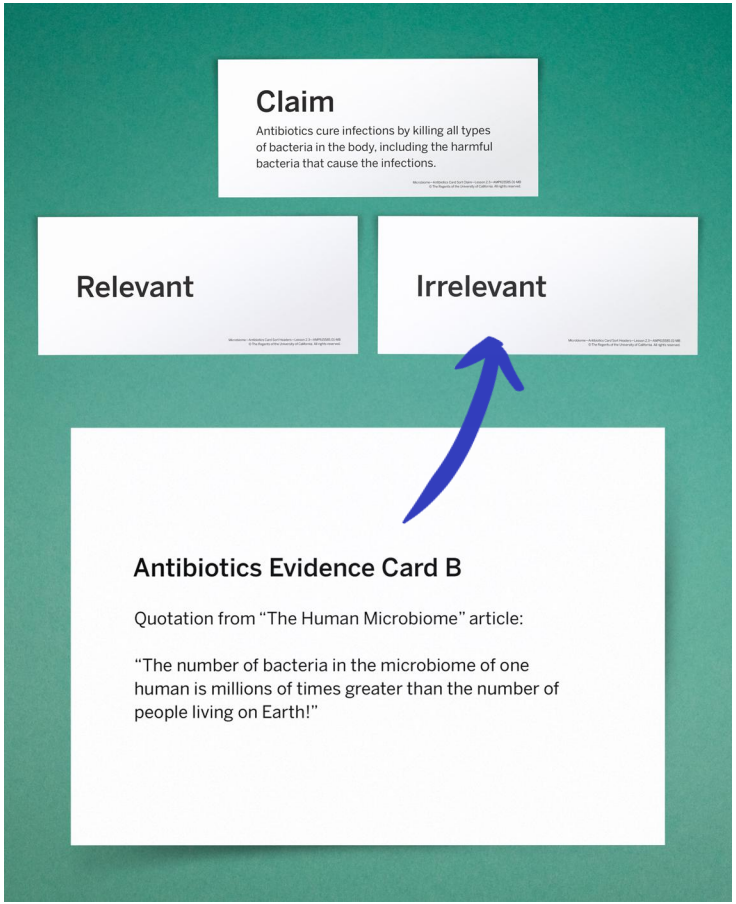


Together, you will discuss each evidence card, decide whether that evidence is **relevant** or **irrelevant** to the claim, and place the card under the category you chose.

Antibiotics Evidence Card B

Quotation from "The Human Microbiome" article:

"The number of bacteria in the microbiome of one human is millions of times greater than the number of people living on Earth!"



The evidence on Card B is interesting, but it may not be relevant to this claim. It's about bacteria, but **not about what antibiotics do** to different types of bacteria. I would put this under **Irrelevant.**

Argumentation Sentence Starters

- I think this evidence supports this claim because…
- I don’t think this evidence supports this claim because…
- I agree because…
- I disagree because…
- Why do you think that?

An important part of sorting evidence is to thoroughly discuss your thinking with a partner. These sentence starters can help you **discuss** your thinking during the Antibiotics Card Sort.

Evaluating Evidence About Antibiotics

Antibiotics Card Sort

How do antibiotics affect the microbiome?

1. Place the Claim card at the top of your desk and the Relevant and Irrelevant headers underneath it.

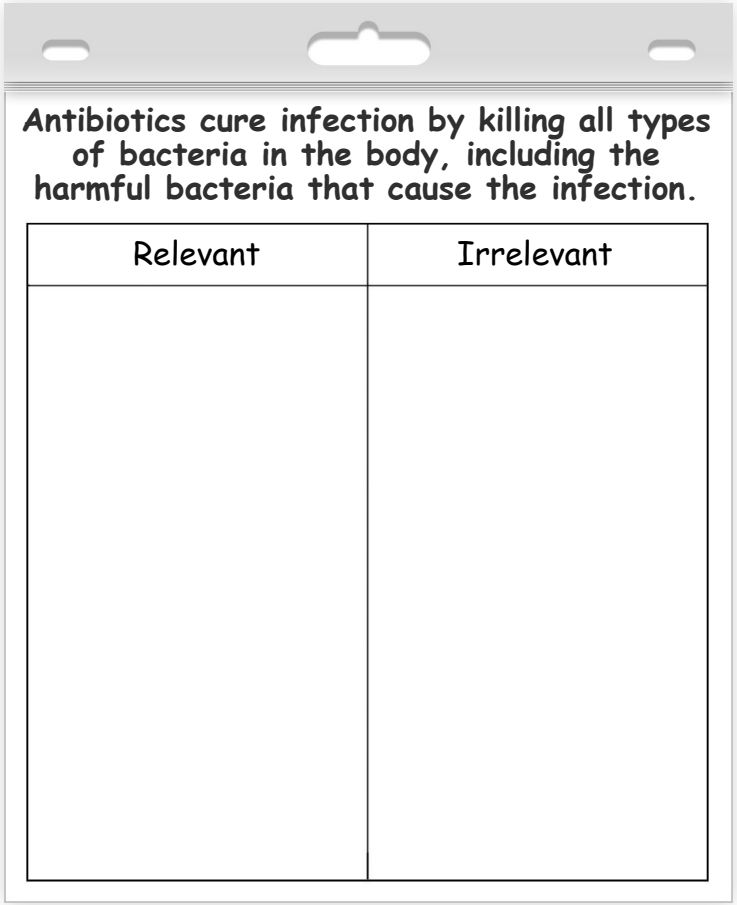
2. With your partner, discuss each evidence card and decide if it is relevant or irrelevant to the claim.

Evaluating Evidence

Scientists use relevant evidence to support a claim

Relevant evidence makes an argument stronger.

It’s important only to include relevant evidence in a strong argument.



Antibiotics cure infection by killing all types of bacteria in the body, including the harmful bacteria that cause the infection.

Relevant	Irrelevant

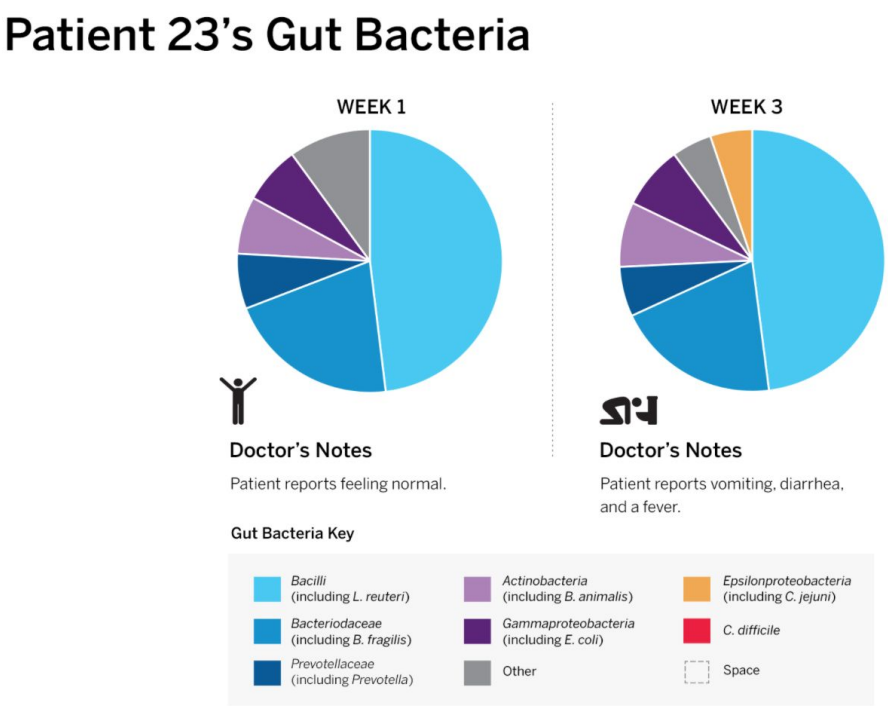
Create your own sorting tool

A. **Quotation from "The Human Microbiome" article:**
"Often, doctors treat infections with antibiotics. Antibiotics are medicines that kill bacteria."

B. **Quotation from "The Human Microbiome" article:** "The number of bacteria in the microbiome of one human is millions of times greater than the number of people living on Earth!"

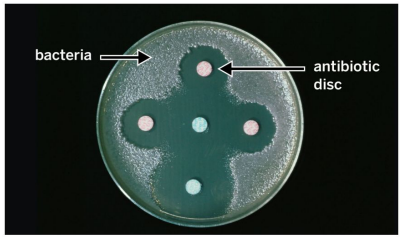
C. **Quotation from "The Human Microbiome" article:**
"Unfortunately, not all bacteria are helpful. Harmful bacteria can invade the human microbiome through cuts, spoiled food, and even the air we breathe. An invasion of harmful bacteria or other microorganisms is called an infection, and infections can make people very sick."

D. Even though they are so tiny, bacteria are living things. They have the same basic needs, such as food, warmth, and living space, as all other living things.



This microorganism is an eyelash mite. It is harmless and lives next to the roots of an organism's eyelashes. This photo was taken through a microscope so the mite in the image is about 300 times larger than its actual size.

E



F

Chart 2: Gut Bacteria in a Person with a "Food Poisoning" Infection (*C. jejuni*)

Total number of bacteria: about 90 trillion

causes "food poisoning"
symptoms: vomiting and diarrhea

What people call "food poisoning" isn't caused by poison: it's usually an infection with harmful bacteria such as *C. jejuni*.

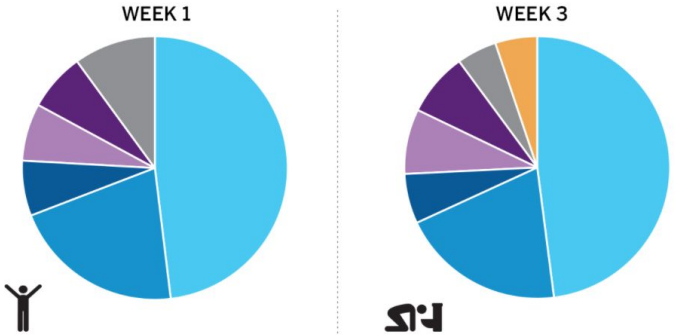
Chart 3: Reduced Gut Bacteria After Treatment with Antibiotics

Reduced number of bacteria: ONLY about 5 trillion!

To treat harmful infections, antibiotics kill bacteria. After treatment with antibiotics, people have reduced numbers of bacteria in their microbiomes. In addition, they may have different types of bacteria than they did before.

G

Patient 23's Gut Bacteria



Doctor's Notes

Patient reports feeling normal.

Doctor's Notes

Patient reports vomiting, diarrhea, and a fever.

Gut Bacteria Key

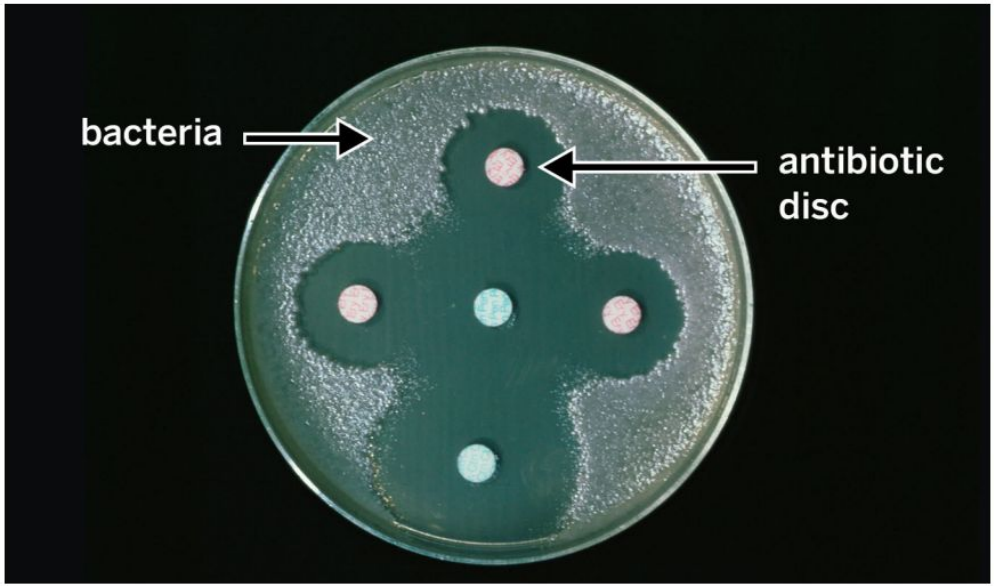
- *Bacilli* (including *L. reuteri*)
- *Bacteriodaceae* (including *B. fragilis*)
- *Prevotellaceae* (including *Prevotella*)
- *Actinobacteria* (including *B. animalis*)
- *Gammaproteobacteria* (including *E. coli*)
- Other
- *Epsilonproteobacteria* (including *C. jejuni*)
- *C. difficile*
- Space

Evidence Card E

This microorganism is an eyelash mite. It is harmless and lives next to the roots of an organism's eyelashes. This photo was taken through a microscope so the mite in the image is about 300 times larger than its actual size.

E

Evidence Card F

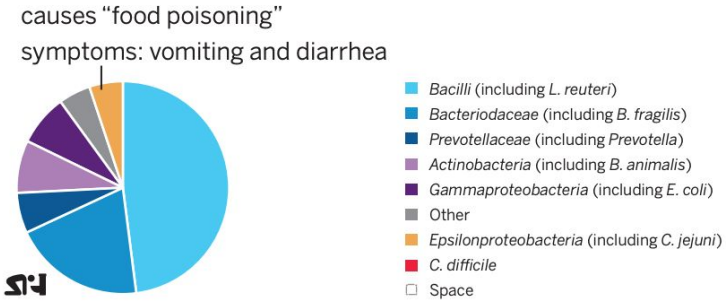


F

Evidence Card G

Chart 2: Gut Bacteria in a Person with a "Food Poisoning" Infection (*C. jejuni*)

Total number of bacteria: about 90 trillion



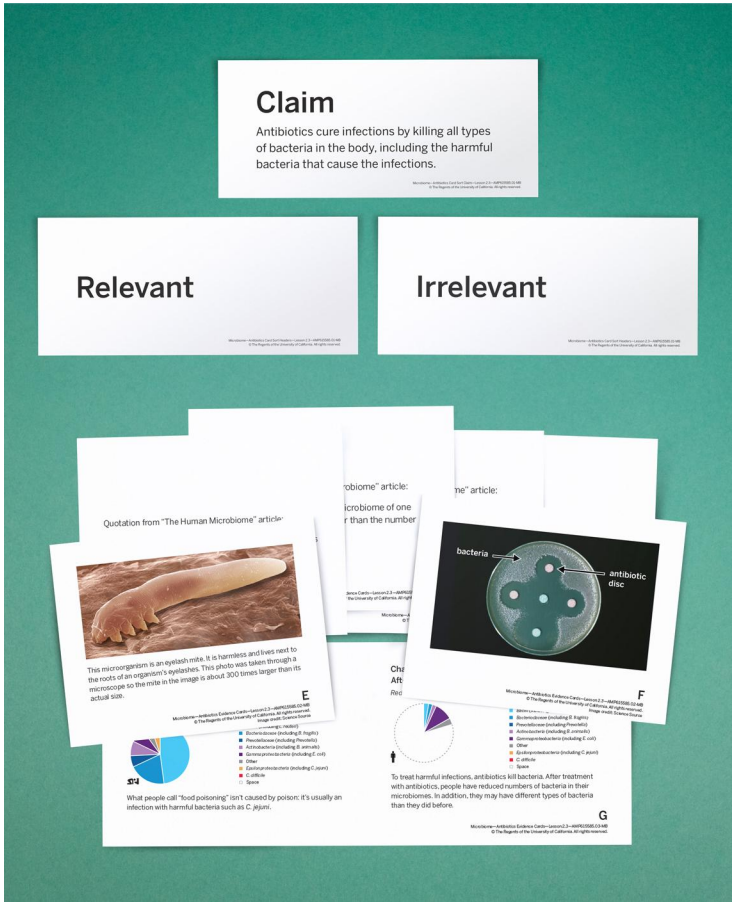
What people call "food poisoning" isn't caused by poison: it's usually an infection with harmful bacteria such as *C. jejuni*.

Chart 3: Reduced Gut Bacteria After Treatment with Antibiotics

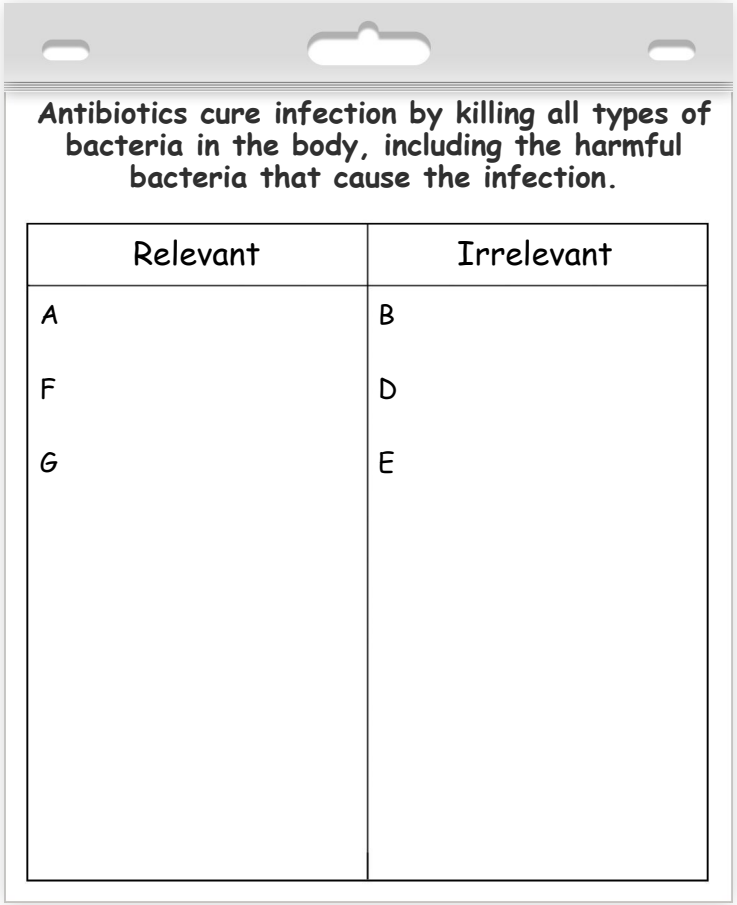
Reduced number of bacteria: ONLY about 5 trillion!

To treat harmful infections, antibiotics kill bacteria. After treatment with antibiotics, people have reduced numbers of bacteria in their microbiomes. In addition, they may have different types of bacteria than they did before.

G



Let's discuss which evidence you decided was **irrelevant** to the claim, which you decided was **relevant,** and **why.**



Antibiotics cure infection by killing all types of bacteria in the body, including the harmful bacteria that cause the infection.

Relevant	Irrelevant
A	B
F	D
G	E

What about evidence card C?

Put the Evidence Cards in order and clip them together with the Claim, Relevant, and Irrelevant headers.

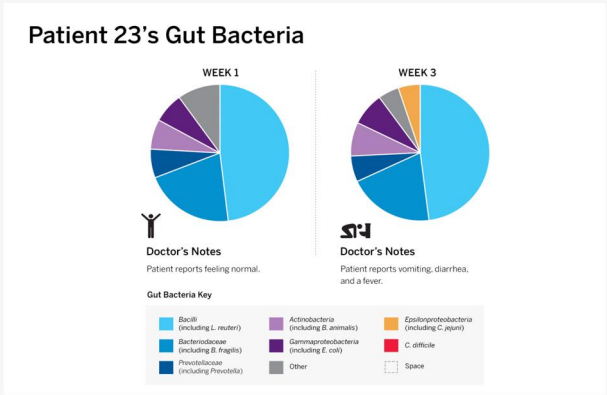
5 MIN

Activity 4

Returning to Patient 23

Returning to Patient 23

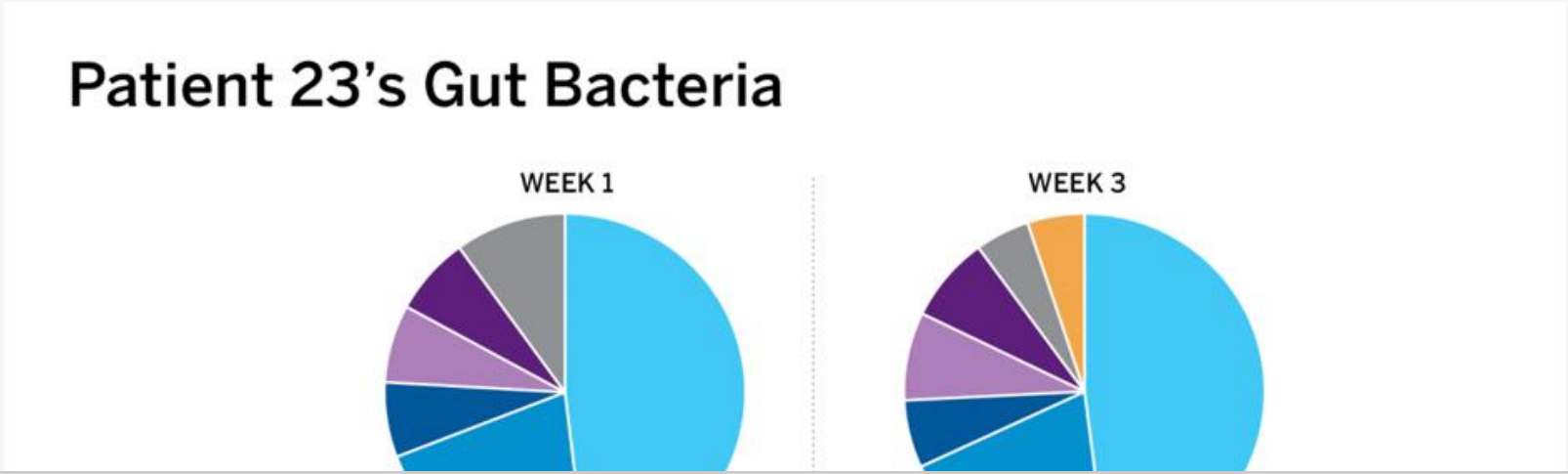
What will happen to Patient 23's gut microbiome after his antibiotics treatment?

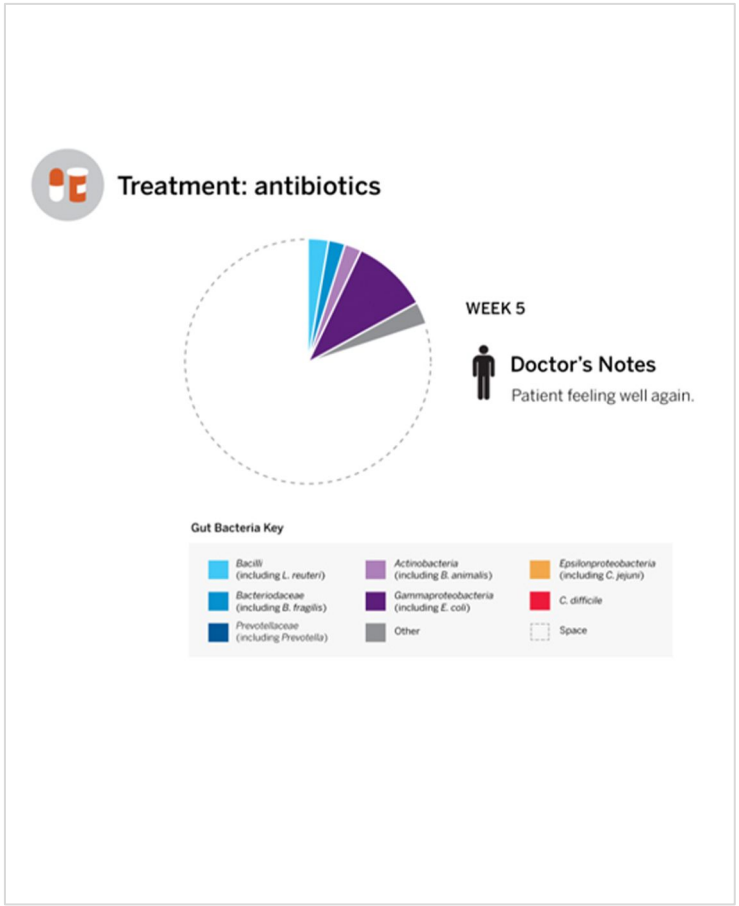


As you know, Patient 23 likely had food poisoning, or an infection from the harmful bacteria *C. jejuni*. At the end of week 3, he was **treated with antibiotics** for that infection.

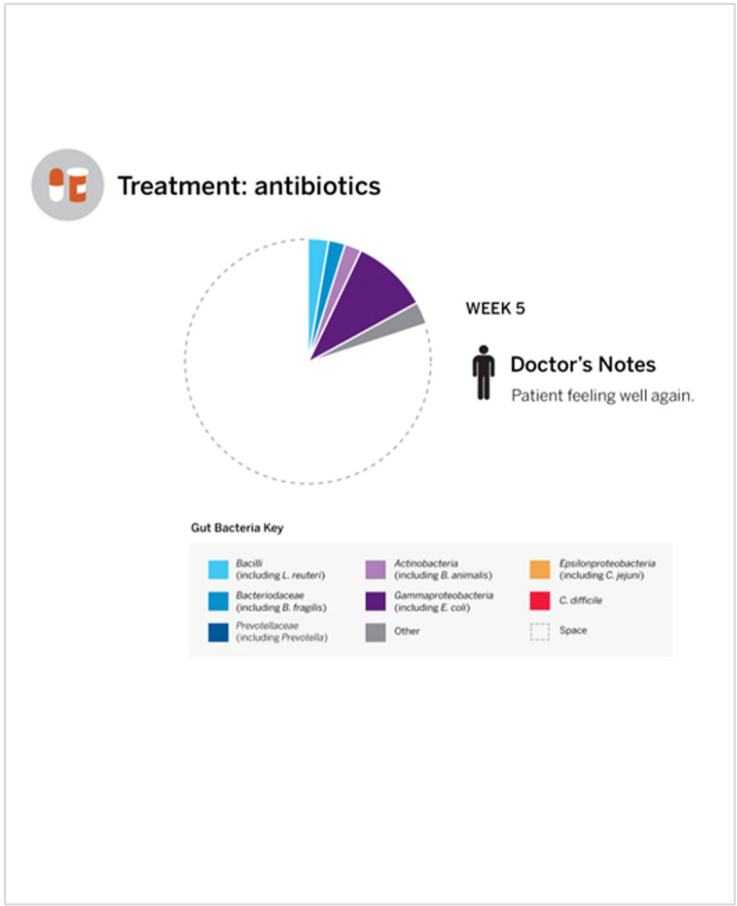
Returning to Patient 23

What will happen to Patient 23's gut microbiome after his antibiotics treatment?





You'll now have a chance to look at Patient 23's case study data from week 5.



Discuss and **record** your observations of Patient 23's case study data from week 5.

Activity 5

Homework

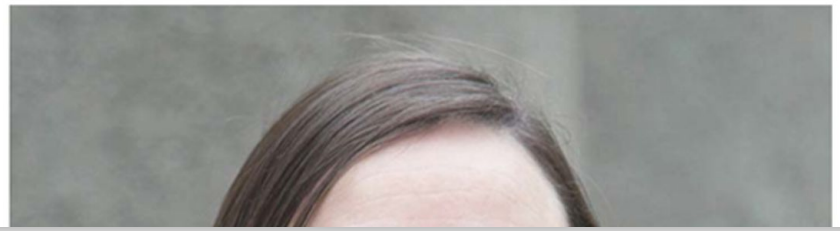
For this activity, you will learn about a **scientist** who studies the **human microbiome** by reading an article and responding to a question.

Homework

Reading "Meet a Scientist Who Studies the Human Microbiome"

Learn more about a scientist who studies the human microbiome. Open the "Meet a Scientist Who Studies the Human Microbiome" article in the Amplify Library. Read and answer the question below. Then, press HAND IN to submit your article.

Meet a Scientist Who Studies the Human Microbiome



What do scientists who study the human microbiome hope to achieve?

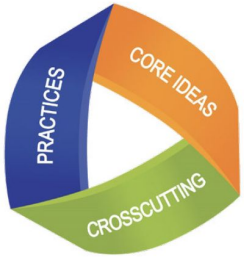
End of Lesson

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

Amplify.

Published and Distributed by Amplify. www.amplify.com

What Science and Engineering Practices did students engage with during the lesson?



Science and Engineering Practices

1. Asking Questions and Defining Problems
2. Developing and Using Models
3. Planning and Carrying Out Investigations
4. Analyzing and Interpreting Data
5. Using Mathematics and Computational Thinking
6. Constructing Explanations and Designing Solutions
7. Engaging in Argument from Evidence
8. Obtaining, Evaluating, and Communicating Information

Lesson __	Activity Overview	
What is the purpose of this lesson? Students are introduced to scientific argumentation and analyze evidence about the effects of antibiotics on the microbiome.	**Activity 1 (5 min)**	Warm Up
What will students learn? Scientists can only make arguments about things that can be observed and investigated. Learn about bacteria.	**Activity 2 (10 min)**	Introducing Argumentation
3-D Statement (identify SEP, CCC, and DCI): Students evaluate evidence about the effects of antibiotics on the microorganisms that make up the human microbiome (cause and effect)in order to construct explanations.	**Activity 3 (20 min)**	Evaluating Evidence about antibiotics
Student Resources: Argumentation wall materials, evidence cards per pair of students	**Activity 4 (10 min)**	Discussing evidence Returning to patient 23
Assessment Opportunities: none	**Activity 5**	Homework

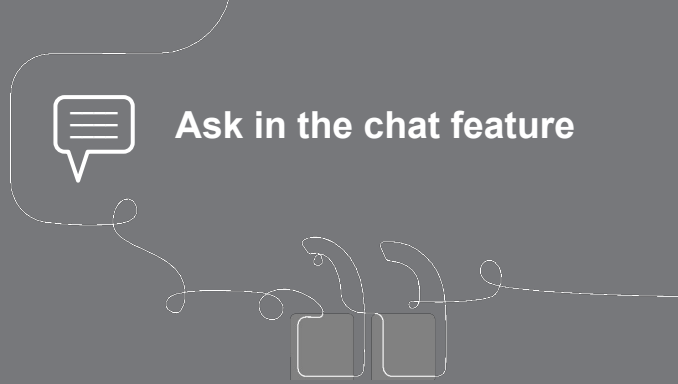
From the Lesson at a glance in the overview

Lesson Reflection

Answer in the chat feature

How is a launch unit lesson similar/different from a core unit lesson?

What questions do you have?

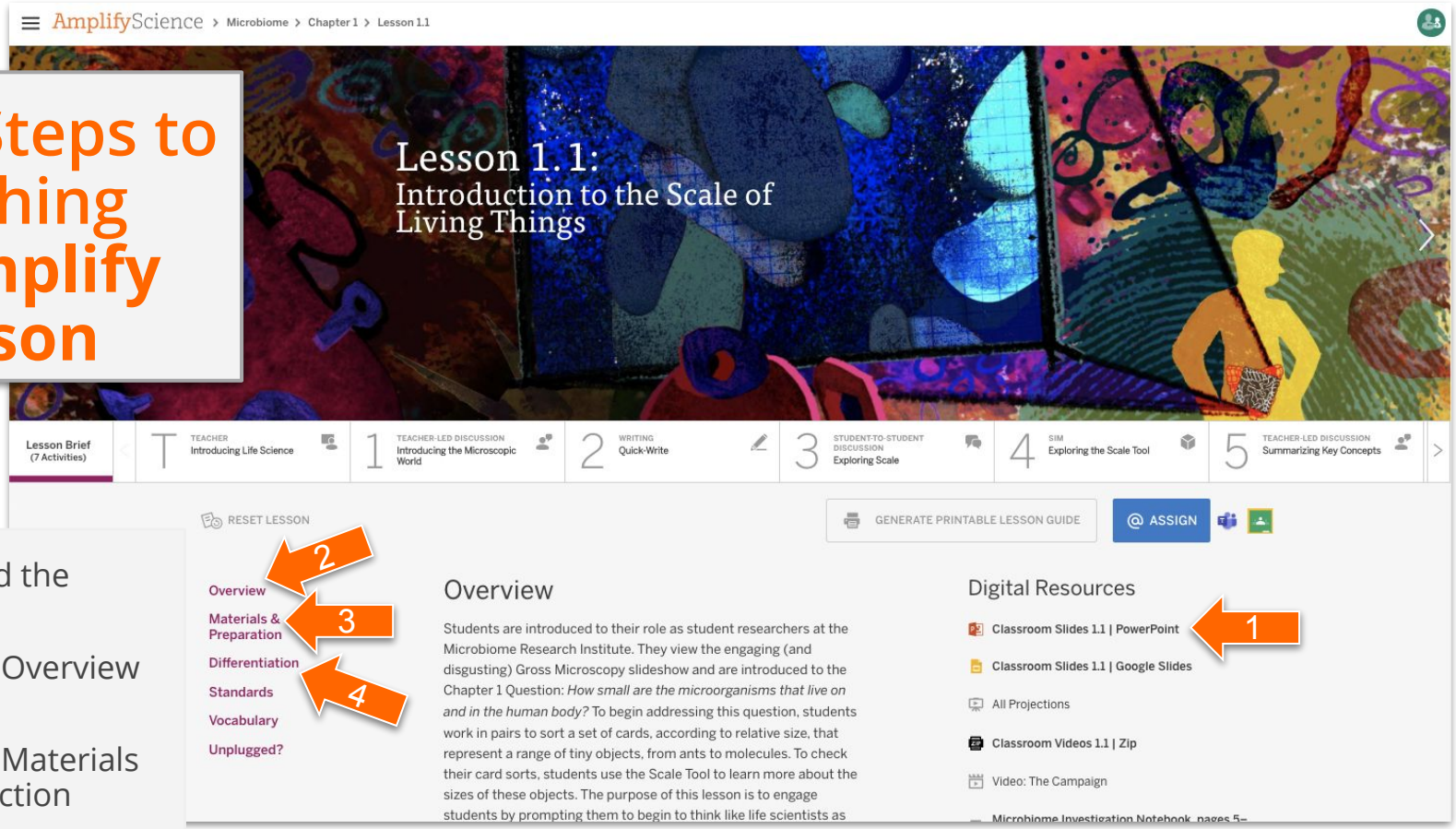


Questions?

Plan for the day

- Framing the day
- Introduction to the Launch Unit
- Unit Internalization
- **Planning with the Classroom Slides**
- Closing

4 Easy Steps to Teaching an Amplify Lesson



Step 1: Download the Classroom Slides

Step 2: Read the Overview Section

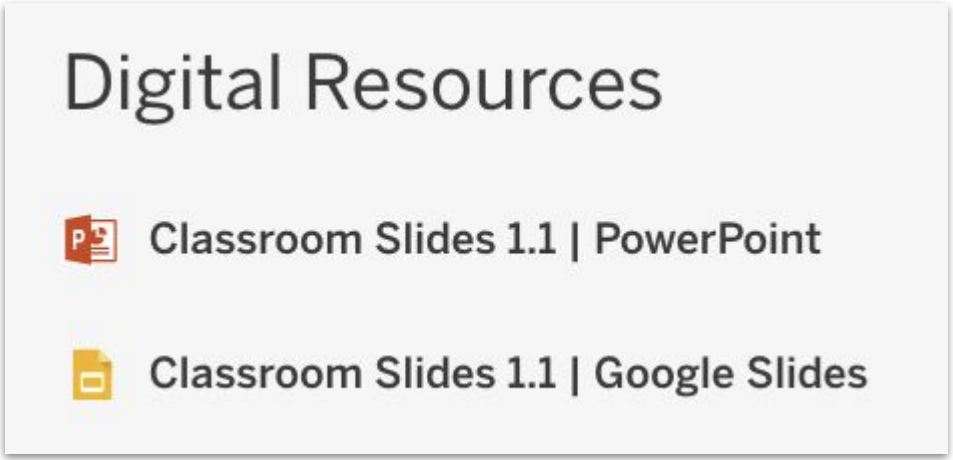
Step 3: Read the Materials & Preparation Section

Step 4: Read the Differentiation Section

Amplify.

Breakout Groups: Directions for Planning Time

1. Download the slides for the lesson you would like to plan
2. Insert the next slide at the front of the slide deck
3. Navigate at the lesson level to answer the questions on this slide
4. Make edits directly on your side deck to meet the needs of your students



Lesson __	Activity Overview	
What is the purpose of this lesson?	**Activity 1 (##min)**	
What will students learn?	**Activity 2 (##min)**	
3-D Statement (identify SEP, CCC, and DCI):	**Activity 3 (##min)**	
Student Resources:	**Activity 4 (##min)**	
Assessment Opportunities:	**Activity 5 (##min)**	

Navigation Temperature Check

Rate yourself on your comfort level accessing Amplify Science materials and navigating a digital curriculum.

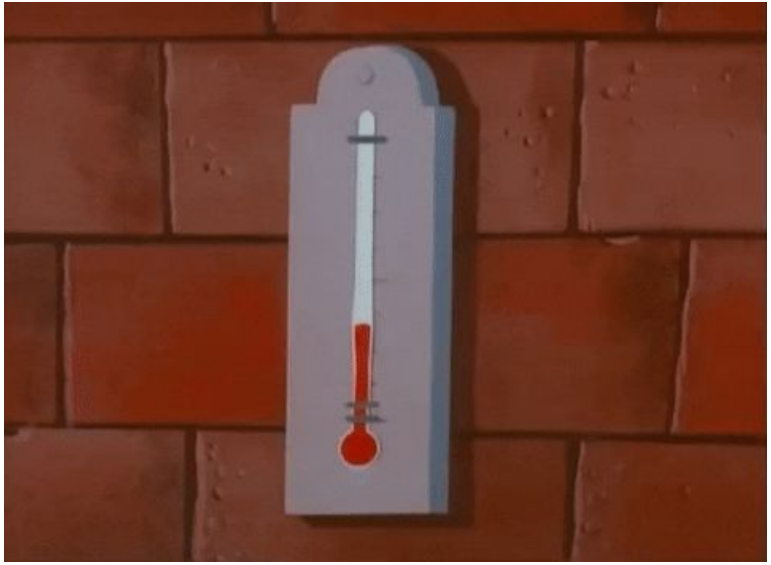
1 = Extremely Uncomfortable

2 = Uncomfortable

3 = Mild

4 = Comfortable

5 = Extremely Comfortable



Breakout groups

Please choose a person from your group to share out!

Planning:

- What did you add to your slide decks?

Differentiation:

- How do you plan to differentiate the lesson for diverse learners?

Lesson __	Activity Overview	
What is the purpose of this lesson?	Activity 1 (##min)	
What will students learn?	Activity 2 (##min)	
3-D Statement (identify SEP, CCC, and DCI):	Activity 3 (##min)	
Student Resources:	Activity 4 (##min)	
Assessment Opportunities:	Activity 5 (##min)	

Plan for the day

- Framing the day
- Introduction to the Launch Unit
- Unit Internalization
- Planning with the Classroom Slides
- **Closing**

Overarching goals

By the end of this series, you will be able to:

- ☑ Leverage successes and learnings from remote and hybrid teaching in your transition back to school for the 2021-22 school year.
- ☑ Navigate the Amplify Science curriculum.
- ☑ Describe what teaching and learning look like in Amplify Science.
- ☑ Understand the benefits of teaching the standard Amplify Science curriculum.
- ☑ Apply program essentials to prepare to teach.