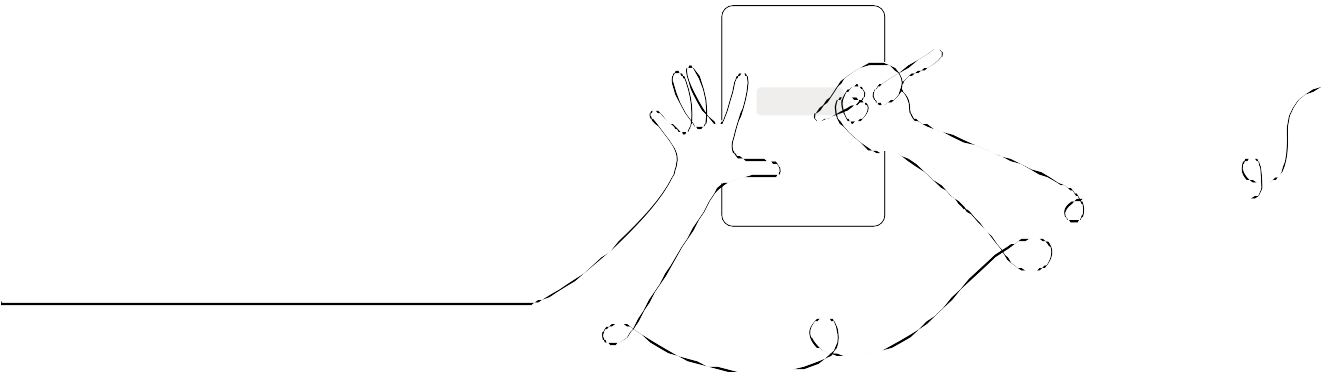
AmplifyScience

Participant Notebook

Grade 1 - Unit 3, Spinning Earth Internalization / Guided Planning



Unit Internalization / Guided Planning

Agenda

Part 1

Introduction & Framing

NGSS & 3D Learning

Phenomenon-Based Instruction

Unit Internalization

Part 2

Teaching and Learning in Amplify Science Instructional

Approach Reflection Planning a Lesson

Closing

Demo account for your workshop:

URL: **learning.amplify.com** (Log in with Google)

Temporary username: _____ **@pd.tryamplify.net**

Password: _____

Reflection

Use the provided spaces as a place for reflection throughout the session.

Session goals and student outcomes

What	Why	How

Year at a glance

Units per year

K–2 **3**

3–5 **4**

Unit types

Although every Amplify Science unit provides a three-dimensional learning experience, each unit emphasizes one of the following specific science and engineering practices.

Investigation

Investigation units focus on the process of strategically developing investigations and gathering data to answer questions. Students are first asked to consider questions about what happens in the natural world and why, and are then involved in designing and conducting investigations that produce data to help answer those questions.

Modeling

These Amplify Science units provide extra support to students engaging in the practice of modeling. Students use physical models, investigate with computer models, and create their own diagrams to help them visualize what might be happening on the nanoscale.

Engineering design

Engineering design solves complex problems by applying science principles to the design of functional solutions, and iteratively testing those solutions to determine how well they meet pre-set criteria. All Amplify Science engineering design units are structured to make the development of such solutions the central focus.

Argumentation (grades 3–5)

These Amplify Science units provide extra support to students engaging in the practice of argumentation. As students move up the K–5 grades, they focus on important aspects of argumentation in an intentional sequence.

Course structure

Key

- A Argumentation
- E Engineering design
- I Investigation
- M Modeling

Kindergarten (66 lessons)

- *Needs of Plants and Animals* 22 lessons I
- *Pushes and Pulls* 22 lessons E
- *Sunlight and Weather* 22 lessons M

Grade 1 (66 lessons)

- *Animal and Plant Defenses* 22 lessons M
- *Light and Sound* 22 lessons E
- *Spinning Earth* 22 lessons I

Grade 2 (66 lessons)

- *Plant and Animal Relationships* 22 lessons I
- *Properties of Materials* 22 lessons E
- *Changing Landforms* 22 lessons M

Grade 3 (88 lessons)

- *Balancing Forces* 22 lessons M
- *Inheritance and Traits* 22 lessons I
- *Environments and Survival* 22 lessons E
- *Weather and Climate* 22 lessons A

Grade 4 (88 lessons)

- *Energy Conversions* 22 lessons E
- *Vision and Light* 22 lessons I
- *Earth's Features* 22 lessons A
- *Waves, Energy, and Information* 22 lessons M

Grade 5 (88 lessons)

- *Patterns of Earth and Sky* 22 lessons I
- *Modeling Matter* 22 lessons M
- *The Earth System* 26 lessons E
- *Ecosystem Restoration* 22 lessons A

K-5 Program components

The K-5 program contains both physical and digital instructional materials. The table below describes materials and, when applicable, includes links to find additional information.

Teacher materials

Teacher's Guide	Contains all of the unit's lesson plans, differentiation strategies, and an assortment of instructional supports and resources at the unit, lesson, and individual activity level (also available in print for purchase): bit.ly/amplifyk5navigation
Classroom Slides	Each lesson has a downloadable and editable PowerPoint or Google Slides file to help guide teachers and students through the lesson: bit.ly/amplifyslideshowto
Classroom Wall materials	The printed Classroom Wall materials can be found in the unit kit. PDFs are also provided in the digital Teacher's Guide: bit.ly/amplifyclassroomwall
Embedded assessments	Includes formal and informal opportunities for students to demonstrate understanding and for teachers to gather information: bit.ly/amplifyk5assessment
Program Guide	A resource for finding out more about the program's structure, components, supports, how it meets the standards, and flexibility: bit.ly/amplifyprogramguide
Program Hub	Features remote learning resources, training videos, hands-on investigation videos, and Professional Learning resources: bit.ly/amplifyprogramhub

Student materials

Hands-on materials	The unit kit includes both consumable and non-consumable physical materials used for the hands-on activities that are carried out at strategic points throughout the unit. bit.ly/amplifymaterials
Investigation Notebooks	Contains instructions for student activities and space for students to record data, reflect on ideas from texts and investigations, and construct explanations and arguments: bit.ly/amplifyk5fillable
Student books	Informational texts written by the Lawrence Hall of Science allow students to practice reading within the science content area: bit.ly/amplifystudentbooks
Digital applications	Digital tools and simulations, available across grades 2–5, support and advance learning objectives by giving students opportunities to analyze data, visualize phenomena, and share their thinking: bit.ly/amplifydigitaltools

Curriculum add-ons

Spanish-language licenses	Spanish materials that mirror their English counterparts in both content and quality are also available for purchase: bit.ly/amplifyspanish
Interactive Classroom	A new digital interface for teachers and students designed for classrooms in which every student has a digital device: bit.ly/amplifyinteractiveclassroom

Three dimensionR]]VRc_Z_X reference

3-D learning engages students in using scientific and engineering practices and applying crosscutting concepts as tools to develop understanding of and solve challenging problems related to disciplinary core ideas.

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

Disciplinary Core Ideas

Earth and Space Sciences:
- Earth's Place in the Universe
- Earth's Systems
- Earth and Human Activity

Life Sciences:
- From Molecules to Organisms
- Ecosystems
- Heredity
- Biological Evolution

Physical Sciences:
- Matter and its Interactions
- Motion and Stability
- Energy ù▮Ĉ ŋĝČğŁ AŁŁĬğĄùŋğĶIŅ

Engineering, Technology and the Applications of Science:
- Engineering Design
- Links among Engineering SČĄĝIĸĬĶĘŠÊ MĄğČIĄČ ùIĊ MĶĄğČŋŠ

Crosscutting Concepts

1. Patterns
2. Cause and Effect
3. Scale, Proportion, and Quantity
4. Systems and System Models
5. Energy and Matter
6. Structure and Function
7. Stability and Change

Scientific and Engineering Practices

NGSS@NSTA
STEM STARTS HERE

1. Asking questions (for science)
   and defining problems (for engineering)
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 (for science)
   and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Disciplinary Core Ideas

NGSS@NSTA
STEM STARTS HERE

Life Science	Physical Science
LS1: From Molecules to Organisms: Structures and Processes LS2: Ecosystems: Interactions, Energy, and Dynamics LS3: Heredity: Inheritance and Variation of Traits LS4: Biological Evolution: Unity and Diversity	PS1: Matter and Its Interactions PS2: Motion and Stability: Forces and Interactions PS3: Energy PS4: Waves and Their Applications in Technologies for Information Transfer
Earth & Space Science	**Engineering & Technology**
ESS1: Earth's Place in the Universe ESS2: Earth's Systems ESS3: Earth and Human Activity	ETS1: Engineering Design ETS2: Links Among Engineering, Technology, Science, and Society

Core and Component Ideas

NGSS@NSTA STEM STARTS HERE

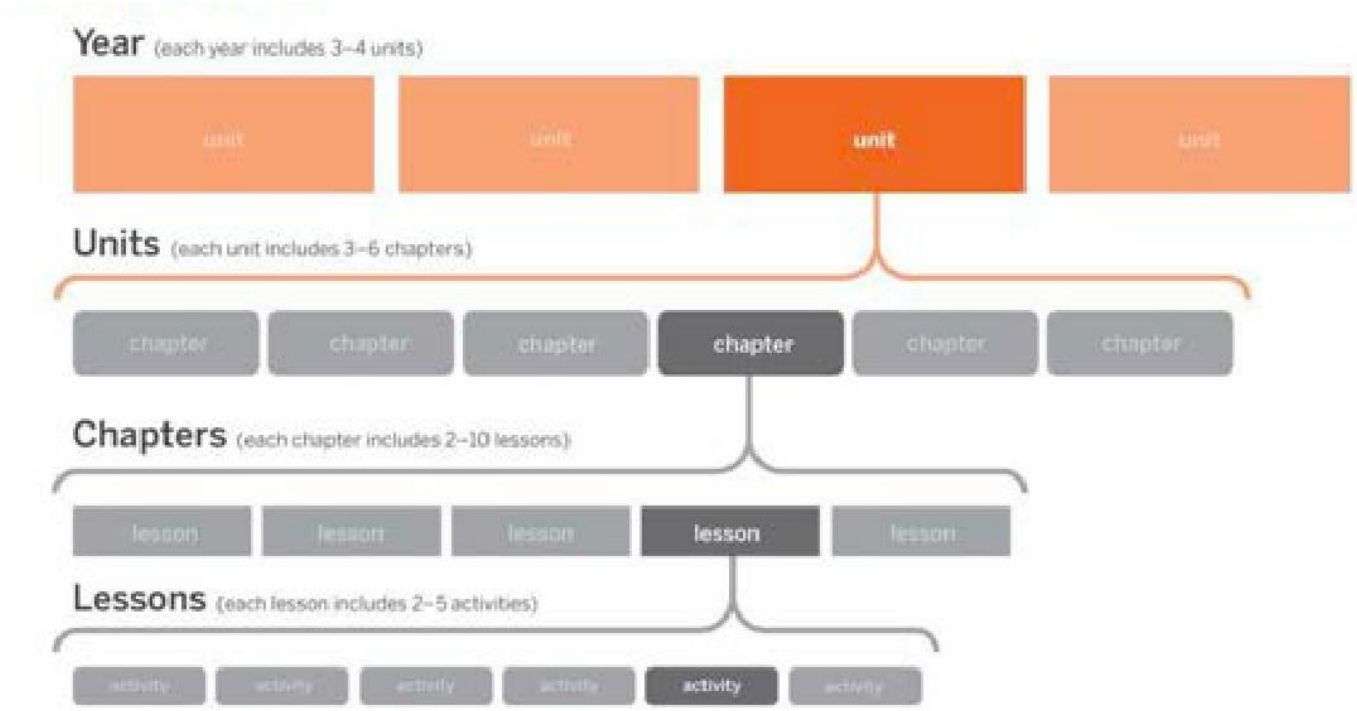
Life Science	Earth & Space Science	Physical Science	Engineering & Technology
LS1: From Molecules to Organisms: Structures and Processes LS1.A: Structure and Function LS1.B: Growth and Development of Organisms LS1.C: Organization for Matter and Energy Flow in Organisms LS1.D: Information Processing **LS2: Ecosystems: Interactions, Energy, and Dynamics** LS2.A: Interdependent Relationships in Ecosystems LS2.B: Cycles of Matter and Energy Transfer in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS2.D: Social Interactions and Group Behavior **LS3: Heredity: Inheritance and Variation of Traits** LS3.A: Inheritance of Traits LS3.B: Variation of Traits **LS4: Biological Evolution: Unity and Diversity** LS4.A: Evidence of Common Ancestry and Diversity LS4.B: Natural Selection LS4.C: Adaptation LS4.D: Biodiversity and Humans	**ESS1: Earth's Place in the Universe** ESS1.A: The Universe and Its Stars ESS1.B: Earth and the Solar System ESS1.C: The History of Planet Earth **ESS2: Earth's Systems** ESS2.A: Earth Materials and Systems ESS2.B: Plate Tectonics and Large-Scale System Interactions ESS2.C: The Roles of Water in Earth's Surface Processes ESS2.D: Weather and Climate ESS2.E: Biogeology **ESS3: Earth and Human Activity** ESS3.A: Natural Resources ESS3.B: Natural Hazards ESS3.C: Human Impacts on Earth Systems ESS3.D: Global Climate Change	**PS1: Matter and Its Interactions** PS1.A: Structure and Properties of Matter PS1.B: Chemical Reactions PS1.C: Nuclear Processes **PS2: Motion and Stability: Forces and Interactions** PS2.A: Forces and Motion PS2.B: Types of Interactions PS2.C: Stability and Instability in Physical Systems **PS3: Energy** PS3.A: Definitions of Energy PS3.B: Conservation of Energy and Energy Transfer PS3.C: Relationship Between Energy and Forces PS3.D: Energy in Chemical Processes and Everyday Life **PS4: Waves and Their Applications in Technologies for Information Transfer** PS4.A: Wave Properties PS4.B: Electromagnetic Radiation PS4.C: Information Technologies and Instrumentation	**ETS1: Engineering Design** ETS1.A: Defining and Delimiting an Engineering Problem ETS1.B: Developing Possible Solutions ETS1.C: Optimizing the Design Solution **ETS2: Links Among Engineering, Technology, Science, and Society** ETS2.A: Interdependence of Science, Engineering, and Technology ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World ***Note**: In NGSS, the core ideas for Engineering, Technology, and the Application of Science are integrated with the Life Science, Earth & Space Science, and Physical Science core ideas*

Crosscutting Concepts

NGSS@NSTA
STEM STARTS HERE

1. Patterns
2. Cause and effect: Mechanism and explanation
3. Scale, proportion, and quantity
4. Systems and system models
5. Energy and matter: Flows, cycles, and conservation
6. Structure and function
7. Stability and change

=-' @RgZXReZ`_ decfTefcV



Unit Level resources

The Unit Level resources aim to quickly familiarize teachers with the unit's content, structure, and materials. It is recommended that teachers read through the Planning for the Unit documents, and consult the Teacher References as necessary. Some of the Unit Level resources include:

Planning for the Unit

Unit Overview	Describes what's in each unit and how students learn across chapters
Unit Map	An overview of what students figure out by chapter and how they figure it out
Progress Build	Explains the learning progression of ideas students figure out in the unit
Materials and Preparation	Lists materials included in the unit's kit, items to be provided by the teacher, and briefly outlines preparation requirements for each lesson
Science Background	Adult-level primer on the science content students figure out in the unit

Teacher References

Lesson Overview Compilation	Lesson Overview of each lesson in the unit, including lesson summary, activity purposes, and timing
3-D Statements	Describes 3-D learning across the unit, chapters, and in individual lessons
Assessment System	Describes components of the Amplify Science Assessment System
Embedded Formative Assessments	Includes full text of formative assessments in the unit
Books in This Unit	K-5: Summarizes each unit text and explains how the text supports instruction
Articles in This Unit	6-8: Summarizes each unit text and explains how the text supports instruction
Apps in This Unit	2-8: Outlines functionality of digital tools and how students use them

Printable Resources

Coherence Flowcharts	Visualization of how all of the different parts of a chapter connect and flow into one another so that students are able to figure out the unit phenomenon
Investigation Notebook	Digital version of the Investigation Notebook, for copying and projecting. The PDFs are fillable, so students can also complete their work digitally.
Article Compilation	6-8: Downloadable PDF with all of the unit's science articles in one document
Copymaster Compilation	Downloadable PDF with all of the unit's copymasters in one place
Print Materials	A digital copy of the Print Materials included in the Unit Kit

Unit Map

Why doesn't the sky always look the same?

As sky scientists, students explain why a boy living in a nearby place sees different things in the sky than his grandma who lives in a faraway place. Students record, organize, and analyze observations of the sun and other sky objects as they look for patterns and make sense of the cycle of daytime and nighttime.

Chapter 1: Why did the sky look different to Sai than to his grandma?

Students figure out: Sai and his grandma saw different things at the same time because they live in different places. When it is daytime for Sai, it is nighttime for his grandma. When Sai sees the sun, Sai's grandma sees the stars.

How they figure it out: Students make observations of the daytime sky and read about observations of the nighttime sky. They use evidence from live webcams to compare and contrast what people in different places on Earth see in the sky at the same time. They begin to notice patterns in what they see in the sky.

Chapter 2: Why was it daytime for Sai when it was nighttime for his grandma?

Students figure out: It was daytime for Sai when it was nighttime for his grandma because Earth is shaped like a ball, and Sai and his grandma live on different parts of Earth. When the place where Sai lives is facing the sun, the place where his grandma lives is facing away from the sun.

How they figure it out: Students watch videos of Earth to develop an understanding that Earth's shape is round like a ball. Students use globes and their own heads as models of Earth to observe how different parts of Earth face the sun at different times. They conclude that it is daytime in places on Earth that are facing the sun and nighttime in places on Earth that are not facing the sun.

Chapter 3: Why did daytime change to nighttime while Sai talked on the phone?

Students figure out: It changed from daytime to nighttime because Earth is spinning. When Sai and his grandma started talking, he saw the sun because the place on Earth where he lives was facing the sun. As Earth spins, the place where Sai lives moves to face away from the sun, so it changes to nighttime.

How they figure it out: Students observe the position of the sun through the course of a day and record this data on their Sky Mural. They use these observations and view time-lapse videos to develop an understanding that Earth spins. Students then engage in a hands-on activity to conclude that, as Earth spins, we face different directions, so what we see in the sky changes.

Chapter 4: What will Sai see in the sky when he calls his grandma tomorrow?

Students figure out: When Sai talks on the phone to his grandma at the same time tomorrow, he will see the same thing he saw in the sky today. The sun makes the same pattern in the sky every day because Earth spins one full time every day. This pattern lets us predict that Sai will see the sunset in the evening.

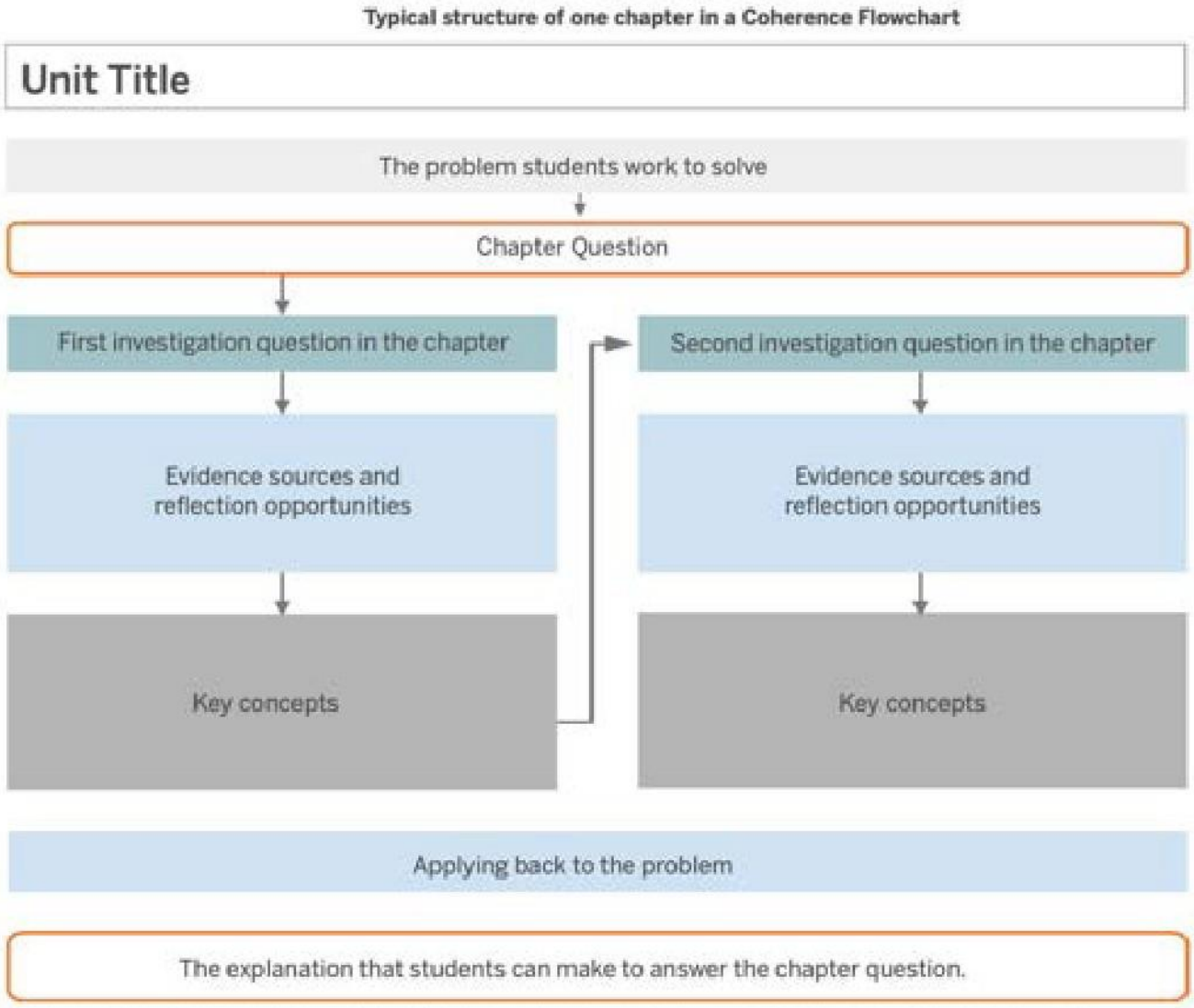
How they figure it out: Students make additional observations of the sky, both at the same time as previous observations and at sunset. They then record this new data on the Sky Mural. They organize this data in a new way in order to arrive at the understanding that the sun makes the same pattern in the sky every day because Earth spins one full time every day.

Chapter 5: Why was it nighttime for Sai when he called his grandma during the winter?

Students figure out: It was nighttime when Sai called his grandma during the winter because in winter, daytime is shorter and nighttime is longer than in other seasons.

How they figure it out: Students gather evidence about the seasons by reading and discussing a series of texts. They observe that there is a seasonal pattern to the length of daytime and nighttime over the course of a year.

Coherence Flowchart structure



Instruction is framed by questions about the unit's anchor phenomenon and the related problem students are solving. Chapter Questions then guide students in figuring out the phenomenon, piece by piece. Within each chapter, Investigation Questions focus students on a manageable piece of content that will help them figure out the Chapter Question. Each question motivates activities, and each activity provides specific evidence related to the Investigation Question. Students synthesize the understanding constructed over multiple activities, and this understanding is formalized through key concepts. Often a key concept leads students to an additional Investigation Question students need to pursue to answer the Chapter Question. At the end of the chapter, students' new understanding is applied back to the unit's anchor phenomenon and leads students to a new Chapter Question or a final explanation.

Spinning Earth: Investigating Patterns in the Sky

Unit Anchor Phenomenon

Problem students work to solve

The sky looks different to Sai than to his grandma when they talk on the phone.
Why doesn't the sky always look the same?

Chapter-level Anchor Phenomenon
Chapter 1 Question

The sky looked different to Sai than to his grandma when Sai called.
Why did the sky look different to Sai than to his grandma?

Investigation Questions

What can we see in the sky at different times? (1.1-1.3)
(Note: See Lesson Overviews for lesson-level Investigative Phenomena)

What does the sky look like to people in different places on Earth right now? (1.4-1.5)
(Note: See Lesson Overviews for lesson-level Investigative Phenomena)

Evidence sources and reflection opportunities

- Make, record, and discuss observations of the sky (1.1)
- Make a new sky observation and compare to the first (1.2)
- Read *After Sunset* (1.2)
- Collect daytime and nighttime observations from *After Sunset* (1.2)
- Sort Sky Observations data (1.3)
- Engage in Sky Investigations Role-Play (1.3)
- Read about patterns in *Patterns of Earth and Space* (1.3)

- Make observations of webcams showing the sky from different places (1.4)
- Engage in Sky Investigations Role-Play (1.4)
- Use Interpretation Language Frame to discuss and record whether it is daytime or nighttime in different places on Earth (1.4)
- Organize webcam data to look for patterns (1.4)
- Explain what different people on Earth see at the same time (1.5)

Key concepts

- We can see the sun in the sky during the daytime and the stars in the sky during the nighttime. (1.3)

- Right now, the sky looks different to different places on Earth. (1.5)

Application of key concepts to the problem

- Shared Writing to answer the Chapter 1 Question (1.5)

Explanation that students can make to answer the Chapter 1 Question

Sai and his grandma saw different things at the same time because they live in different places. When it is daytime for Sai, it is nighttime for his grandma. When Sai sees the sun, Sai's grandma sees the stars.

Classroom Slides reference

Classroom Slides are a resource designed to make planning and teaching with Amplify Science faster and easier. EùAĢĝ ĬČŅŅĶı ĝùŅ ČĊğŋùăĬČ ŅĬğĊČŅ ĶŁŋğİğťČĊ ĖĶŁ ⍰ŋĢÛÚĦŰũį ¦ŰиńÛ¦ŰŋLJį ÞńÛĦŋŰLJ ãõ ùıĊ IŰÚьưń ŋĶ ĝČĬŁ guide teachers and their students through the lesson with easy-to-follow images, videos, questions, and instructions.

This reference sheet has basic information to get you started. For a more in-depth how-to? Go to: https://tinyurl.com/amplifyslideshowto

Helpful tips:

The text on the slides is color coded! Black text on the slides denotes suggested teacher talk. Orange text on the slides denotes a student action.

Icons on the slide cue the teacher about what is happening in the lesson. Here's what the icons on the slides mean:

You may occasionally also come across the following student action icons:

In addition to the text and visuals on the slide, each slide's notes feld contains additional information, including possible student responses, follow-up prompts, and instructional steps. In most cases, the content on the slide is meant to come before the actions and suggested teacher talk written in the notes. Here's what the icons in the notes feld mean:

Unit level internalization notes

Lesson level internalization notes

Additional Amplify cesources

Program Guide

Additional insight into the program's structure, intent, philosophies, supports, and flexibility.

ĝŋŋĿŅĬĬĬŠêùİĿĬğĖŠêĄĶİĬĿŁĶĘŁùİĘŎğĊČ

CùĬğĖĶŁığù EĊğŋğĶìì
Yeea,!!R^a]ZWj T`^!dTZV_TV!TR]ZW`c_ZR!cVgZVh

4ĶŎğŅğùıù EĊğŋğĶìì
Yeead,!!^j R^a]ZWj T`^!ac`XcR^XfZUV!T`_eV_e!]`fZdZR_R!hV]T`^V!V]V^V_eRcj-
dTY``]!

Amplify Help

Frequently updated compilation of articles with advice and answers from the Amplify team.

my.amplify.com/help

5RcVXZgVcd Site

https://amplify.com/amplify-science-family-resource-intro/

Amplify Support

Contact the Amplify support team for information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-ðƋPM EMS ùıĊ ŚČČĪČıĊŅ ðƋA8ůƑG8 EMSê

Email: help@amplify.com

EİùğĬĭ ČĊŅŎĿĿĶŁŋÕùİĿĬğĖŠêĄĶİ æĿČĊùĘĶĘğĄùĬ l·ŎČŅŋğĶıŅQ̄

Phone: 800-823-1969

Or, reach Amplify Chat by clicking the icon at the bottom right of the digital Seacher's Guide.

When contacting the support team:

- Identify yourself as an Amplify Science user.
- Note the unit you are teaching.
- Note the type of device you are using (Chromebook, iPad, Windows, laptop).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible. Copy your district or site IT contact on emails.

AMPLIFY Science