

Amplify Science

The Assessment System

Grade 5, Unit 2: Modeling Matter

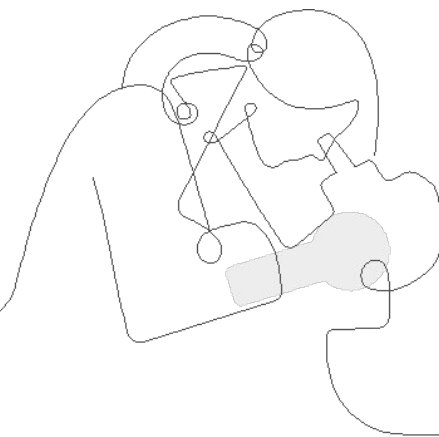
Part 3

Strengthen workshop

School/District Name

Date

Presented by Your Name



Amplify's Purpose Statement

Dear teachers,

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

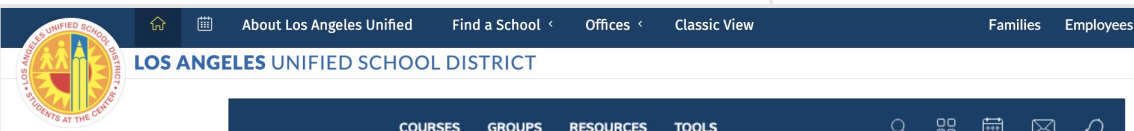
We are in your corner – extending your reach, saving you time, and enhancing your understanding of each student.

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

Schoolology



[← Back to Schoology Home Page](#)

LMS App Center

The LMS App Center provides a catalog of District-approved digital content and learning tools (including digital components of adopted textbooks) that are available for classroom teachers and students to access within the learning management system, Schoolology.

For information on District-approval policies and procedures, please visit: [udidp.lausd.net](#).

- To search the full list of digital learning tools, click "Submit".
- To search by Publisher Name or Textbook Title, type in a word associated to your adopted publisher, then click "Submit".
- To narrow your search with filters such as Content Area, Grade Level, or Content Type, select from the dropdown menu, then click "Submit".

To learn more about using the LMS App Center, please refer to the following [video overview](#).

Publisher Name Starts With

Content Area All

Grade Level All

Content Type All

Textbook Title Starts With

Submit

All Amplify Products



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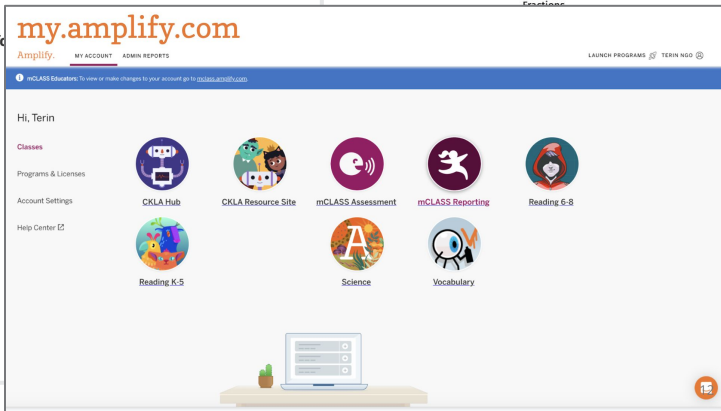
To learn more about using the LMS App Center, please refer to the following [video overview](#).

[← Search Again](#)

Amplify

Content Area: ELA
Grade Level: ES
Content Type: Supplemental
Integration Type: App (Left Navigation)
Purchase Type: District and School
Getting Started Guide
Other Info: School licenses required
mCLASS
CKLA
Amplify Reading
Amplify Science
Creative

Vendor Support Desk:
P: 800.823.9969
E: help@amplify.com
S: amplify.com/support/
Textbook Title(s):
NA



Vendor Support Desk:
P: 800.823.9969
E: help@amplify.com
S: amplify.com/support/
Textbook Title(s):
NA

op is for only)

Join Amplify Science Schoology Group

To join Amplify Science Schoology
ES Group: W4PK-W466-63F5B

Navigation Temperature Check

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

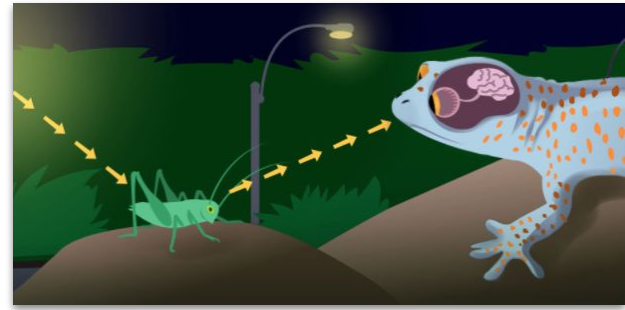
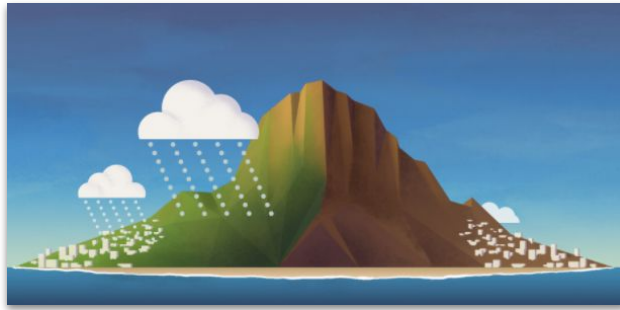
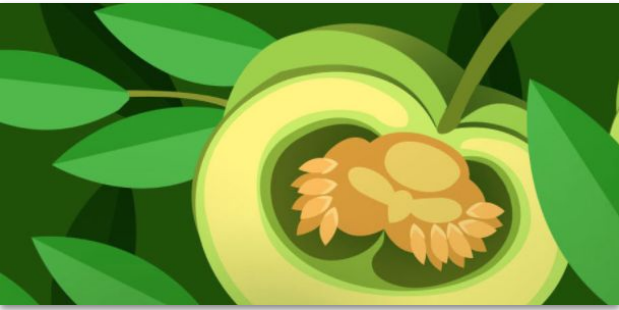
1 = Extremely Uncomfortable

2 = Uncomfortable

3 = Mild

4 = Comfortable

5 = Extremely Comfortable



Plan for the day

- Introduction
- Assessment System
- Progress Build
- Assessments
- Model Lesson
- Planning
- Closing

Overarching goals

- ❑ Describe the structure and purpose of the Amplify Science Assessment System
- ❑ Plan for the strategic use of assessment resources to analyze and respond to student work

Let's connect
this goal to
our students



Norms: Establishing a culture of learners

- **Take risks:** Ask any questions, provide any answers.
- **Participate:** Share your thinking, participate in discussion and reflection.
- **Be fully present:** Unplug and immerse yourself in the moment.
- **Physical needs:** Stand up, get water, take breaks.

Opening reflection

Why do we assess our students?

What is **challenging** about assessing our students?



Participant Notebook

<http://bit.ly/3VpDp0t>

Opening Reflection: Assessment

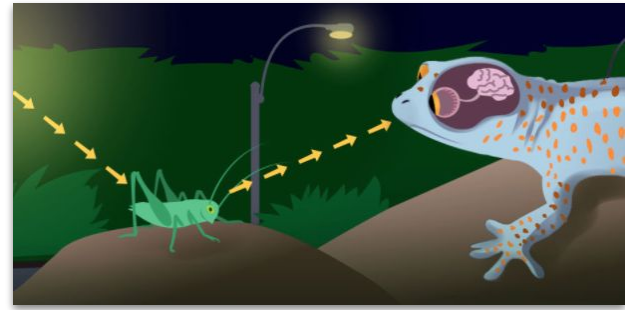
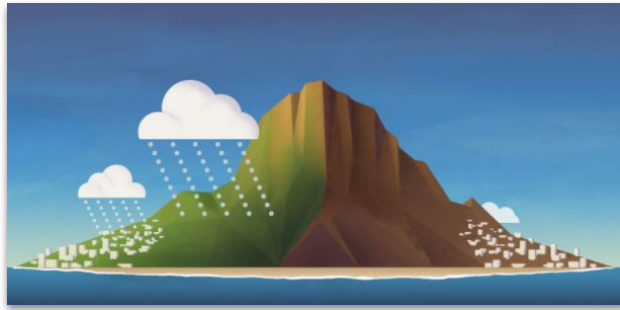
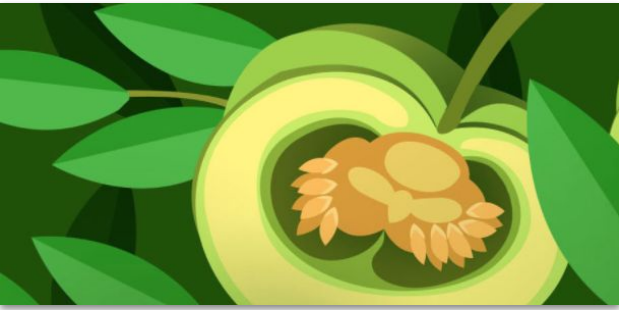


Why do we assess our students?



Why do we assess our students?



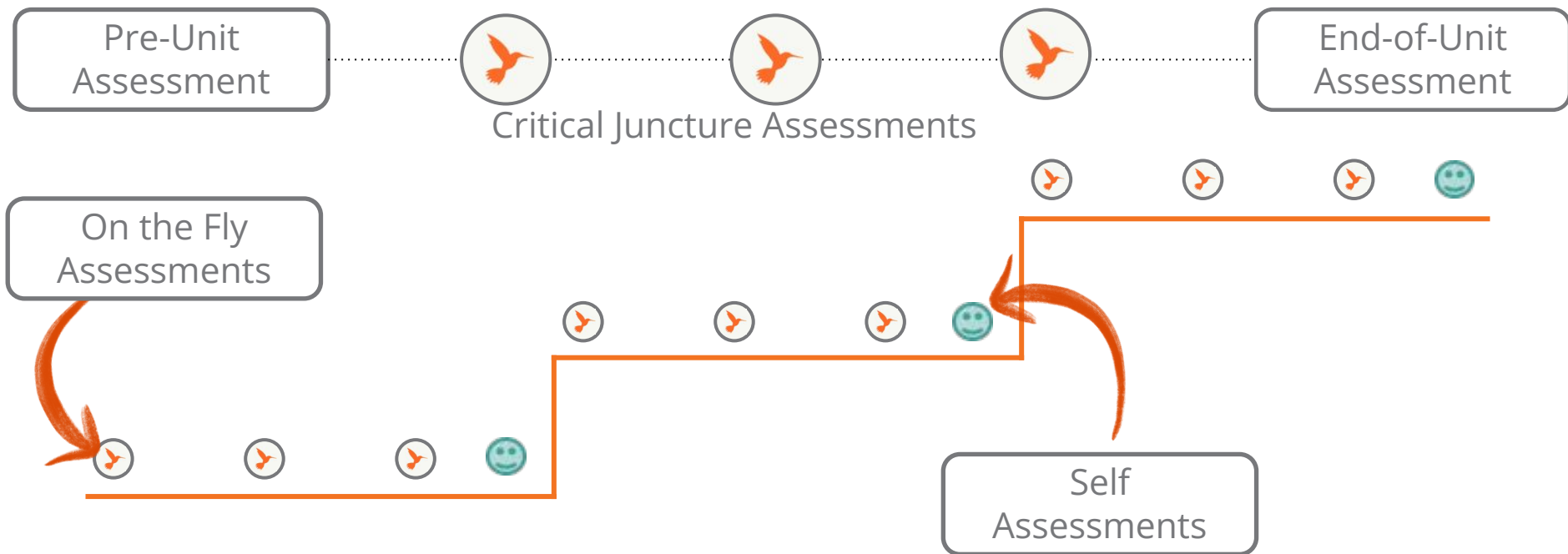


Plan for the day

- Introduction
- **Assessment System**
- Progress Build
- Assessments
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- Planning
- Closing

K-5 Assessment System

Pg. 4



Assessment System Document

Modeling Matters

22 Lessons

Modeling Matter

Printable Teacher Guide

Unit Overview

Chapters

Printable Resources

Planning for the Unit ^

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

Embedded Formative Assessments

Books in This Unit

Apps in This Unit

Opportunities for Unit Extensions

Offline Preparation

Unit Overview

What's in This Unit?

Most people's greatest exposure to physical and chemical changes—at least those changes that are easily discernible—is through food and cooking. Like most everything else, foods are comprised mostly of mixtures, and the kitchen is the locale where we separate, dissolve, cool, heat, whip, emulsify, and further transform foods for some desired outcome. While experimenting with foods and their transformation has been happening since the dawn of humans, it has only been in the past century or so that food scientists have worked to apply scientific principles in order to better understand food. Food scientists work to ensure that the

Read more >

Chapters

Chapter 1: Why did the food coloring separate into different dyes? ⓘ

LESSON 1.1
Pre-Unit Assessment

LESSON 1.2
Introducing Food Science

LESSON 1.3
Made of Matter

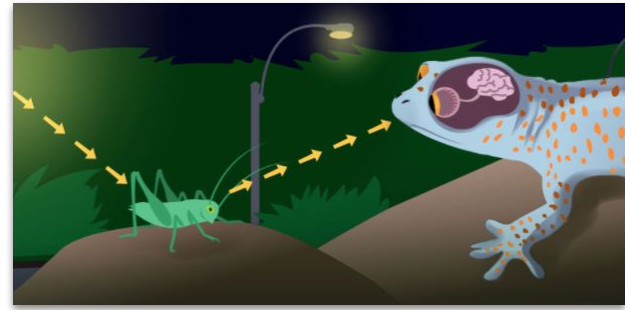
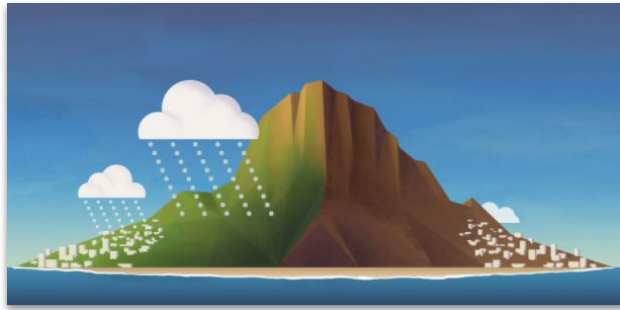
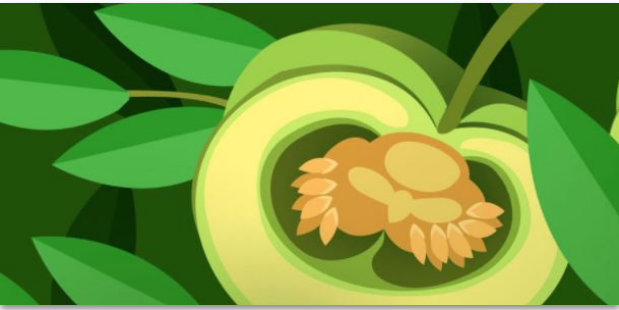
LESSON 1.4
Separating a Food-Coloring Mixture

LESSON 1.5
Exploring Another Model of Chromatography

LESSON 1.6
Nanovision Models of Chromatography

Questions?





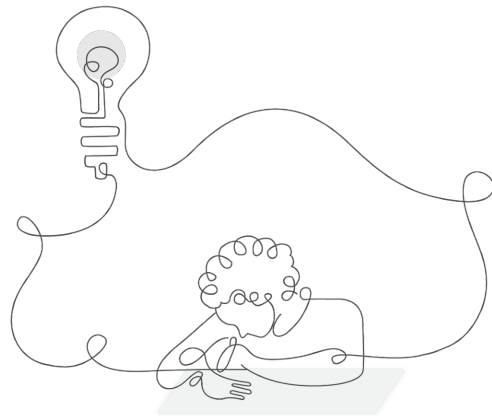
Plan for the day

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Reviewing the unit phenomenon

Modeling Matter

Amplify Science units are designed around complex phenomena that drive student learning through the unit.



Modeling Matter

Problem: Why is the food coloring from Good Food Production, Inc. not exactly the same as Red Dye #75 and may include a harmful dye?

Role: Food Scientists

Students engage in two investigations, one to identify a potentially hazardous food dye in a mixture, and the other to create a good-tasting and visually appealing salad dressing that does not separate into layers and contains no sediment.

Modeling Matter

Unit Question:

What happens when two substances are mixed together?

Students will understand that there is a connection between the observable properties of materials and the properties of the molecules of which those materials are composed. They will also be able to explain a variety of things that can happen when two substances are mixed, at both the observable scale and the nanoscale.

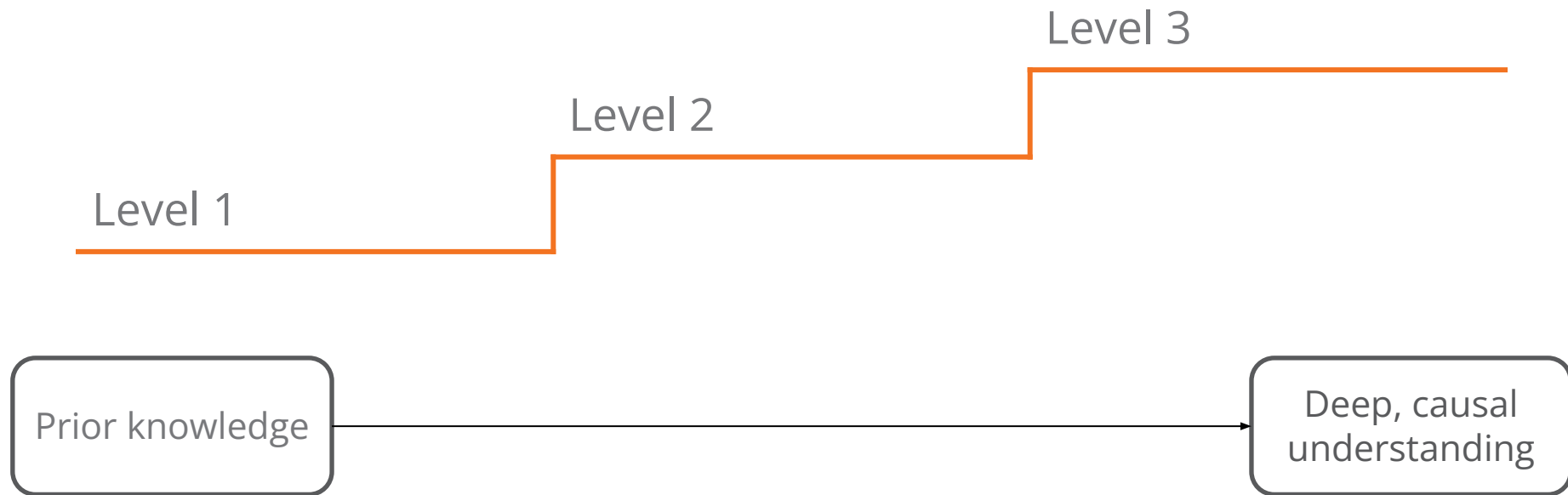
Explaining the phenomenon: Science Concepts

What **science concepts** do you think students need to understand in order to **explain the phenomenon**?

Progress Build

A unit-specific learning progression

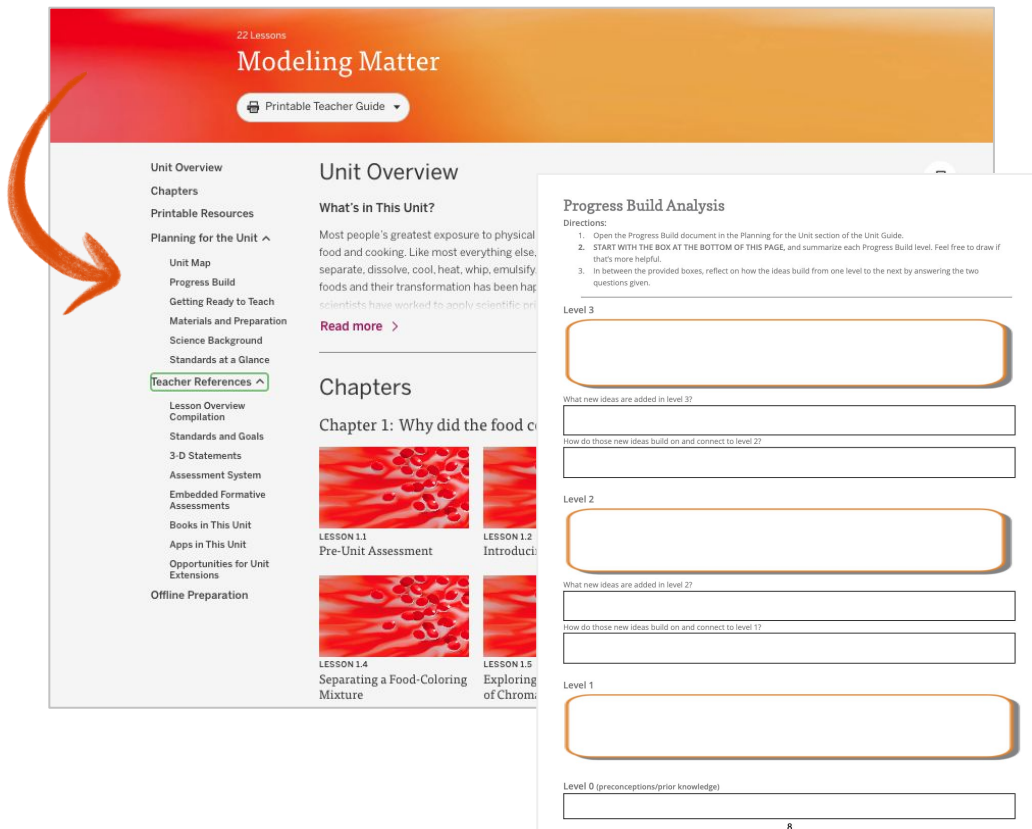
Pg. 4



Progress Build analysis

Work time

Read and analyze your unit's Progress Build.



22 Lessons

Modeling Matter

Printable Teacher Guide

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Planning for the Unit

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- Materials and Preparation
- Science Background
- Standards at a Glance
- Teacher References**

Unit Overview

What's In This Unit?

Most people's greatest exposure to physical food and cooking. Like most everything else, separate, dissolve, cool, heat, whip, emulsify foods and their transformation has been happening. Scientists have worked to apply scientific principles to the kitchen.

[Read more](#)

Chapters

Chapter 1: Why did the food change?

LESSON 1.1
Pre-Unit Assessment

LESSON 1.2
Introduction

LESSON 1.4
Separating a Food-Coloring Mixture

LESSON 1.5
Exploring of Chromatography

Progress Build Analysis

Directions:

1. Open the Progress Build document in the Planning for the Unit section of the Unit Guide.
2. **START WITH THE BOX AT THE BOTTOM OF THIS PAGE**, and summarize each Progress Build level. Feel free to draw if that's more helpful.
3. In between the provided boxes, reflect on how the ideas build from one level to the next by answering the two questions given.

Level 3

What new ideas are added in level 3?

How do those new ideas build on and connect to level 2?

Level 2

What new ideas are added in level 2?

How do those new ideas build on and connect to level 1?

Level 1

What new ideas are added in level 1?

How do those new ideas build on and connect to level 0?

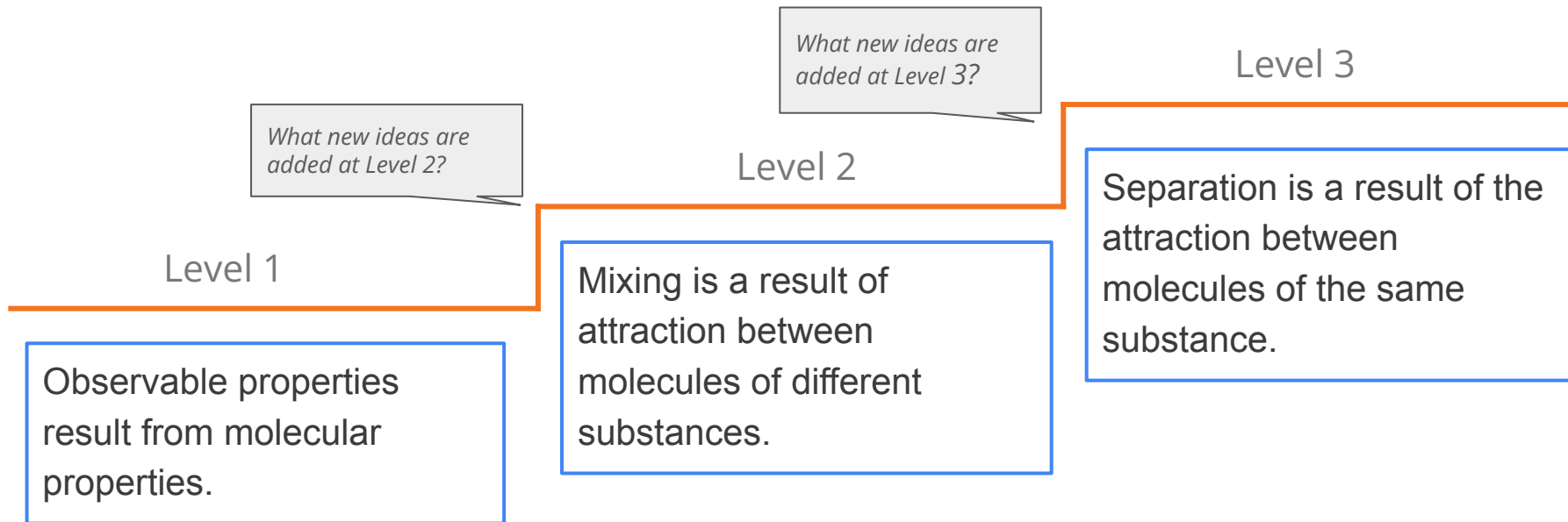
Level 0 (preconceptions/prior knowledge)

8

Progress Build

Modeling Matter

Assumed prior knowledge (preconceptions): Students are likely to have encountered the idea that matter is made up of particles that are too small to see individually. They will also likely recognize that there exist different materials that have different characteristics.



Logging in (demo account)

Safari or Chrome

1. Go to **learning.amplify.com**
2. Select **Log in with Google**
3. If you're already logged in with other Google accounts, click **Use another account**
4. Enter teacher demo account credentials

- xxxxxxxx@pd.tryamplify.net
- Password: xxxx

Steps 1-2

Welcome to **Amplify**

G Log In with Google

C Log In with Clever

A. Log In with Amplify

SSO login

Step 3

Choose an account to continue to Amplify Curriculum Delivery Application

T Teacher Lambertsen
t.lambertsen@tryamplify.net

S Sophia Lambertsen
slambertsen@tryamplify.com

U Use another account

To continue, Google will share your name, email address, language preference, and profile picture with Amplify Curriculum Delivery Application. Before using this app, you can review Amplify Curriculum Delivery Application's [privacy policy](#) and [terms of service](#).

Step 4

Sign in with Google

Sign in to continue to Amplify Curriculum Delivery Application

Email or phone

Forgot email?

To continue, Google will share your name, email address, language preference, and profile picture with Amplify Curriculum Delivery Application. Before using this app, you can review Amplify Curriculum Delivery Application's [privacy policy](#) and [terms of service](#).

Create account Next

Sign in with Google

Hi Teacher
nationalsci20@pd.tryamplify.net

Enter your password

☐ Show password

To continue, Google will share your name, email address, language preference, and profile picture with Amplify Curriculum Delivery Application. Before using this app, you can review Amplify Curriculum Delivery Application's [privacy policy](#) and [terms of service](#).

Forgot password? Next

Progress Build analysis

Group work time

- With your group or partner, create a visual representation of one level of the progress build.

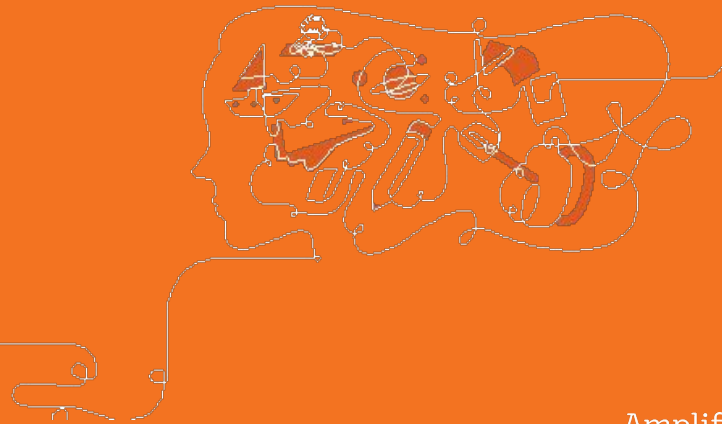


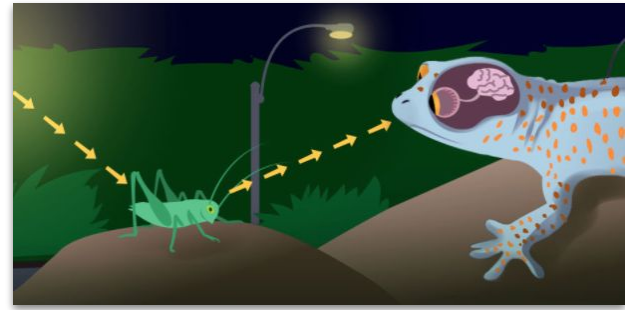
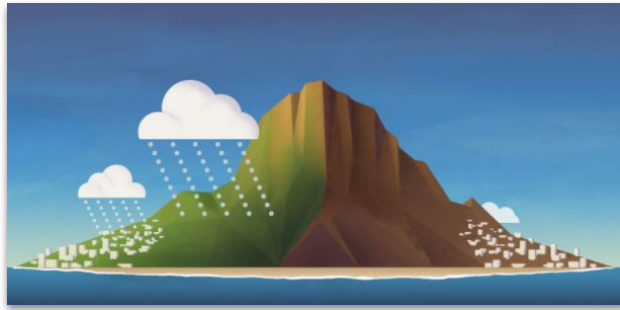
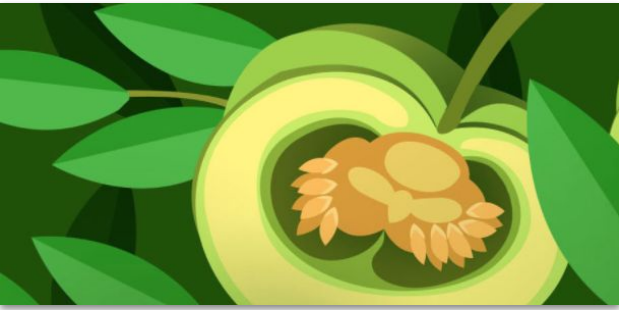
Progress Build analysis

Gallery Walk



Break

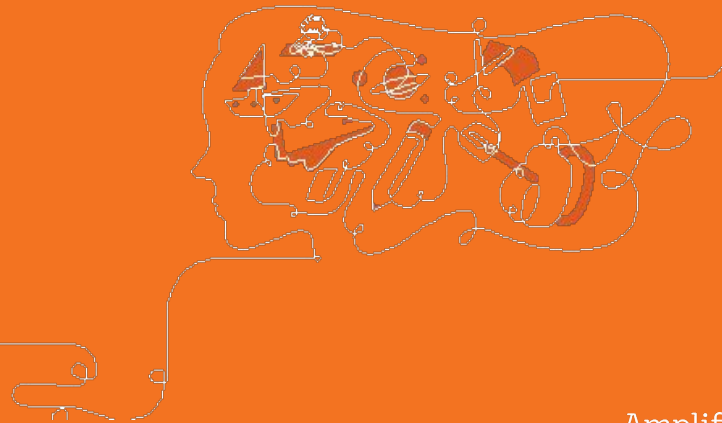




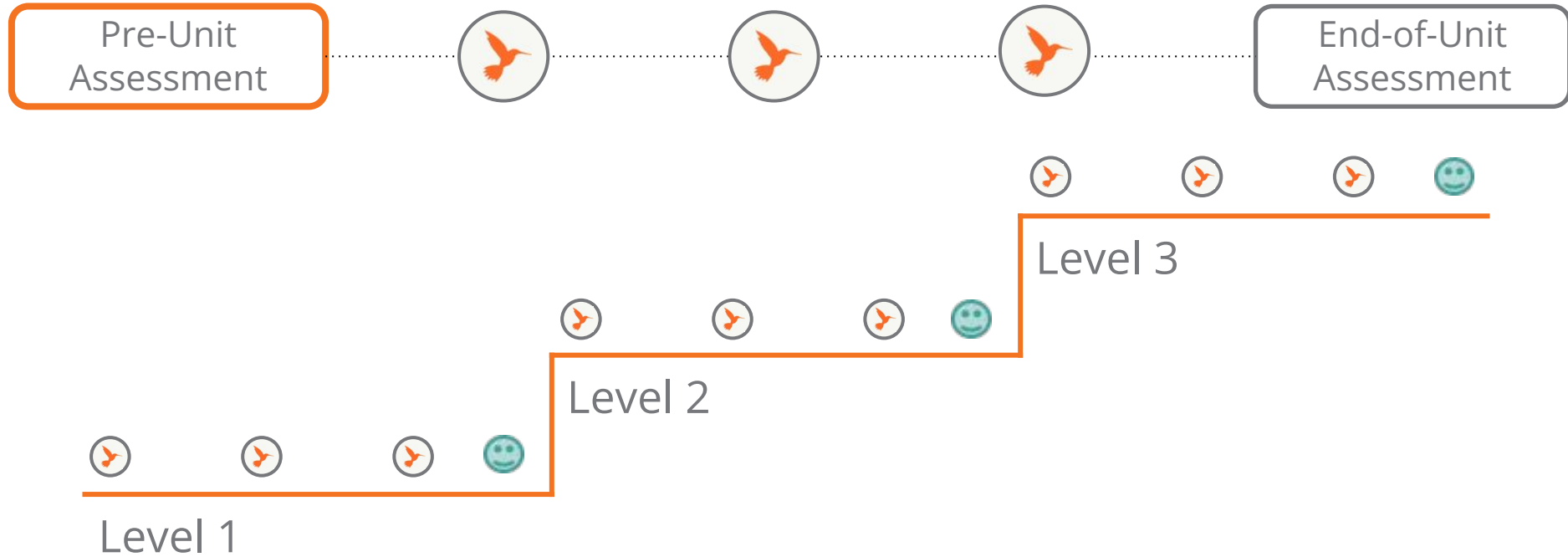
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Pre-Unit Assessment



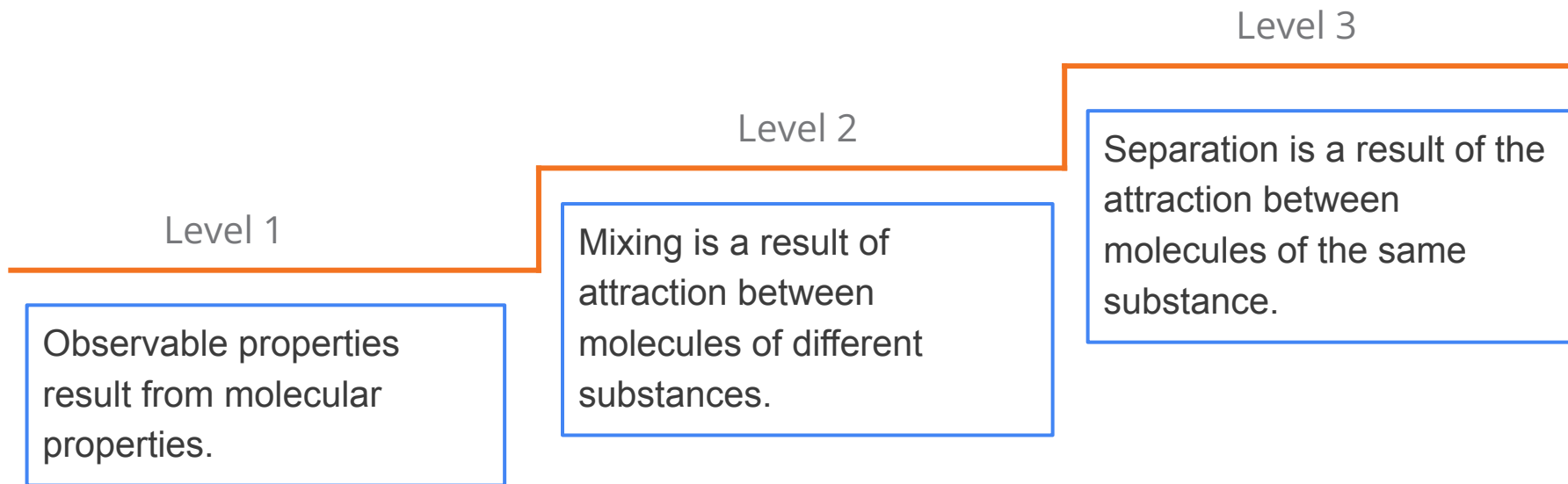
Pre-Unit Assessment



Progress Build

Modeling Matter

Assumed prior knowledge (preconceptions): Students are likely to have encountered the idea that matter is made up of particles that are too small to see individually. They will also likely recognize that there exist different materials that have different characteristics.



Pre-Unit Assessment

Lesson 1.1

Locate the Assessment Guide in Lesson 1.1 of your unit and skim it.

Open up the classroom slides and see how the pre-unit assessment is embedded in the lesson.

Lesson 1.1:
Pre-Unit Assessment

[Printable Lesson Guide](#)

4 READING: Providing the Context of Food Science

RESET LESSON

Overview

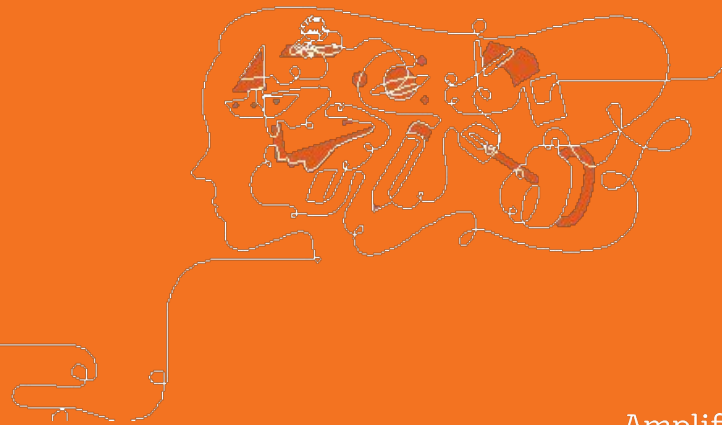
Students' Initial Explanations

Students are introduced to the *Modeling Matter: The Chemistry of Food* unit and are invited to think about the kinds of work that food scientists do. Then, students write their initial explanations about why two different substances mixed into two separate containers of the same liquid behaved differently. Figuring out, on a molecular level, why and how mixtures can separate or mix is the central phenomenon students will solve in this unit. The explanations they provide in this lesson serve as a Pre-Unit Assessment for formative purposes, designed to reveal students' initial understanding of the unit's core content—both unit-specific science concepts and the crosscutting concept of Scale, Proportion, and Quantity—prior to instruction. As such, students' explanations offer a baseline from which to measure growth of understanding over the course of the unit. These explanations can also provide the teacher with insight into students' thinking as they begin this unit. This three-dimensional assessment will allow the teacher to draw connections to students' experiences and to watch for preconceptions that might get in the way of students' understanding. In this lesson, students also receive their Investigation Notebooks and learn some of the ways that scientists use notebooks. Finally, students learn more about what food scientists do by reading the introduction to *Food Scientists's Handbook*, a reference book they will use throughout the unit.

Digital Resources

- Classroom Slides 1.1 | PowerPoint
- Classroom Slides 1.1 | Google Slides
- All Projections
- Pre-Unit Writing: Explaining Mixtures copymaster
- Assessment Guide: Interpreting Students' Pre-Unit Explanations About Mixtures
- Investigation Notebook
- Questioning Strategies for Grades 2-5
- Modeling Matter Family Connections Homework
- Crosscutting Concept Tracker
- Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds

Formative Assessments



K-5 Assessment System



Formative Assessment Document

Modeling Matters

22 Lessons

Modeling Matter

Printable Teacher Guide

Unit Overview

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Read more >

Chapters

Chapter 1: Why did the food coloring separate into different dyes? ⓘ

LESSON 1.1
Pre-Unit Assessment

LESSON 1.2
Introducing Food Science

LESSON 1.3
Made of Matter

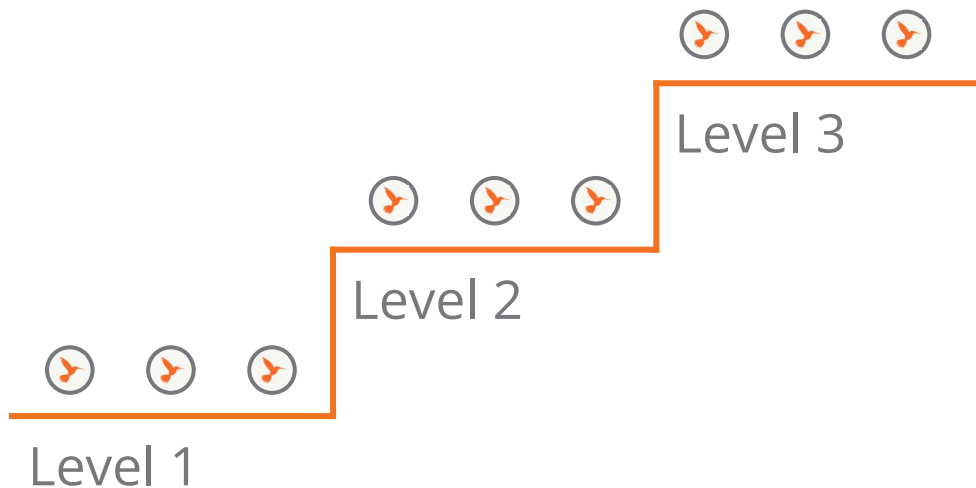
LESSON 1.4
Separating a Food-Coloring Mixture

LESSON 1.5
Exploring Another Model of Chromatography

LESSON 1.6
Nanovision Models of Chromatography

On-the-Fly Assessments

- Track student progress within a Progress Build level
- Embedded into instruction
- Assessment resource includes “Look for” and “Now what”
- Incremental build towards the Critical Juncture



Formative assessment information

Locating assessment resources

Full text of assessment

- Embedded Formative Assessments document
- Instructional guide
- Classroom Slides notes

The screenshot displays the Learning Amplify web interface. At the top, a navigation bar includes a 'Lesson Brief (4 Activities)' tab and a sequence of numbered activity tabs: 1. TEACHER-LED DISCUSSION: How Do Plants Get Water and Sunlight?, 2. HANDS-ON: Exploring Roots and Leaves, 3. HANDS-ON: Measuring Roots and Leaves, and 4. STUDENT-TO-STUDENT DISCUSSION: Debriefing Plant Parts. The fourth tab is currently selected. Below the tabs, the title 'Debriefing Plant Parts' is shown, followed by a description: 'Students share their observations and discuss initial ideas about how plants get their parts to get sunlight and water to grow. (15 min)'. To the right of the description are two icons: 'EMBEDDED FORMATIVE ASSESSMENT' and 'INSTRUCTIONAL GUIDE'. Below this is a navigation bar with three tabs: 'Step-by-step' (which is active), 'Teacher Support', and 'My Notes'. The main content area under 'Step-by-step' contains the following text:

1. Debrief student observations. Solicit students' observations about leaves and roots.

What did you observe about the leaves? What was similar or different between the leaves of different plants?

What did you observe about the roots? What was similar or different between the roots of different plants?

Accept all responses. Prompt students to describe the plant parts in detail, including their shape and color.

2. Introduce evidence. Post the evidence vocabulary card.

We think that roots and leaves look different on different plants. We think this because we observed different plants and saw that the shape and size of roots and leaves of different plants are different.

What we observed is our evidence. Evidence is information that supports an answer to a question.

3. Remind students of the Think-Draw-Pair-Share routine and explain directions. Remind students about the purpose for the Roots and Leaves Investigation. Let students know that they will now use the Think-Draw-Pair-Share routine to discuss their ideas about what the roots and leaves might do for a plant. Remind them that you'll ask a question, and they will follow four steps.

- **Think.** After you ask a question, you'll say, "Think," and students will think silently about the question for about 1 minute.
- **Draw.** When you say, "Draw," students will draw in their notebooks.
- **Pair.** When you say, "Pair," students will discuss their ideas and drawings with their partners.
- **Share.** When you say, "Share," students will stop talking and raise their hands to share an idea—their own idea or their partner's idea—with the class.

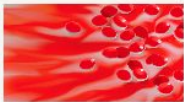
4. Project notebook page 26. Have students turn to page 26. Think-Draw-Pair-Share: What Do Plant Parts Do? in their notebooks.

On The Fly Assessment

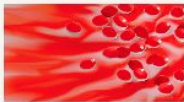
Lesson 1.4

Chapters

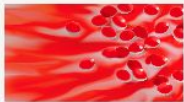
Chapter 1: Why did the food coloring separate into different dyes? ⓘ




LESSON 1.1




LESSON 1.2



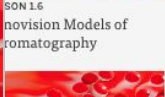
LESSON 1.3




LESSON 1.4



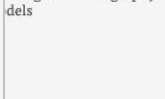
LESSON 1.5



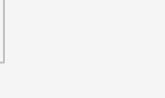
LESSON 1.6



LESSON 1.7



LESSON 1.8



LESSON 1.9

Side of Matter

Revision Models of chromatography

Revising Chromatography Models

Digital Resources

- Classroom Slides 1.4 | PowerPoint
- Classroom Slides 1.4 | Google Slides
- All Projections
- Classroom Videos 1.4 | Zip

Lesson 1.4: Separating a Food-Coloring

Science California > Modeling Matter > Lesson 1.4

Lesson Brief (5 Activities)	1 TEACHER-LED DISCUSSION Introducing the Hermit Crab Dye Context	2 HANDS-ON Separating the Food Coloring	3 HANDS-ON Making the Pasta Model	4 TEACHER-LED DISCUSSION Discussing Chromatography Results	5 WRITING Writing About Molecules
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Writing About Molecules

Students discuss the ways in which molecules can be different and similar and then write about their ideas. (15 min)

On-the-Fly Assessment 3: Students' Ideas About Molecules

ON THE FLY ASSESSMENT

EMBEDDED FORMATIVE ASSESSMENT

INSTRUCTIONAL GUIDE

dyes. Chromatography is a separation technique that involves having a solvent (in this case, water) travel up a medium (in this case, paper) through a test mixture (in this case, food coloring). Different

Chromatography

Embedded Formative Assessment

On-the-Fly, Lesson 1.4




Look for: Some students may express alternate conceptions about molecules. For example, it is common for students to think that molecules are shaped exactly like some of the models they've seen, or that molecules have different colors. Make a note of any students who seem to have these ideas based on the Shared Listening discussion as well as on their written responses.

Now what? When a student expresses an incorrect idea, there is no need to correct or contradict. Instead, ask that student to describe evidence that supports his view. Then, ask students who have other ideas to describe what they think happened and elicit how their evidence supports their ideas. A major goal of the unit is for students to revise their ideas about molecules as they gather more information and evidence. Therefore, you can make note of students' alternate conceptions but resist the natural temptation to correct students at this point.

Classroom slides

Lesson 1.4



Lesson 1.4:
Separating a Food-Coloring Mixture

Printable Lesson Guide

3 HANDS-ON Making the Pasta Model

4 TEACHER-LED DISCUSSION Discussing Chromatography Results

5 WRITING Writing About Molecules

RESET LESSON

Overview

Materials & Preparation

Differentiation

Standards

Vocabulary

Unplugged?

Overview

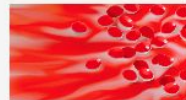
Students are introduced to their first official assignment as food scientists—to identify whether Good Food Production, Inc.'s food coloring contains a potentially harmful dye. The class observes how water "climbs" a paper strip, and then students use the technique of chromatography to separate the food coloring into its component dyes. Chromatography is a separation technique that involves having a solvent (in this case, water) travel up a medium (in this case, paper) through a test mixture (in this case, food coloring). Different

Digital Resources

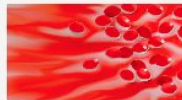
- Classroom Slides 1.4 | PowerPoint
- Classroom Slides 1.4 | Google Slides
- Classroom Videos 1.4 | Zip

Chapters

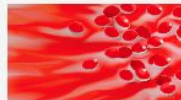
Chapter 1: Why did the food coloring separate into different dyes? ⓘ



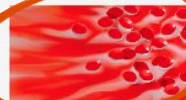
LESSON 1.1
Pre-Unit Assessment



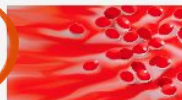
LESSON 1.2
Introducing Food Science



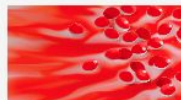
LESSON 1.3
Made of Matter



LESSON 1.4
Separating a Food-Coloring Mixture



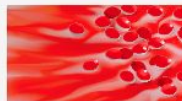
LESSON 1.5
Exploring Another Model of Chromatography



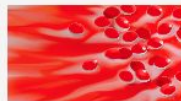
LESSON 1.6
Nanovision Models of Chromatography



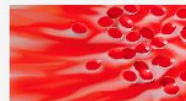
LESSON 1.7
Break It Down



LESSON 1.8
Evaluating Chromatography Models



LESSON 1.9
Revising Chromatography Models



LESSON 1.10
Explaining Chromatography

Shared Listening Question 1:



What are some ways that **molecules** can be **different** from one another?

Shared Listening Question 1:



What are some ways that **molecules can be different** from one another?

On-the-Fly Assessment 3:**Students' Ideas About Molecules**

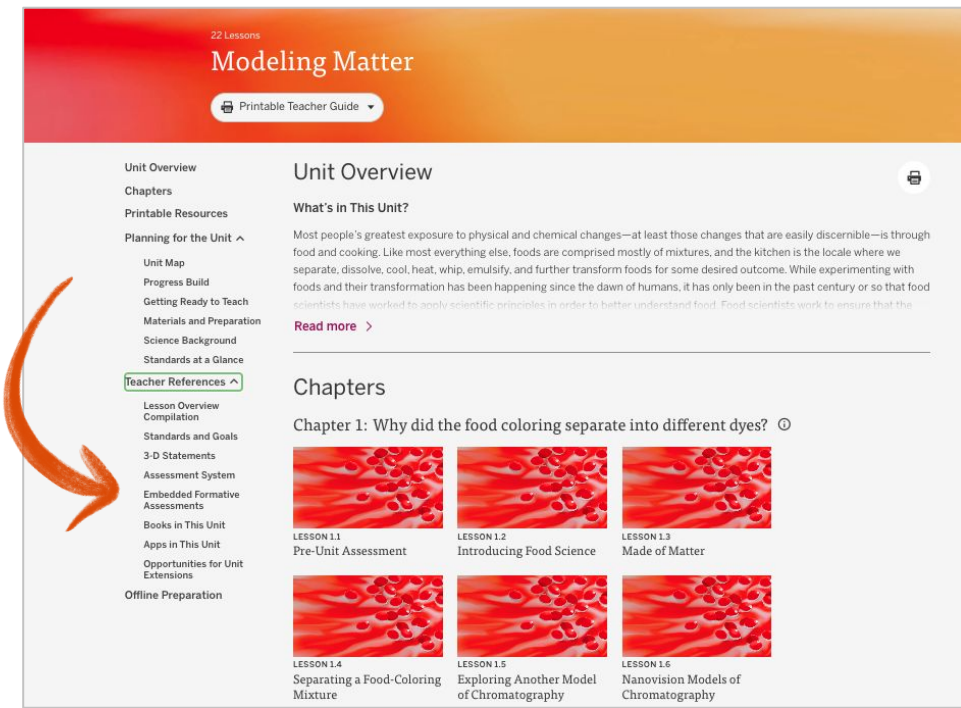
Look for: Some students may express alternative conceptions about molecules. For example, it is common for students to think that molecules are shaped exactly like some of the models they've seen, or that molecules have different colors. Make a note of any students who seem to have these ideas based on the Shared Listening discussion as well as on their written responses.

Now what? When a student expresses an incorrect idea, there is no need to correct or contradict. Instead, ask that student to describe evidence that supports his view. Then, ask students who have other ideas to describe what they think happened and elicit how their evidence supports their ideas. A major goal of the unit is for students to revise their ideas about molecules as they gather more information and evidence. Therefore, you can make note of students' alternative conceptions but resist the natural temptation to correct students at this point.

On the Fly Assessment

Work time

- Explore the On-the- Fly Assessments



The screenshot shows the 'Modeling Matter' unit page. The header is orange with '22 Lessons' and 'Modeling Matter' text, and a 'Printable Teacher Guide' button. The left sidebar lists navigation options: Unit Overview, Chapters, Printable Resources, Planning for the Unit (with a dropdown arrow), Unit Map, Progress Build, Getting Ready to Teach, Materials and Preparation, Science Background, Standards at a Glance, Teacher References (highlighted with a green box and a red arrow), Lesson Overview, Compilation, Standards and Goals, 3-D Statements, Assessment System, Embedded Formative Assessments, Books in This Unit, Apps in This Unit, Opportunities for Unit Extensions, and Offline Preparation. The main content area is titled 'Unit Overview' and includes a 'What's in This Unit?' section with a paragraph about food science and a 'Read more' link. Below this is a 'Chapters' section titled 'Chapter 1: Why did the food coloring separate into different dyes?' followed by a grid of six lesson thumbnails, each with a red background and white text: LESSON 1.1 Pre-Unit Assessment, LESSON 1.2 Introducing Food Science, LESSON 1.3 Made of Matter, LESSON 1.4 Separating a Food-Coloring Mixture, LESSON 1.5 Exploring Another Model of Chromatography, and LESSON 1.6 Nanovision Models of Chromatography.

Example assessment (On-the-Fly, Lesson 1.4)


Reflection

- What **data** can a teacher collect from this activity?
- What can a teacher **do** with this information?

Lesson 1.4: Separating a Food-Coloring Mixture

Activity 5

Shared Listening Question 1:



What are some ways that **molecules can be different** from one another?

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ON-THE-FLY

Formative Assessment Resource

Lesson 1.4, Activity 5



On-the-Fly Assessment 3: Students' Ideas About Molecules

Look for 1

Look for 2

Look for: Some students may express **alternate conceptions about molecules**. For example, it is common for students to think that molecules are shaped exactly like some of the models they've seen, or that molecules have different colors. Make a note of any students who seem to have these ideas based on the Shared Listening discussion as well as on their written responses.

Now what? When a student expresses an incorrect idea, there is no need to correct or contradict. Instead, ask that student to describe evidence that supports his view. Then, ask students who have other ideas to describe what they think happened and elicit how their evidence supports their ideas. A major goal of the unit is for students to revise their ideas about molecules as they gather more information and evidence. Therefore, you can make note of students' alternate conceptions but resist the natural temptation to correct students at this point.

Formative assessment information

Possible student responses

- Within assessments:
 - “Look fors” (OtF)
 - “Assess Understanding” (CJ)
- Possible responses within the Instructional Guide
- Digital resources
 - Assessment Guides
 - Teacher References

The screenshot shows a digital instructional guide interface. At the top, a horizontal navigation bar contains five tabs: 'Lesson Brief (5 Activities)', '1 TEACHER-LED DISCUSSION Introducing the Harmful-Dye Context', '2 HANDS-ON Separating the Flood Coloring', '3 HANDS-ON Mixing the Parts Model', '4 TEACHER-LED DISCUSSION Discussing Chromatography Results', and '5 WRITING Writing About Molecules'. The '5 WRITING' tab is selected and highlighted with a red underline. Below the navigation bar, the main content area is titled 'Writing About Molecules'. Underneath the title, it says 'Students discuss the ways in which molecules can be different and similar and then write about their ideas. (15 min)'. To the right of this text are two icons: 'EMBEDDED FORMATIVE ASSESSMENT' and 'INSTRUCTIONAL GUIDE'. Below the title and description, there is a horizontal menu with four tabs: 'Step-by-step', 'Teacher Support', 'Possible Responses', and 'My Notes'. The 'Possible Responses' tab is circled in red. The main content area below the menu displays the 'Step-by-step' instructions for the writing activity, which include: '1. Frame the discussion.', '2. Remind the class of the Shared Listening routine.', and '3. Conduct Shared Listening.'.

Collecting formative assessment data

Create a system that's easy for you to use.

Grade :

Lesson

Look for 1:

Look for 2:

[illegible]

K-1 Clipboard Assessment Tool

The Clipboard Assessment Tool offers a support for collecting data for the On-the-Fly and Critical Juncture Assessments that align to each Progress Build level in the unit.

Chapter 3: Clipboard Assessment Tool

x = incorrect
✓ = correct

Progress Build Level 2: The longer that sunlight shines on the surface, the warmer it gets.

Question to ask students	Students who understand...
Lesson 3.3, Activity 4: Why is the playground surface warmer in the afternoon than it was in the morning?	should say that it is warmer because <u>sunlight has been shining on it for a long or longer time</u> (than in the morning).
Lesson 3.4, Activity 1: Has the sunlight been shining on the rock for a longer time in this picture than in the other one, or for a shorter time?	should walk to the <u>shorter</u> yard if the picture shows the surface when it is cooler than in the other picture, or walk to the <u>longer</u> yard if the picture shows the surface when it is warmer than in the other picture.
Lesson 3.4, Activity 2: Walk to the time of day when: • ① the surface is cold. • ② the surface is warm. • ③ the surface is hot. • ④ sunlight is not shining on the surface. • ⑤ sunlight has been shining on the surface for a long time. • ⑥ sunlight has been shining on the surface for a short time.	<p>① should walk to <u>nighttime</u>. ② should walk to <u>morning</u>. ③ should walk to <u>afternoon</u>. ④ should walk to <u>nighttime</u>.</p> <p>⑤ should walk to <u>afternoon</u>. ⑥ should walk to <u>morning</u>.</p> <p>M = Morning A = Afternoon N = Nighttime</p>

3 Images
1. Lizard (L)
2. Feet (F)
3. Chocolate (C)

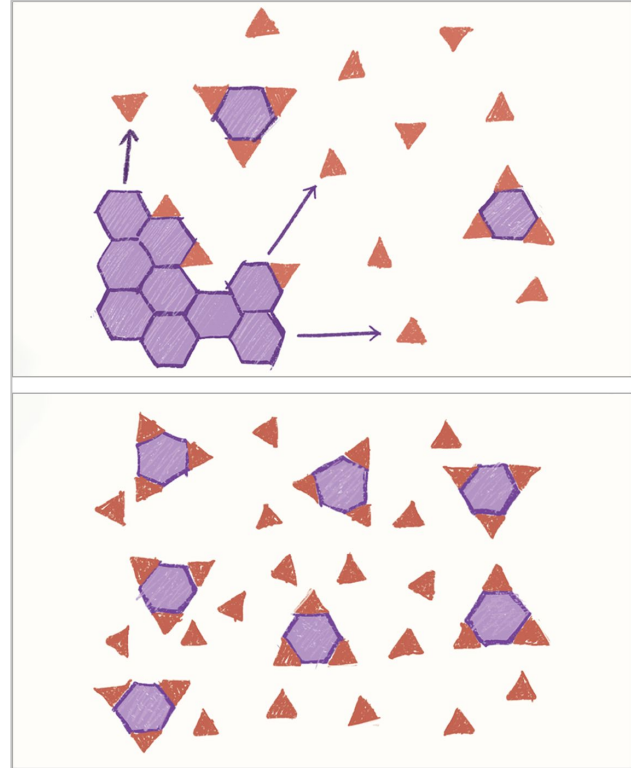
Student's name	Notes	* CJ * 2	
		Lesson 3.4, Act 1	Lesson 3.4, Act 2
Student A	"There are no clouds in the sky."	L = x F = x C = x	① x M ④ x M ② x N ⑤ x N ③ ✓ ⑥ ✓
Student B	"Because kids played on it."	L = x F = x C = x	① x M ④ ✓ ② x N ⑤ x N ③ ✓ ⑥ ✓
Student C		L = ✓ F = x C = ✓	① ✓ ④ ✓ ② x A ⑤ ✓ ③ ✓ ⑥ ✓

Additional formative assessment information

On-the-Fly Assessments

In addition to assessing concepts in the Progress Build, some On-the-Fly Assessments provide data about:

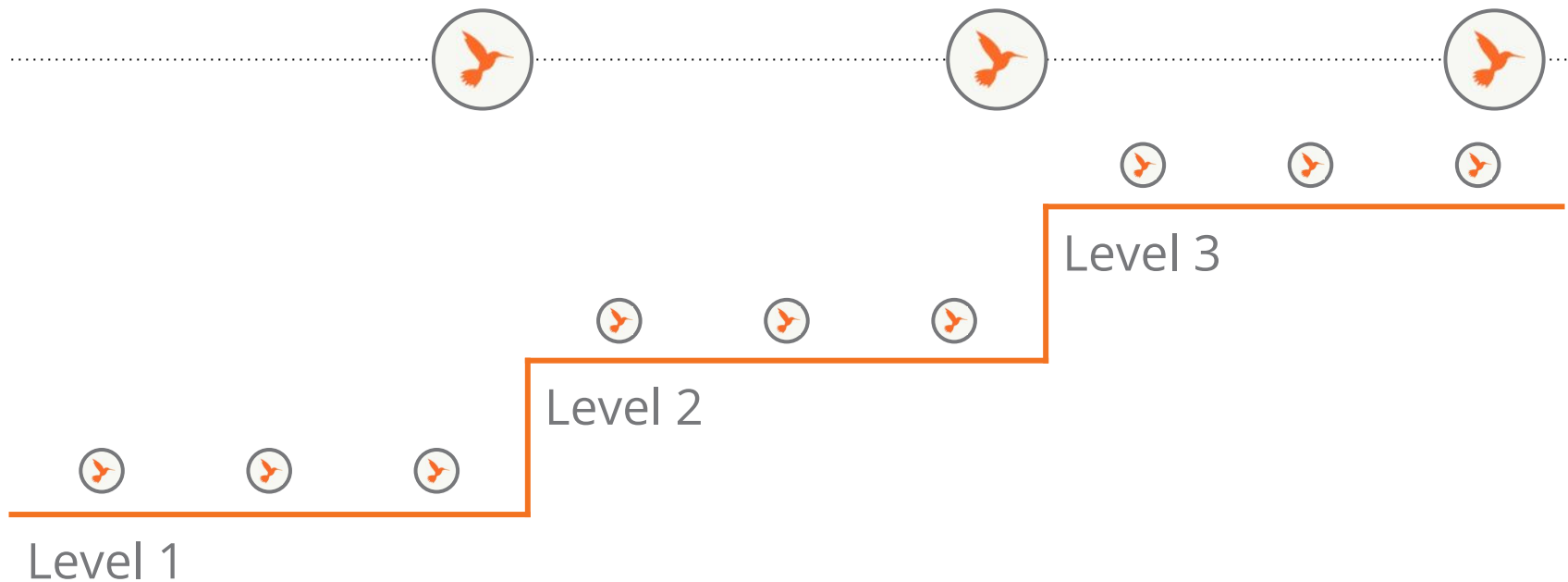
- Science and Engineering Practices
- Crosscutting Concepts
- Literacy skills
- Student collaboration



Questions?

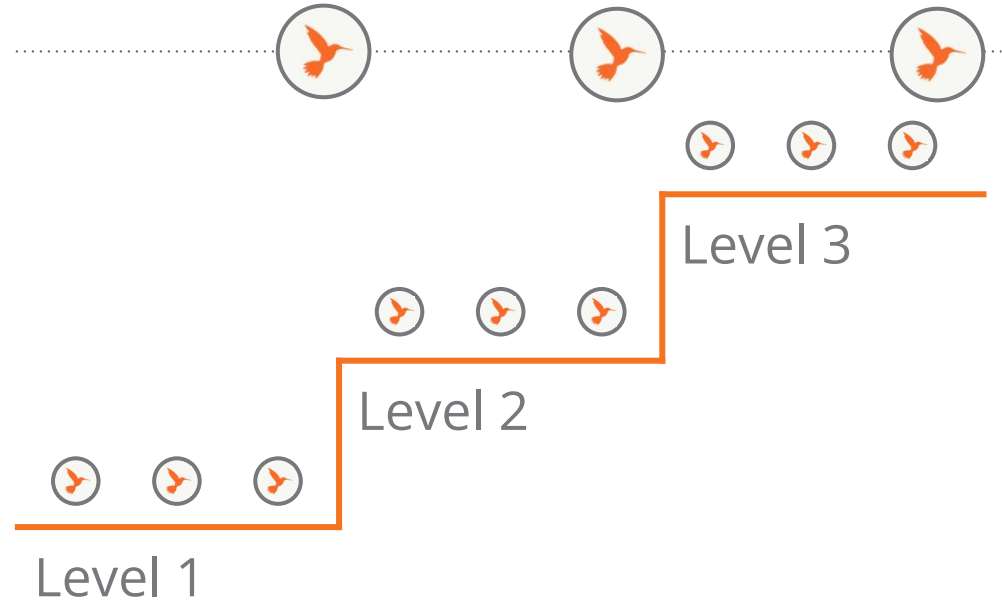


Critical Juncture Assessments

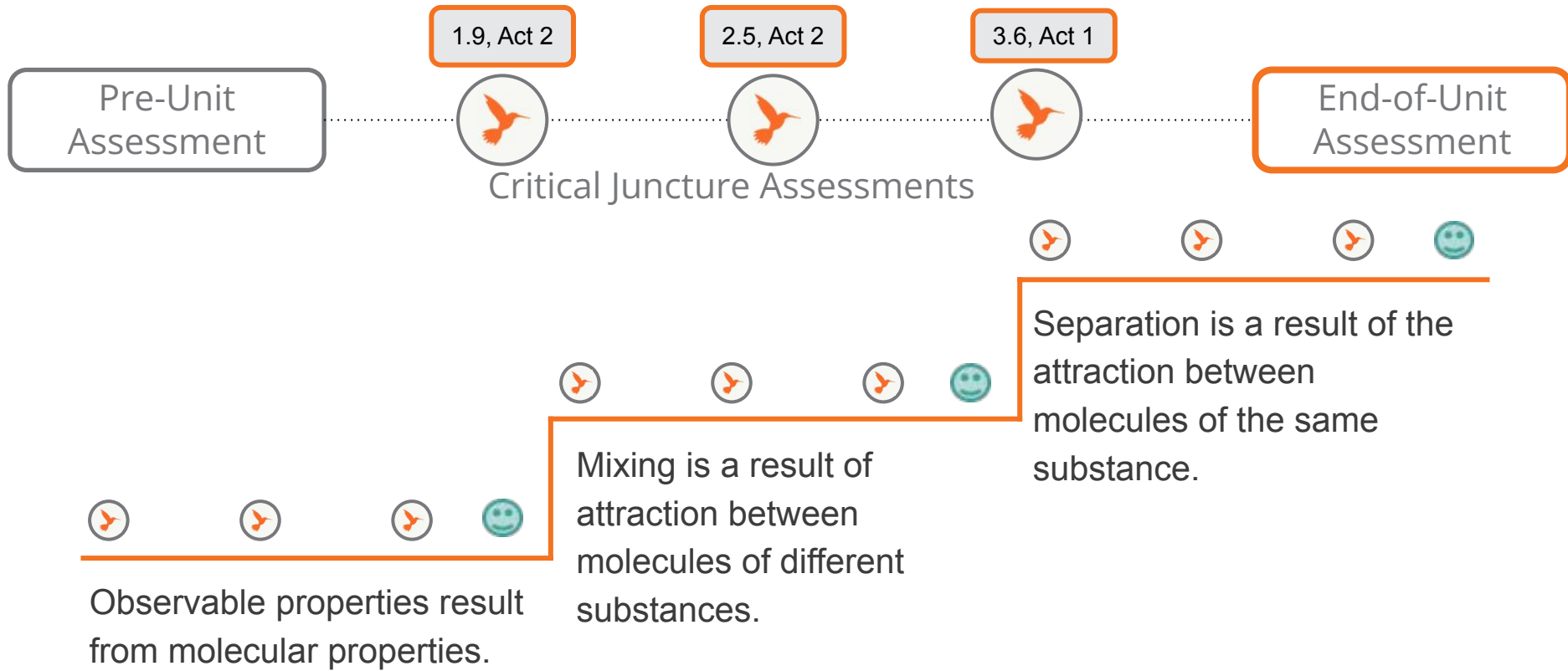


Critical Juncture Assessments

- Track student progress between Progress Build levels
- Embedded into instruction
- Assessment resource includes “Assess Understanding” and “Tailor Instruction”



K-5 Assessment System



Critical Juncture Assessment

Lesson 1.9, Activity 2

The screenshot displays the Critical Juncture Assessment interface for Lesson 1.9, Activity 2. The interface is divided into several sections:

- Unit Overview:** Includes links for Chapters, Printable Resources, Planning for the Unit (Unit Map, Progress Build, Getting Ready to Teach, Materials and Preparation, Science Background, Standards at a Glance), and Teacher References (Lesson Overview, Compilation, Standards and Goals).
- Chapters:** Lists chapters from 1.1 to 1.6, each with a corresponding image of red spheres. Chapter 1.9 is highlighted with an orange circle.
- Lesson 1.9: Revising Chromatography Models:** The main title of the activity, also highlighted with an orange circle.
- Lesson Brief (3 Activities):** A table with three columns: 1. Student-to-Student (Word Relationships), 2. Writing (Critical Juncture: Drawing Revised Nanovision Models), and 3. Writing (Considering an Audience).
- Critical Juncture: Drawing Revised Nanovision Models:** The main activity title, highlighted with an orange circle.
- Students review their prior nanovision models of chromatography and incorporate changes in their revised nanovision models.(30 min):** The description of the activity.
- Digital Resources:** Includes Classroom Slides 1.9 | PowerPoint, Classroom Slides 1.9 | Google Slides, All Projections, and Modeling Matter Investigation Notebook, pages 30-32.

Red circles highlight the 'Critical Juncture Assessment' logo and the 'Lesson 1.9: Revising Chromatography Models' title. An orange circle highlights the 'Lesson 1.9: Revising Chromatography Models' title in the 'Chapters' section.

Embedded Formative Assessment

Critical Juncture Lesson 1.9



Critical Juncture Assessment 1a: Applying Understanding of Molecules to Model

Tailor instruction: Students will have two opportunities to show understanding of these two ideas—different substances are made of different molecules, and molecules have properties that determine the distance traveled in chromatography—in this lesson (their revised nanovision models of chromatography) and again in Lesson 1.10 with their written scientific explanations. If a large portion of the class does not show an understanding of the two ideas in either their drawn models or in their written explanations, refer to the ideas for tailoring instruction in Critical Juncture Assessment 1b: Explaining Chromatography (in Lesson 1.10).

notebook), focusing on whether students included these two elements.

Critical Juncture Assessment

Lesson 1.9, Activity 2

Lesson 1.9: Revising Chromatography Models

[Printable Lesson Guide](#)

Lesson Brief (3 Activities)

- 1 STUDENT TO STUDENT Word Relationships
- 2 WRITING Critical Juncture: Drawing Revised Nanovision Models
- 3 WRITING Considering an Audience
- 4 WRITING

Overview

Students first review the ideas they've been learning about by engaging in the Word Relationships routine, which prompts them to use academic vocabulary in a discussion of key ideas. Then, students consider what they know about molecules and the separation of mixtures to create their revised nanovision models to submit to the president of Good Food Production, Inc. These revised models will serve as the first part of a two-part Critical Juncture Assessment of students' understanding of differences in the properties of the substances' molecules. (The second part, in Lesson 1.10, is a written explanation on the same topic.) Students then begin thinking about

Digital Resources

- Classroom Slides 1.9 | PowerPoint
- Classroom Slides 1.9 | Google Slides
- All Projections
- Modeling Matter Investigation Notebook, pages 30-32

Unit Overview

- Chapters
- Printable Resources
- Planning for the Unit
 - Unit Map
 - Progress Build
 - Getting Ready to Teach
 - Materials and Preparation
 - Science Background
 - Standards at a Glance
- Teacher References

Chapters

Chapter 1: Why did the food coloring separate into different dyes? ⓘ

Lesson 1.1
Pre-Unit Assessment

Lesson 1.2
Introducing Food Science

Lesson 1.3
Made of Matter

Lesson 1.4
Separating a Food-Coloring Mixture

Lesson 1.5
Exploring Another Model of Chromatography

Lesson 1.6
Nanovision Models of Chromatography

Lesson 1.7
Break It Down

Lesson 1.8
Evaluating Chromatography Models

Lesson 1.9
Revising Chromatography Models

Lesson 1.10
Explaining Chromatography

Name: _____ Date: _____

Revised Nanovision Model of Chromatography

1. Draw shapes for each molecule in the Key.
2. Draw what you think happened with the water molecules and dye molecules during chromatography.
3. Add labels to explain your ideas.

Key	
<input type="checkbox"/>	Dye 1 molecule
<input type="checkbox"/>	Dye 2 molecule
<input type="checkbox"/>	Dye 3 molecule
<input type="checkbox"/>	water molecule

32

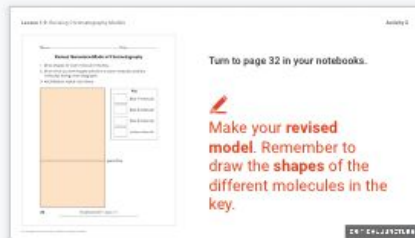
Modeling Matter—Lesson 1.9

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Turn to page 32 in your notebooks.



Make your **revised model**. Remember to draw the **shapes** of the different molecules in the key.



Teacher action:

Read the directions on the notebook page out loud. As students work, circulate and remind students to make sure that their models explain what they think happened. Encourage them to add labels as needed. Note that this is the first part of a two-part assessment. You will use students' models, as well as the explanations they will write in the next lesson, as a Critical Juncture Assessment.

Critical Juncture Assessment 1a:

Applying Understanding of Molecules to Model Chromatography

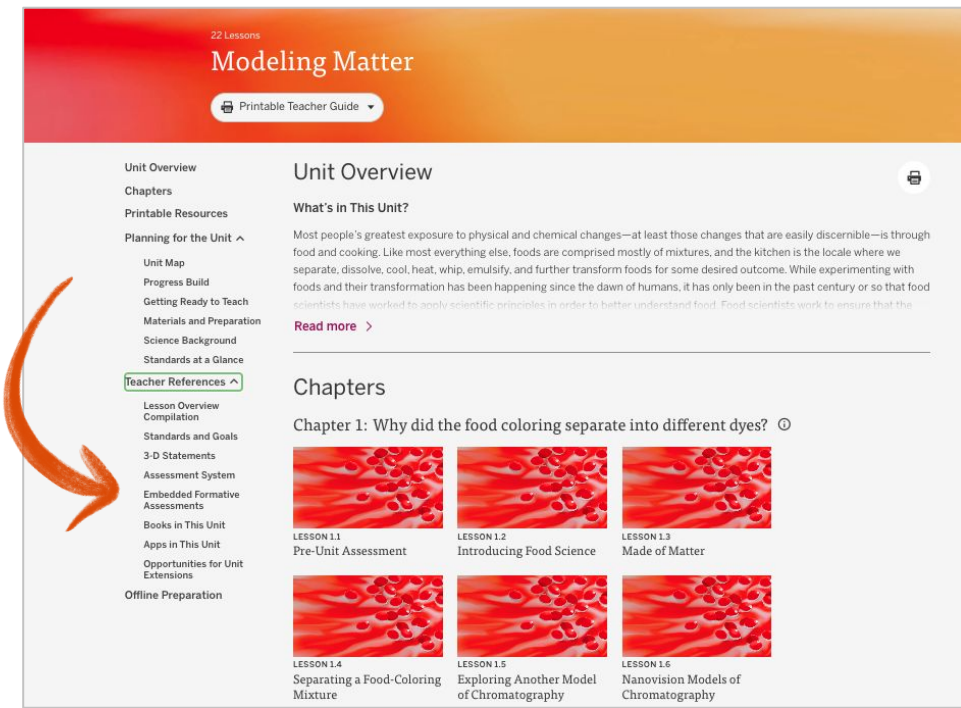
Assess understanding: Students' final nanovision models provide an opportunity to assess their understanding of different substances as made of unique molecules and of molecules' properties as determining substances' observable behavior. In their models, students should 1) represent the molecules of the different-colored dyes as different from one another (e.g., the red dye molecules should be shown as different from the yellow dye molecules) and 2) show and describe differences in the molecules' size and/or strength of attraction to the paper as determining how far they travel (e.g., smaller molecules or more weakly attracted molecules travel farther). After class, review students' revised models of chromatography (page 32, Revised Nanovision Model of Chromatography, in the notebook), focusing on whether students included these two elements.

Tailor instruction: Students will have two opportunities to show understanding of these two ideas—different substances are made of different molecules, and molecules have properties that determine the distance traveled in chromatography—in this lesson (their revised nanovision models of chromatography) and again in Lesson 1.10 with their written scientific explanations. If a large portion of the class does not show an understanding of the two ideas in either their drawn models or in their written explanations, refer to the ideas for tailoring instruction in Critical Juncture Assessment 1b: Explaining Chromatography (in Lesson 1.10).

Formative Assessments

Work time

- Explore the Critical Juncture Assessments



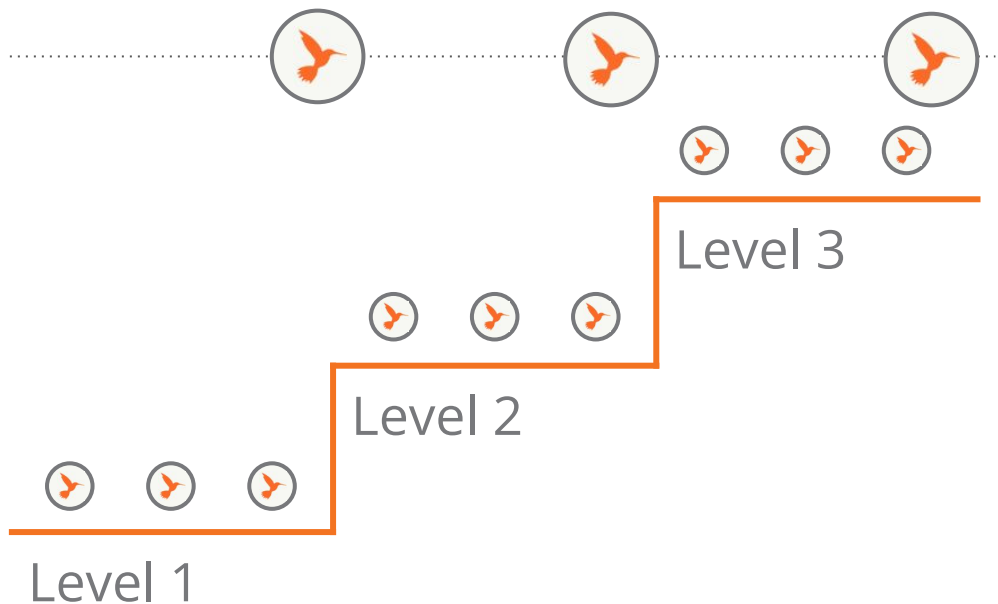
The screenshot shows the 'Modeling Matter' unit overview page. The header is a gradient of red and orange, displaying '22 Lessons' and 'Modeling Matter' with a 'Printable Teacher Guide' button. A sidebar on the left lists navigation options: Unit Overview, Chapters, Printable Resources, Planning for the Unit (with a sub-menu), Unit Map, Progress Build, Getting Ready to Teach, Materials and Preparation, Science Background, Standards at a Glance, Teacher References (highlighted with a green box and a red arrow), Lesson Overview, Compilation, Standards and Goals, 3-D Statements, Assessment System, Embedded Formative Assessments, Books in This Unit, Apps in This Unit, Opportunities for Unit Extensions, and Offline Preparation. The main content area is titled 'Unit Overview' and includes a 'What's in This Unit?' section with a paragraph about food and science, a 'Read more' link, and a 'Chapters' section. The 'Chapters' section lists six lessons, each with a red background image and a title: LESSON 1.1 Pre-Unit Assessment, LESSON 1.2 Introducing Food Science, LESSON 1.3 Made of Matter, LESSON 1.4 Separating a Food-Coloring Mixture, LESSON 1.5 Exploring Another Model of Chromatography, and LESSON 1.6 Nanovision Models of Chromatography.

Embedded formative assessments

Reflection

In 1-2 sentences, describe the relationship among:

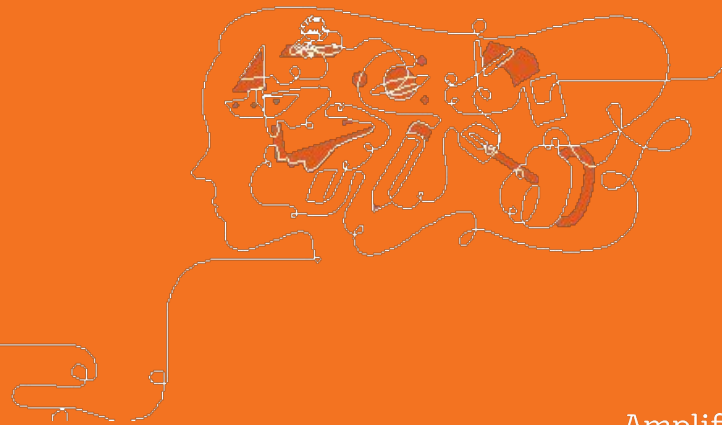
- Progress Build
- On-the-Fly Assessments
- Critical Juncture Assessments



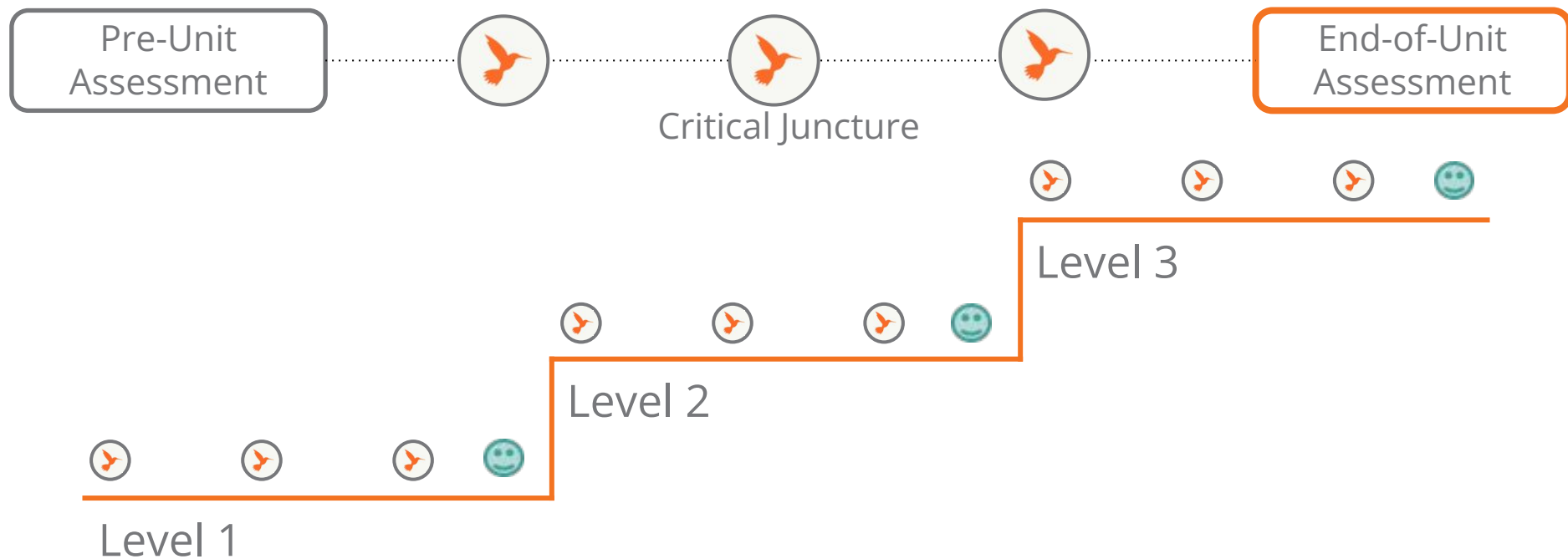
Questions?



End-of-Unit Assessment



K-5 Assessment System



End-of-Unit Assessment

3-dimensional assessment opportunity

- Summative assessment of mastery of science concepts
- Formative assessment of Science and Engineering Practices



End of Unit Assessments

What are students being asked to do?

Why do the oil and vinegar separate into layers when they are stirred together, but completely mix when lecithin is stirred in?

**Problems with
Good Food Production, Inc.'s
New Salad Dressing**



We do not want our salad dressing to separate

We do not want sediments in our salad dressing.

3 Dimensional Learning

The assessment task in this lesson provides guidance for assessing student understanding of the following standards:

Science and Engineering Practices

- Practice 6: Constructing Explanations and Designing Solutions
 - CEDS-E1: Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard).
- Practice 8: Obtaining, Evaluating, and Communicating Information
 - INFO-E5: Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts.

Disciplinary Core Ideas

- PS1.A: Structure and Properties of Matter:
 - PS1.A-E1: Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means... (5-PS1-1)
 - PS1.A-E3: Measurements of a variety of properties can be used to identify materials.

Crosscutting Concept

- Scale, Proportion, and Quantity
 - SPQ-E1: Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.

End of Unit Assessment Rubric

Question: Why do the oil and vinegar separate into layers when they are stirred together, but completely mix when lecithin is stirred in?

Rubric 1: Assessing Students' Performance of the Practices of Constructing Explanations and Obtaining, Evaluating, and Communicating Information

Rubric 1 focuses on the first two criteria (causal and explanatory, clear and well-organized) and is designed to monitor and support students as they develop, identify with the practice of constructing explanations. For each criterion, levels are described to monitor students' progress by indicating the degree to which students can independently demonstrate fluency with the scientific practice. Importantly, practices develop through regular opportunities for performance across multiple units, and mastery of the practice is outside the scope of a single unit. Thus, this rubric is intended to guide formative feedback to students rather than assign summative grades. It features targeted questions a teacher may use to assess a student's written work and provides specific feedback for future encounters with the practice.

Note that while the examples provided in this rubric accurately reflect the science concepts in the unit, students may provide alternate accounts that, if causal and explanatory in nature, still represent productive moves toward developing the practice of constructing a scientific explanation.

Rubric 1: Assessing Students' Performance of the Practices of Constructing Explanations and Obtaining, Evaluating, and Communicating Information		
Criteria	Description of level	Level
Causal and explanatory Does the explanation go beyond, or add to, what can be observed to explain the non-mixing and mixing of the ingredients?	The writing does not go beyond, or add to, what was observed to explain why the ingredients sometimes separated and sometimes mixed together. Possible feedback: <i>You described what the salad dressing looked like when the ingredients were stirred together, but why did they sometimes separate and sometimes mix? What causes ingredients to separate or to mix together?</i>	0
	The writing goes beyond describing the observable interactions of the ingredients to propose: <ul style="list-style-type: none"> • why the oil and vinegar initially separated, but the addition of the lecithin resulted in mixing (e.g., that the mixing was caused by molecules getting mixed up). OR <ul style="list-style-type: none"> • why different molecules interact in different ways (e.g., different molecules are more attracted or less attracted to one another and to molecules of other ingredients). Possible feedback: <i>You gave a partial explanation (e.g., that the mixing was caused by molecules getting mixed up), but can you explain more fully why that happened (e.g., why molecules interact differently with and without lecithin)?</i>	1

(continued on next page)

Modeling Matter: The Chemistry of Food (Grade 5)

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3

Rubric 2: Assessing Students' Understanding of Science Ideas Encountered in the Unit

Rubric 2 considers whether students' explanations are consistent with the relevant science ideas that students have encountered in the unit. This rubric may be used summatively by tallying the points for each science idea demonstrated, as described on the next page.

Rubric 2: Assessing Students' Understanding of the Science Ideas Encountered in the Unit		
Criteria	Questions to keep in mind	Score
Grounded in evidence Is the explanation consistent with the relevant science ideas that students have experienced so far? (Note that students need not explicitly cite classroom examples or data, as long as their descriptions are consistent with the science ideas learned.)	Does the student show understanding that substances are made of particles that are too small to be seen? (1 point) Evidence could include: <ul style="list-style-type: none"> • The explanation describes that vinegar, oil, and lecithin are all made of molecules. • The explanation uses interactions of individual molecules to account for the mixing or separation of ingredients. 	
	Does the student show understanding that the particles that make up materials have properties that explain why ingredients sometimes mix? (1 point) Evidence could include: <ul style="list-style-type: none"> • The explanation describes mixing as a result of a high attraction between the molecules of two or more substances. • The explanation describes that because lecithin molecules are highly attracted to both oil molecules and vinegar molecules, all three kinds of molecules will stay together (mix). 	
	Does the student show understanding that the particles that make up materials have properties that explain why ingredients sometimes separate? (1 point) Evidence could include: <ul style="list-style-type: none"> • The explanation describes that oil and vinegar separated because the vinegar molecules were not highly attracted to the oil molecules, but they were highly attracted to other vinegar molecules. 	
Total (0-3)		

Modeling Matter: The Chemistry of Food (Grade 5)

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Rubric 3: Assessing Students' Understanding of the Crosscutting Concept of Scale, Proportion, and Quantity

Rubric 3 considers how well students are able to apply the crosscutting concept of Scale, Proportion, and Quantity to a specific phenomenon. This rubric may be used summatively by tallying the points for each application demonstrated, as described on the next page.

Rubric 3: Assessing Students' Understanding of the Crosscutting Concept of Scale, Proportion, and Quantity		
Criteria	Questions to keep in mind	Score
Grounded in evidence Does the explanation use changes that happen at one scale to account for something that can be observed at another scale?	Does the explanation recognize that objects can exist at the observable scale and also at a scale that is too small to be observed with the naked eye? (1 point)	
	Does the explanation account for the observable separation or mixing of ingredients by describing interactions of particles that are too small to be observed with the naked eye? (1 point)	
Total (0-2)		

Modeling Matter: The Chemistry of Food (Grade 5)

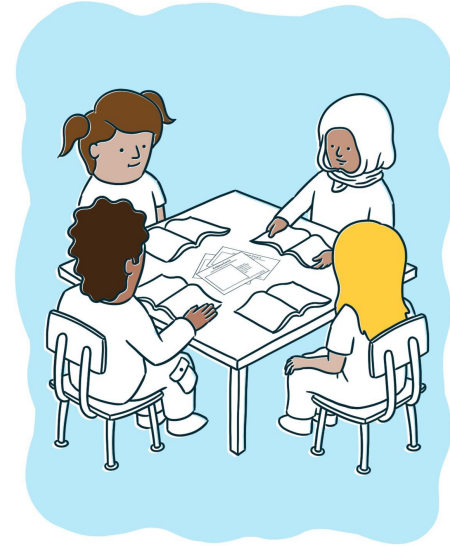
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6

End-of-Unit Assessment

Work time

- Open your Participant Notebook to page 12.
- Score the three student responses (page 16) with rubric 2 only (science ideas).
- Come together with your group and discuss your scores.
- Share out



End-of-Unit Assessment

- Go to the The **End-of-Unit Writing** and the **End-of Unit Assessment Guide** on the lesson page
- Compare your scores with the student responses in the guide.
- Discuss with your group if there were any differences.

Lesson 3.7:
End-of-Unit Assessment

Printable Lesson Guide

RESET LESSON

Overview
Materials & Preparation
Differentiation
Standards
Vocabulary
Unplugged?

Overview

Students' Explanations

This lesson, in which students write final scientific explanations for the president of Good Food Production, Inc., serves as the end-of-unit assessment. The end-of-unit assessment is designed to reveal students' understanding of unit-specific science concepts; the crosscutting concept of Scale, Proportion, and Quantity; and the practice of constructing explanations. Using the information that students have gathered from text and experience, as well as their understanding of the nanoscale that they've developed through drawing and investigating models of molecules, students write scientific explanations of why the ingredients in the salad dressing will stay mixed. Before starting to write, the teacher guides the class in reflecting on their learning by adding models they've worked with recently to the Models chart. Students add to their notes (from Lesson 3.6) about evidence based on their investigations and models, and they review the features of a scientific explanation. Students then write their explanations independently. When students finish writing, the class directs the teacher to make their salad dressing, and they review what they have learned along the way. The class then conducts a taste test of the salad dressing and reflects on all they have done as food scientists in the unit. The purpose of this lesson is for students to apply all they have learned to communicate like a scientist in order to answer the Unit Question: What happens when two substances are mixed together?

Digital Resources

- Classroom Slides 3.7 | PowerPoint
- Classroom Slides 3.7 | Google Slides
- All Projections
- End of Unit Writing: Explaining Emulsifiers in Salad Dressing, Version A copymaster
- End of Unit Writing: Explaining Emulsifiers in Salad Dressing, Version B copymaster
- Assessment Guide: Assessing Students' End-of-Unit Explanations About Emulsifiers in Salad Dressing
- Optional: Chapter 3 Home Investigation: Molecules in Salad Dressing Quiz copymaster
- Models Chart: Completed
- Modeling Matter Investigation Notebook, page 83

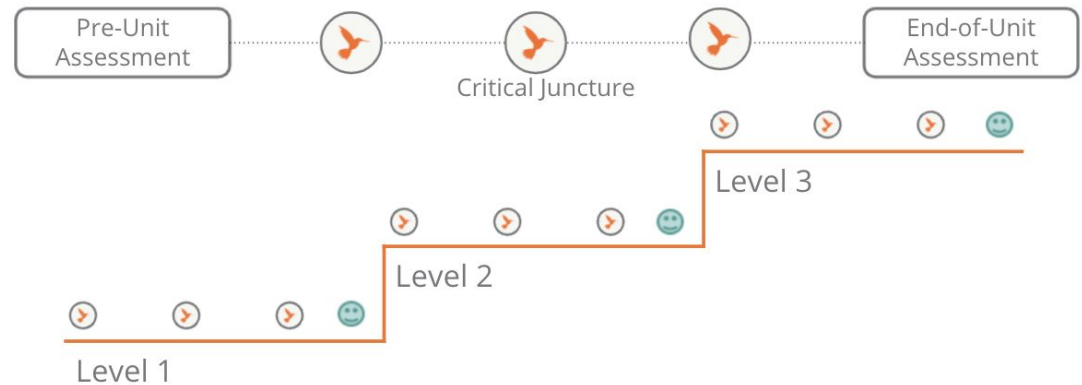
Assessment System

Reflection

How do the Progress Build and assessments work as a system?

What are the benefits of this system for students? For teachers?

K-5 Assessment System

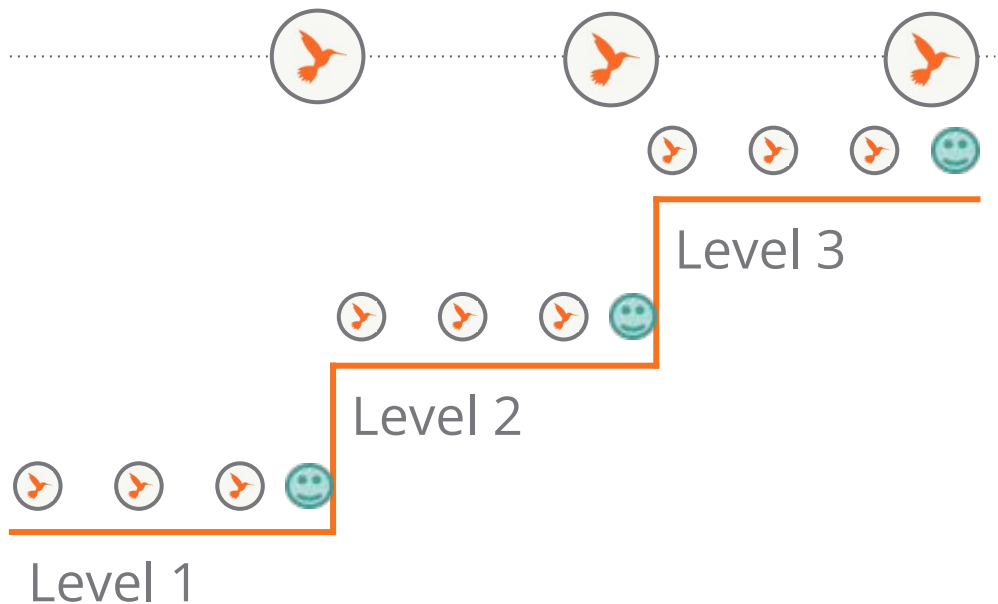


Lunch Break

Additional formative assessment information

Student Self-Assessments

- End of each chapter
- Grades K-1: Pair Share activity
- Grades 2-5: Independent Investigation Notebook activity



Additional assessment information

End of Unit Assessments

Chapter 4: Why is there more water vapor high up over West Ferris than East Ferris? ⓘ



LESSON 4.1
Investigating the
Movement of Water Vapor



LESSON 4.2
Investigating Rain
Distribution



LESSON 4.3
End-of-Unit Assessment
Part 1



LESSON 4.4
How the Earth System
Explains Dinosaur
Extinction



LESSON 4.5
Final Design Iterations

Chapter 5: How can East Ferris turn wastewater into clean freshwater? ⓘ



LESSON 5.1
Investigating Wastewater
Treatment



LESSON 5.2
Chemical Reactions
Everywhere



LESSON 5.3
Chemical Reactions at the
Nanoscale



LESSON 5.4
Controlling Chemical
Reactions



LESSON 5.5
End-of-Unit Assessment
Part 2



LESSON 5.6
Reflecting on Water
Availability

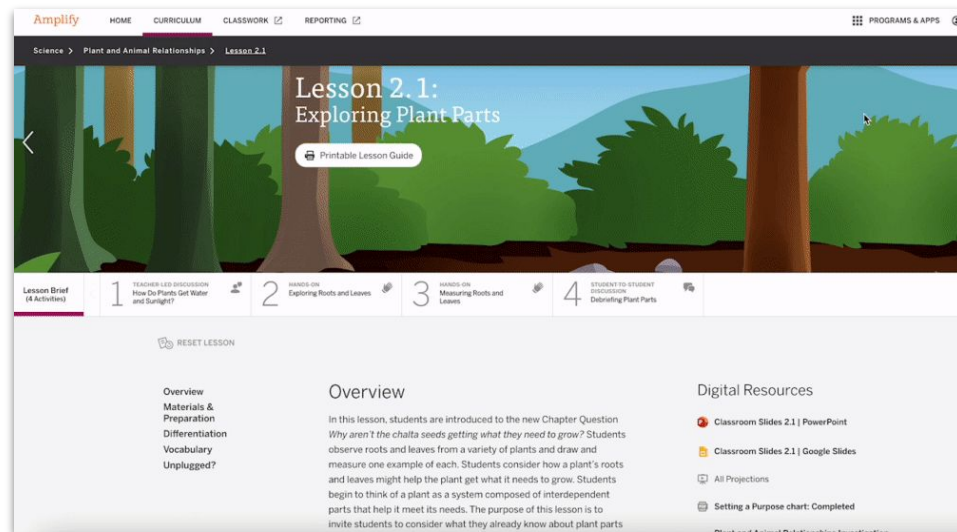
Questions?



Resources for NGSS progress monitoring

NGSS Benchmark assessments

- Accessible in the Global Navigation menu
- Grades 3-5
- 4 assessments per grade



Resources for NGSS progress monitoring

3D Assessment Objectives

- Located in the Unit Guide
- Identifies where each dimension of the target Performance Expectations are assessed in the unit, in the grade, or in the grade-band.

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

SEP: Planning and Carrying Out Investigations

Needs of Plants and Animals (Grade K)

OTFA 7: Lesson 2.3, Activity 3
OTFA 10: Lesson 3.1, Activity 2

Pushes and Pulls (Grade K)

PRE: Lesson 1.1, Activity T
OTFA 4: Lesson 2.1, Activity 2

Sunlight and Weather (Grade K)

OTFA 2: Lesson 2.1 Activity 4
INV: Lesson 4.1, Activities 3 + 4 (S)
OTFA 14: Lesson 5.2, Activity 4

Light and Sound (Grade 1)

OTFA 2: Lesson 1.3, Activity 3
OTFA 7: Lesson 3.1, Activity 2
INV: Lesson 4.1, Activity 3 (S)

Spinning Earth (Grade 1)

OTFA 7: Lesson 3.1, Activity 2
OTFA 8: Lesson 3.3, Activity 4
OTFA 11: Lesson 4.1, Activity 2

Plant and Animal Relationships (Grade 2)

OTFA 4: Lesson 1.6, Activity 4
OTFA 9: Lesson 3.3, Activity 3
OTFA 12: Lesson 4.1, Activity 4
OTFA 13: Lesson 4.2, Activity 4
INV: Lesson 4.3, Activity 4 and Lesson 4.3, Activities 1–4 (S)
OTFA 14: Lesson 4.3, Activity 3

DCI: LS2.A: Interdependent Relationships in Ecosystems

Plant and Animal Relationships (Grade 2)

PRE: Lesson 1.1, Activity 3
CJ 1: Lesson 1.7 Activity 2
OTFA 7: Lesson 2.3, Activity 3
CJ 2a: Lesson 2.4, Activity 3
CJ 2b: Lesson 2.5, Activity 3
INV: Lesson 4.3, Activity 4 and Lesson 4.3, Activities 1–4 (S)
EOU: Lesson 4.4, Activity 3 (S)

CCC: Cause and Effect

Pushes and Pulls (Grade K)
PRE: Lesson 1.1, Activity T
EOU: Lesson 6.3, Activity 1 (S)

Sunlight and Weather (Grade K)
PRE: Lesson 1.3, Activity 4
OTFA 13: Lesson 4.4, Activity 1
EOU: Lesson 5.6, Activity 1 (S)

Animal and Plant Defenses (Grade 1)
OTFA 3: Lesson 1.4, Activity 3

Light and Sound (Grade 1)
PRE: Lesson 1.1, Activity 1
OTFA 3: Lesson 1.4, Activity 3
OTFA 9: Lesson 3.6, Activity 1
INV: Lesson 4.1, Activity 3 (S)
EOU: Lesson 4.6, Activity 1 (S)

Changing Landforms (Grade 2)
OTFA 5: Lesson 2.4, Activity 2

Properties of Materials (Grade 2)
OTFA 8: Lesson 2.3, Activity 5
OTFA 16: Lesson 4.3, Activity 4
EOU: Lesson 4.4, Activity 2 (S)

Generating grades

Group collaborative discussion

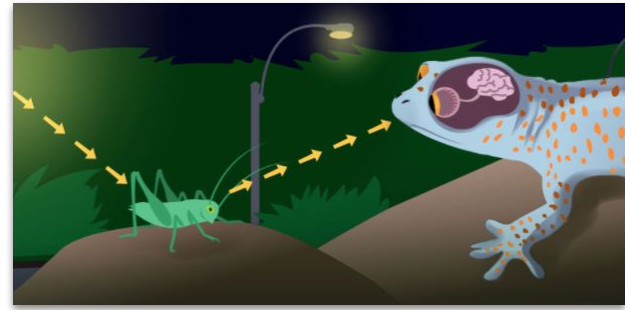
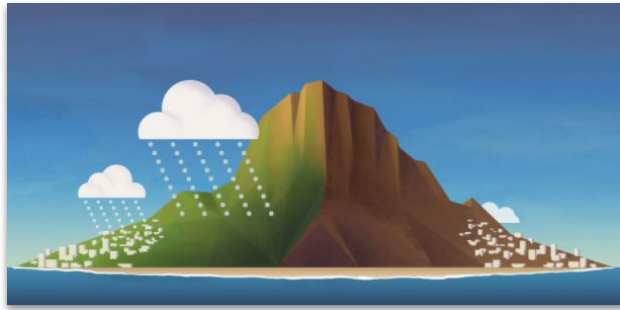
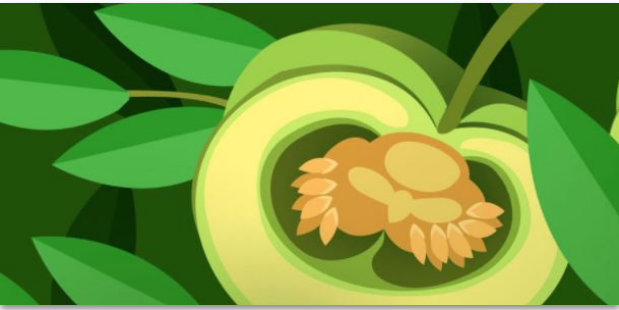
What are your district's grading requirements for science?

How will you use Amplify Science assessments to generate grades?



Questions?





Plan for the day

- Introduction
- Assessment System
- Progress Build
- Assessments
- **Model Lesson**
- Planning
- Closing

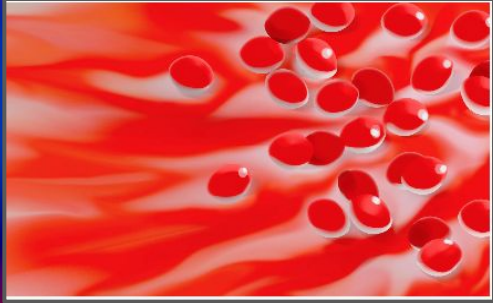
Modeling Matter

Problem: Why is the food coloring from Good Food Production, Inc. not exactly the same as Red Dye #75 and may include a harmful dye?

Role: Food Scientists

engage in two investigations, one to identify a potentially hazardous food dye in a mixture, and the other to create a good-tasting and visually appealing salad dressing that does not separate into layers and contains no sediment.

Coherent Storylines



Why did the food coloring separate into different dyes?



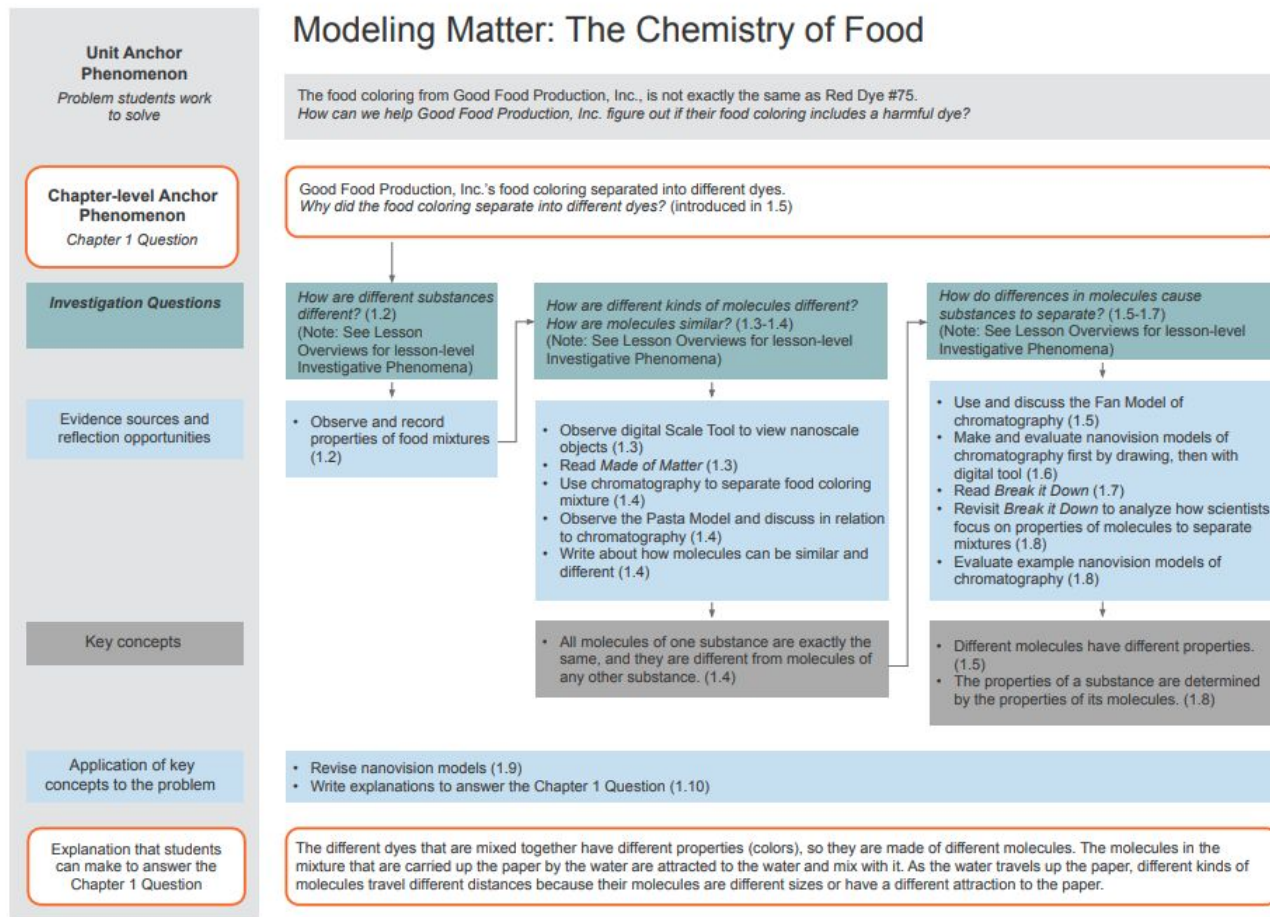
Why do some salad dressings have sediments, and others do not?



Why can salad-dressing ingredients separate again after being mixed?

Coherence Flowchart

Chapter 1

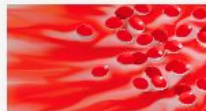


Modeling Matter

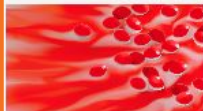
Leading up to our
model lesson

Chapters

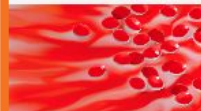
Chapter 1: Why did the food coloring separate into different dyes? ⓘ



LESSON 1.1
Pre-Unit Assessment



LESSON 1.2
Introducing Food Science



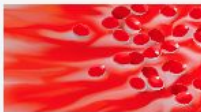
LESSON 1.3
Made of Matter



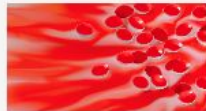
LESSON 1.4
Separating a Food-Coloring
Mixture



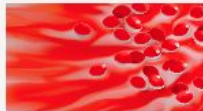
LESSON 1.5
Exploring Another Model
of Chromatography



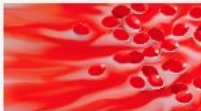
LESSON 1.6
Nanovision Models of
Chromatography



LESSON 1.7
Break It Down



LESSON 1.8
Evaluating
Chromatography Models



LESSON 1.9
Revising Chromatography
Models



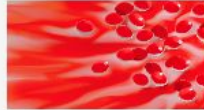
LESSON 1.10
Explaining
Chromatography

Modeling Matter

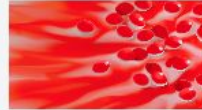
Model lesson 1.4

Chapters

Chapter 1: Why did the food coloring separate into different dyes? ⓘ



LESSON 1.1
Pre-Unit Assessment



LESSON 1.2
Introducing Food Science



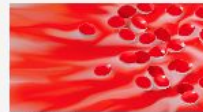
LESSON 1.3
Made of Matter



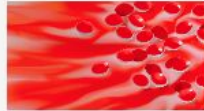
LESSON 1.4
Separating a Food-Coloring
Mixture



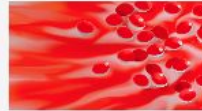
LESSON 1.5
Exploring Another Model
of Chromatography



LESSON 1.6
Nanovision Models of
Chromatography



LESSON 1.7
Break It Down



LESSON 1.8
Evaluating
Chromatography Models

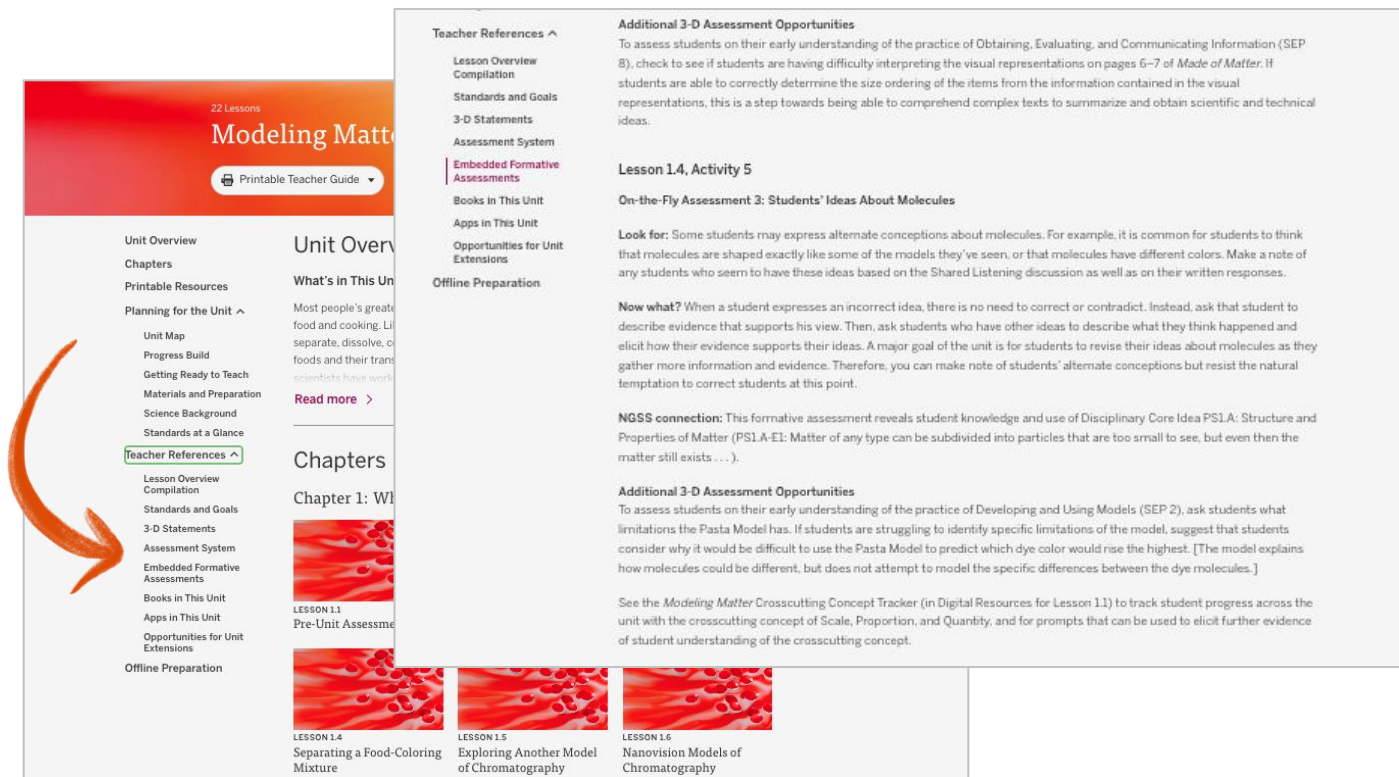


LESSON 1.9
Revising Chromatography
Models



LESSON 1.10
Explaining
Chromatography

Embedded Formative Assessments



The screenshot shows the 'Modeling Matter' unit page. The left sidebar contains a list of links: Unit Overview, Chapters, Printable Resources, Planning for the Unit, Unit Map, Progress Build, Getting Ready to Teach, Materials and Preparation, Science Background, Standards at a Glance, **Teacher References** (highlighted with an orange arrow), Lesson Overview, Compilation, Standards and Goals, 3-D Statements, Assessment System, Embedded Formative Assessments, Books in This Unit, Apps in This Unit, Opportunities for Unit Extensions, and Offline Preparation. The main content area is titled 'Unit Overview' and includes a 'What's in This Unit' section with a 'Read more' link. Below this is a 'Chapters' section with 'Chapter 1: What's in This Unit'. The 'Teacher References' section is expanded, showing 'Lesson Overview', 'Compilation', 'Standards and Goals', '3-D Statements', 'Assessment System', 'Embedded Formative Assessments' (highlighted), 'Books in This Unit', 'Apps in This Unit', 'Opportunities for Unit Extensions', and 'Offline Preparation'. The 'Additional 3-D Assessment Opportunities' section is also expanded, showing 'Lesson 1.4, Activity 5' and 'On-the-Fly Assessment 3: Students' Ideas About Molecules'. The 'Look for:' section describes common student misconceptions about molecules. The 'Now what?' section provides guidance on how to respond to student ideas. The 'NGSS connection:' section links the assessment to Disciplinary Core Idea PS1.A: Structure and Properties of Matter. The 'Additional 3-D Assessment Opportunities' section provides further context for the assessment. Below the text are three images of molecular models labeled 'LESSON 1.1 Pre-Unit Assessment', 'LESSON 1.4 Separating a Food-Coloring Mixture', 'LESSON 1.5 Exploring Another Model of Chromatography', and 'LESSON 1.6 Nanovision Models of Chromatography'.

22 Lessons
Modeling Matter
Printable Teacher Guide

Unit Overview
Chapters
Printable Resources
Planning for the Unit
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
Embedded Formative Assessments
Books in This Unit
Apps in This Unit
Opportunities for Unit Extensions
Offline Preparation

Unit Overview
What's in This Unit
Most people's greatest food and cooking. Like separate, dissolve, or foods and their transformations. *scientists have work*
[Read more](#)

Chapters
Chapter 1: What's in This Unit

Teacher References
Lesson Overview
Compilation
Standards and Goals
3-D Statements
Assessment System
Embedded Formative Assessments
Books in This Unit
Apps in This Unit
Opportunities for Unit Extensions
Offline Preparation

Additional 3-D Assessment Opportunities
To assess students on their early understanding of the practice of Obtaining, Evaluating, and Communicating Information (SEP 8), check to see if students are having difficulty interpreting the visual representations on pages 6–7 of *Made of Matter*. If students are able to correctly determine the size ordering of the items from the information contained in the visual representations, this is a step towards being able to comprehend complex texts to summarize and obtain scientific and technical ideas.

Lesson 1.4, Activity 5
On-the-Fly Assessment 3: Students' Ideas About Molecules

Look for: Some students may express alternate conceptions about molecules. For example, it is common for students to think that molecules are shaped exactly like some of the models they've seen, or that molecules have different colors. Make a note of any students who seem to have these ideas based on the Shared Listening discussion as well as on their written responses.

Now what? When a student expresses an incorrect idea, there is no need to correct or contradict. Instead, ask that student to describe evidence that supports his view. Then, ask students who have other ideas to describe what they think happened and elicit how their evidence supports their ideas. A major goal of the unit is for students to revise their ideas about molecules as they gather more information and evidence. Therefore, you can make note of students' alternate conceptions but resist the natural temptation to correct students at this point.

NGSS connection: This formative assessment reveals student knowledge and use of Disciplinary Core Idea PS1.A: Structure and Properties of Matter (PS1.A-EL: Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists...).

Additional 3-D Assessment Opportunities
To assess students on their early understanding of the practice of Developing and Using Models (SEP 2), ask students what limitations the Pasta Model has. If students are struggling to identify specific limitations of the model, suggest that students consider why it would be difficult to use the Pasta Model to predict which dye color would rise the highest. [The model explains how molecules could be different, but does not attempt to model the specific differences between the dye molecules.]

See the *Modeling Matter* Crosscutting Concept Tracker (in Digital Resources for Lesson 1.1) to track student progress across the unit with the crosscutting concept of Scale, Proportion, and Quantity, and for prompts that can be used to elicit further evidence of student understanding of the crosscutting concept.

LESSON 1.1
Pre-Unit Assessment

LESSON 1.4
Separating a Food-Coloring Mixture

LESSON 1.5
Exploring Another Model of Chromatography

LESSON 1.6
Nanovision Models of Chromatography

Collecting formative assessment data

Create a system that's easy for you to use.

Grade :

Lesson

Look for 1:

Look for 2:

[illegible]

The Lesson Brief

Lesson 1.4: Separating a Food-Coloring Mixture

Printable Lesson Guide

1

TEACHER-LED DISCUSSION
Introducing the Harmful-
Dye Context

2

HANDS-ON
Separating the Food
Coloring

3

HANDS-ON
Making the Pasta Model

4

TEACHER-LED DISCUSSION
Discussing
Chromatography Results

5

WRITING
Writing About Molecules

RESET LESSON

Overview
Materials &
Preparation
Differentiation
Standards
Vocabulary
Unplugged?

Overview

Students are introduced to their first official assignment as food scientists—to identify whether Good Food Production, Inc.'s food coloring contains a potentially harmful dye. The class observes how water “climbs” a paper strip, and then students use the technique of chromatography to separate the food coloring into its component dyes. Chromatography is a separation technique that involves having a solvent (in this case, water) travel up a medium (in this case, paper) through a test mixture (in this case, food coloring). Different substances travel different distances up the paper, resulting in the separation of the test mixture. After students have started their chromatography tests, the teacher uses pasta shapes to model what may be happening in a chromatography test on the nanoscale. This model helps students see that the properties of different types of

Digital Resources

- Classroom Slides 1.4 | PowerPoint
- Classroom Slides 1.4 | Google Slides
- All Projections
- Classroom Videos 1.4 | Zip
- Chromatography Observations chart
- Chromatography Diagram: Completed
- Matter Chart: Completed

Patterns of Earth and Sky

Materials for Lesson 1.5

For the Class:

Materials & Preparation For the Classroom Wall

- key concept: *All molecules of one substance are exactly the same, and they are different from molecules of any other substance.*
- Matter chart
- Properties of Matter chart

For Each Group of Four Students

- 1 tray*
- 2 large plastic cups
- 2 prepared strips of chromatography paper
- 2 pencils*
- 2 small pieces of masking tape*
- 4 small pieces of clear tape*
- 1 pair of scissors*

For the Class

- 1 strip of chromatography paper
- 3 bottles of food coloring (red, blue, yellow)
- 5 large plastic cups
- 1 small plastic cup
- large pasta (penne or shells)
- small pasta (orzo)
- medium pasta (elbow macaroni)
- 1–2 toothpicks*
- 2 sheets of chart paper*
- 1 sheet of paper towel*
- 1 large clear container with lid (at least 16 oz.)*
- pitcher*
- water*
- marker*
- masking tape*
- clear tape*
- 1 pencil*
- 1 pair of scissors*

Modeling Matter

Classroom Wall

Partner Reading Guidelines

1. Sit next to your partner and place the book between you.
2. Take turns reading.
3. Read in a quiet voice.
4. Be respectful and polite to your partner.
5. Ask your partner for help if you need it. Work together to make sure you both understand what you read.

Problem:

Unit Question: What happens when two substances are mixed together?

Chapter 1 Question: Why did the food separate coloring into different dyes?

Investigation Question: How are different substances different?

Key Concept:

Key Concept:

Vocabulary:

mixture
observe
property
substance
atom
matter
model
molecule



Grade 5 | Modeling Matter

Lesson 1.4: Separating a Food-Coloring Mixture

Activity 1

Introducing the Harmful-Dye Context





To: Food Science Lab

From: Lauren Harold, President, Good Food Production, Inc.

Subject: Test for Harmful Food Dye



Good Food Production, Inc.

Dear Food Scientists,

Customers are concerned about food products that contain Red Dye #75. Some people believe that Red Dye #75 causes health problems in children. Good Food Production, Inc. wants to make sure our customers are safe!

We need to test the food coloring that's used in many of our products to see if it might contain red food dye, so we know if we need to submit it for further testing. Please determine whether our food coloring is a pure substance or whether it is a mixture. If it is a mixture, please determine whether red dye is part of the mixture.

Sincerely,

Lauren Harold, President
Good Food Production, Inc.

This is the food dye that might be harmful,
Red Dye #75.





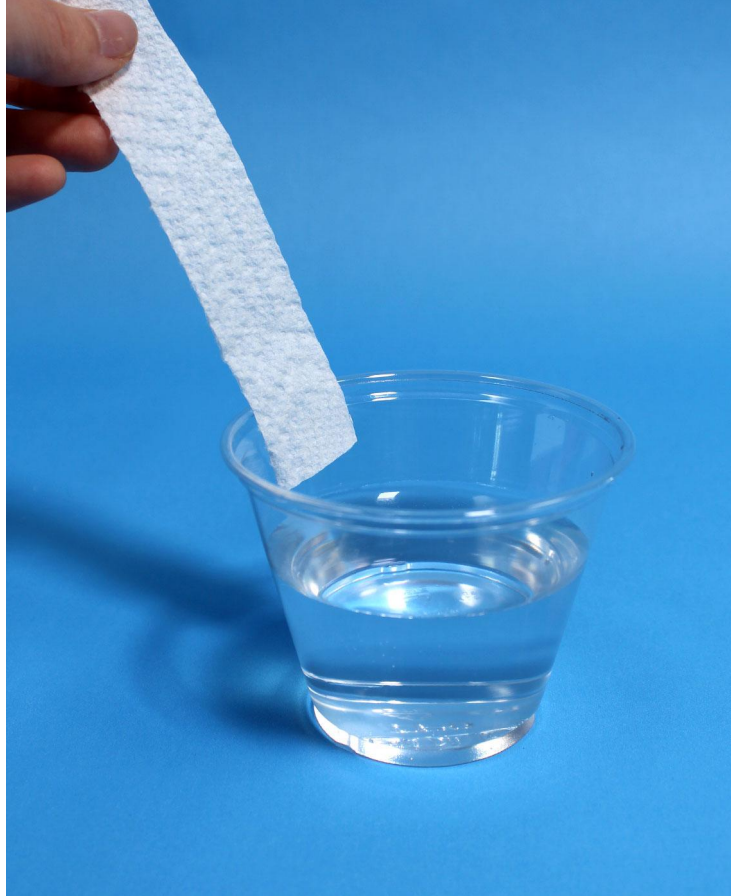
This is the **food coloring** that Good Food Production, Inc. uses in many of its products.

We will **test to find out if it is a mixture** that could contain Red Dye #75.

Activity 2

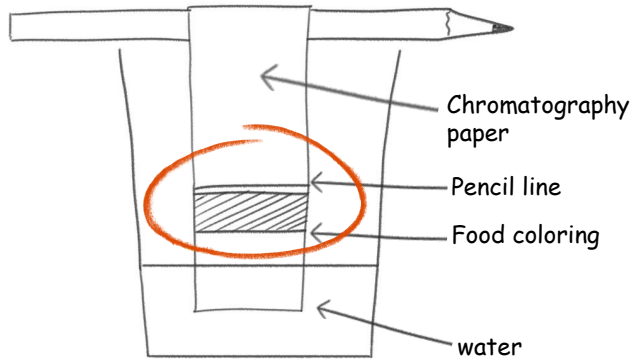
Separating the Food Coloring





Let's take a look at something that is part of the **chromatography test**, which we'll use to investigate the food coloring.

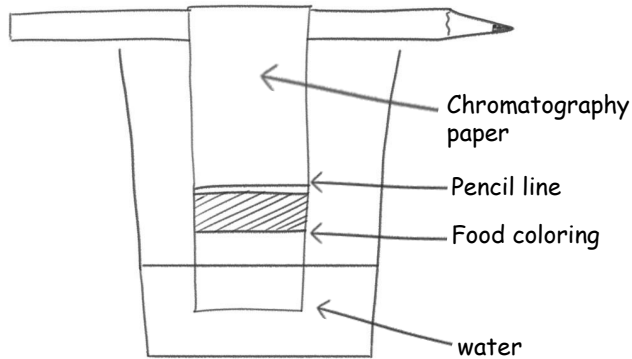
Chromatography Diagram



In **chromatography**, a paper strip is dipped into water, as we just saw.

In a chromatography **test**, however, the paper also has a test mixture on it.

Chromatography Diagram



You will hang the paper strip so the bottom touches the water.

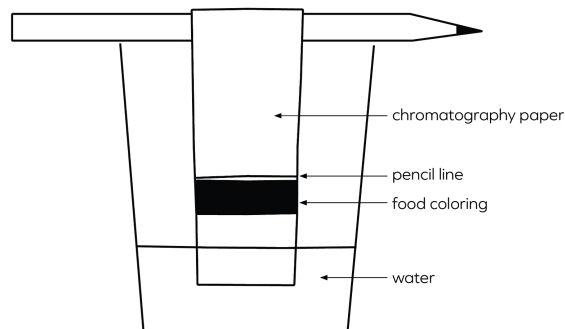


What do you **predict** will happen?

Name: _____ Date: _____

Using Chromatography to Separate a Mixture

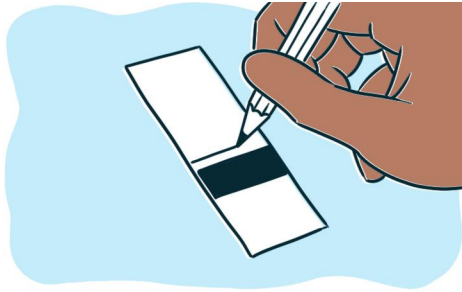
1. **Draw a pencil line.** On the paper strip, draw a pencil line along the top edge of the food coloring.
2. **Attach the paper strip so it hangs in the water, but the food coloring is still above the water.** Tape the top of the paper strip to a pencil. The bottom of the paper strip should just touch the water in the cup, and the food coloring should remain above the water.
3. **Start the chromatography test by hanging the paper strip in the water.** Place the pencil across the top of the cup.



Turn to page 9 in your notebooks.

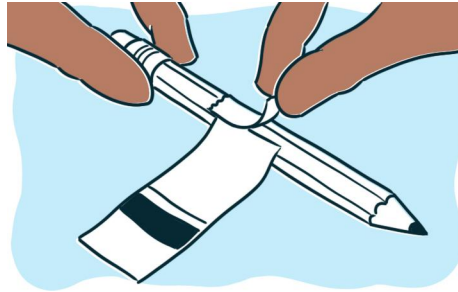
Let's review the directions.

Chromatography Test



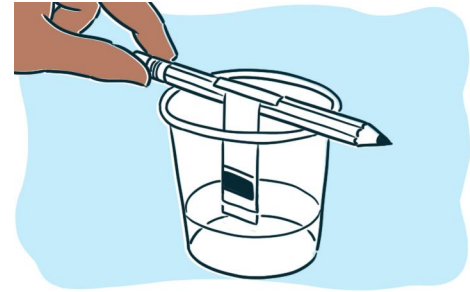
Step 1

Draw a pencil line.



Step 2

Tape the top of the paper strip to a pencil so that the paper strip will hang in the water, with the food coloring still above the water.



Step 3

Place the pencil across the top of the cup to begin the test.

Activity 3

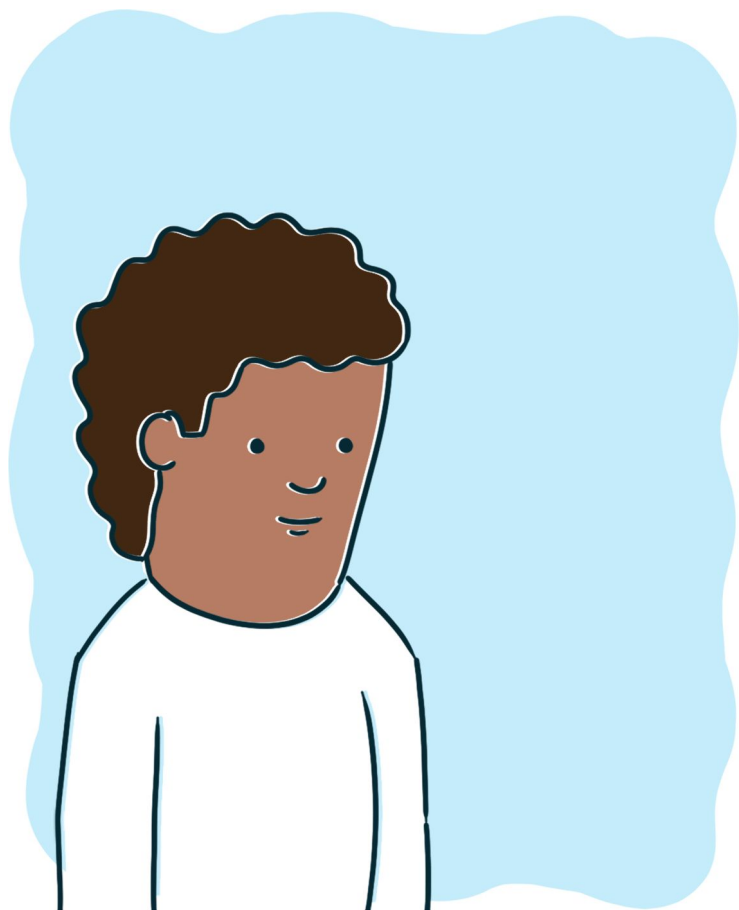
Making the Pasta Model





While we wait, let's look at a **model** to help us understand how chromatography works.

In this model, each cup contains a different **substance**.



Today you will pretend to have nanovision goggles.



Put on your imaginary **nanovision goggles** to make things look billions of times larger than they really are.



In this model, each piece of pasta represents a molecule.



What do you notice about the **molecules**?



Let's think about the substances in our model one substance at a time.



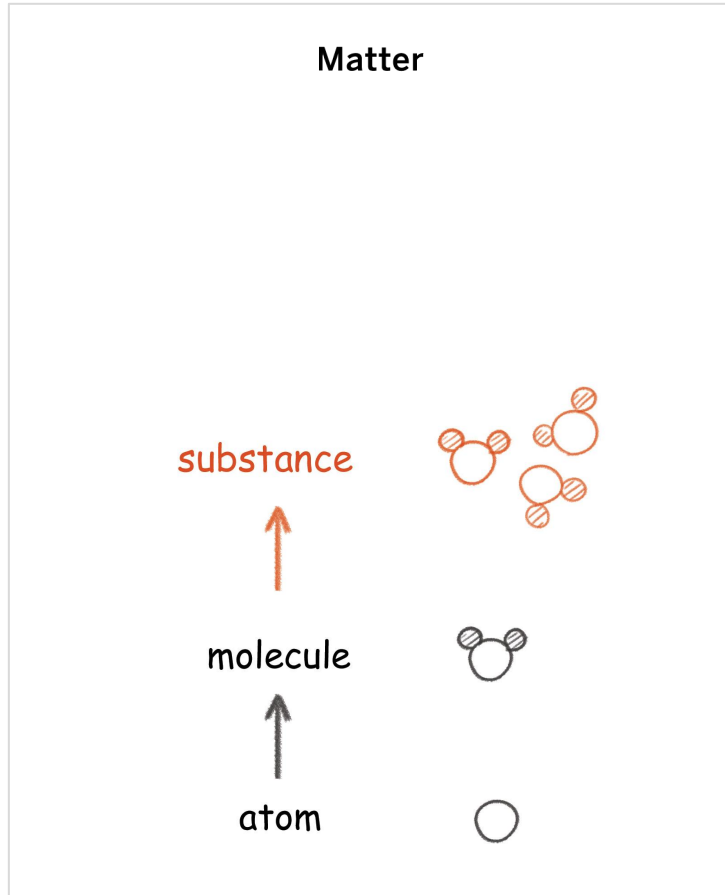
Are the molecules of this substance **the same or different?**

Key Concept

All molecules of one substance are exactly the same, and they are different from molecules of any other substance.

Remember that we are investigating these questions:

How are different kinds of molecules different? How are molecules similar?



We can add **substance** to our chart.

As we just noted in our key concept, all **molecules of one substance are exactly the same.**

Pasta Model: Making a Mixture

Step 1

Three volunteers will pick up the cups of pasta representing each of the substances in our model.

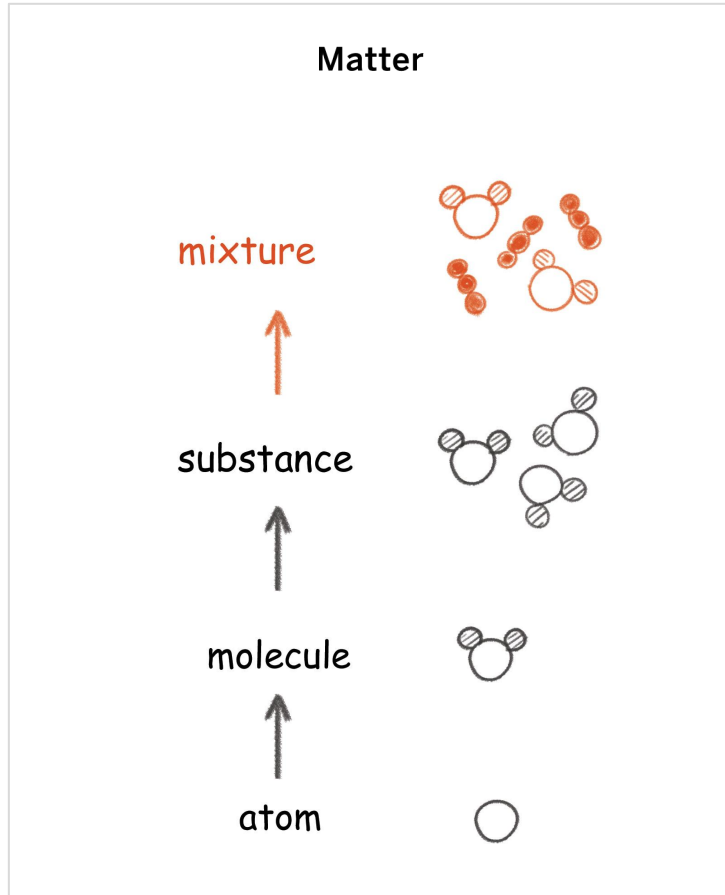
Step 2

The volunteers will pour all three cups of pasta into the container at the same time so all the pasta types mix together.

Step 3

Let's observe the mixture we have created.





Mixtures are made out of different substances and include **more than one kind of molecule**.

Let's update our chart again.



How could we **separate the mixture** in our model back into three separate substances?



Let's try shaking the container to separate the mixture.



Observe what happens when the container is shaken.



What was it about the **molecules** in the pasta mixture that allowed the mixture to **separate** when the container was shaken?

Properties of substances	Properties of molecules
color smell texture	shape size

We just figured out that **molecules have properties.**

Let’s add what we’ve learned to our chart about properties.

Activity 4

Discussing Chromatography Results

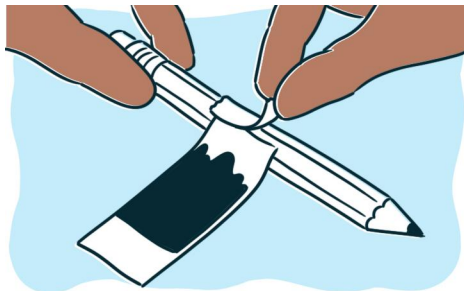


Finishing the Chromatography Tests



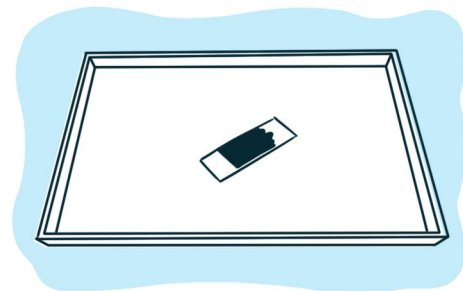
Step 1

Lift the paper strip out of the cup.



Step 2

Carefully **remove the tape** holding the paper to the pencil.



Step 3

Let the strip dry by leaving it on your tray.

Chromatography Observations



We can use this chart to record what you observed.



What happened in the chromatography test?

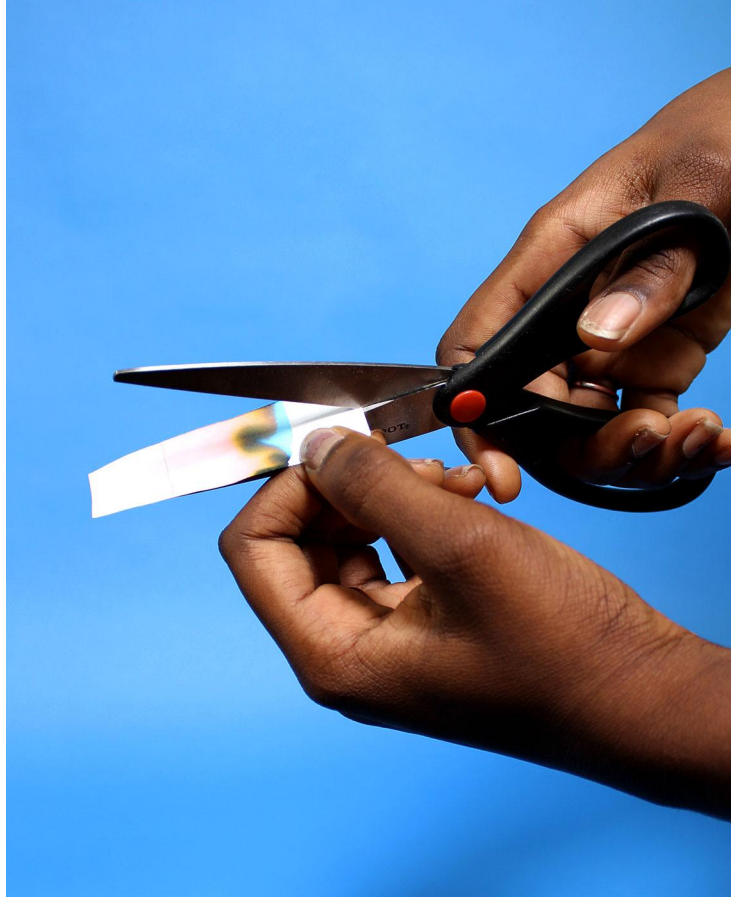


What **colors** of dye do you see in your chromatography strip?

Based on these observations, was the food coloring a **substance or a mixture**?



Is it possible that the harmful Red Dye #75 is in the food coloring mixture?



Cut your chromatography strip in half. Each partner gets half.

Tape your half to page 9 in your notebook.

Activity 5

Writing About Molecules



Remember that we are investigating these questions:

How are different kinds of molecules different? How are molecules similar?

Shared Listening



Step 1

I will ask a question.

Partner A shares for one minute while **Partner B listens**.



Step 2

Partner B restates what they heard Partner A say. **Partner A can correct misstatements**, if necessary, but not add any new information.



Step 3

Partners switch roles for the second question. (Partner B will share and Partner A will listen, then restate Partner B's ideas.)

Shared Listening Question 1:



What are some ways that **molecules can be different** from one another?

Shared Listening Question 2:



What are some ways that **molecules** can be **similar** to one another?

Name: _____ Date: _____

Writing About Molecules

How are different kinds of molecules different? How are they similar?
Explain how you know. What is your evidence?

Turn to page 10 in your notebooks.



Record your ideas about
how molecules are
similar and different.

End of Lesson

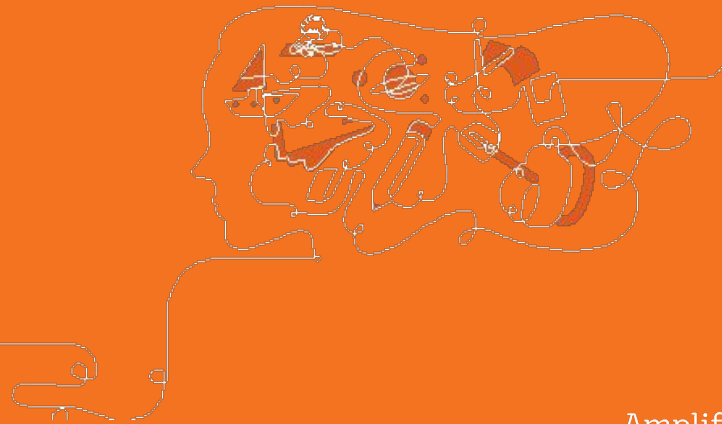


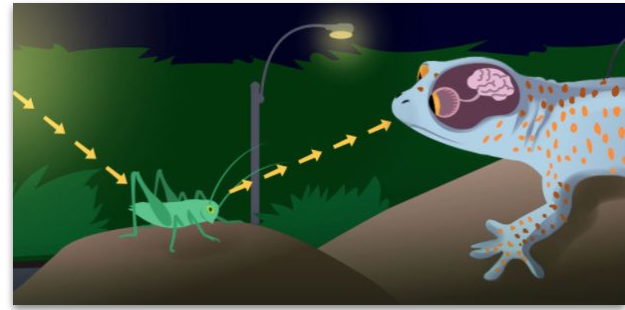
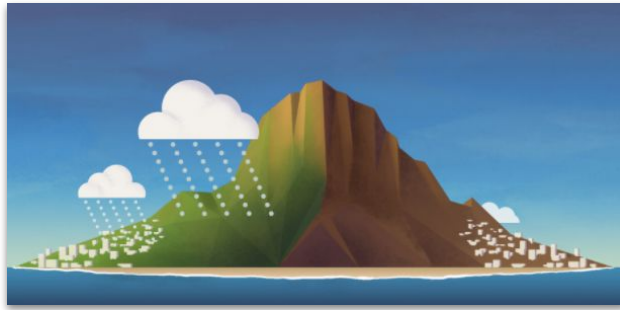
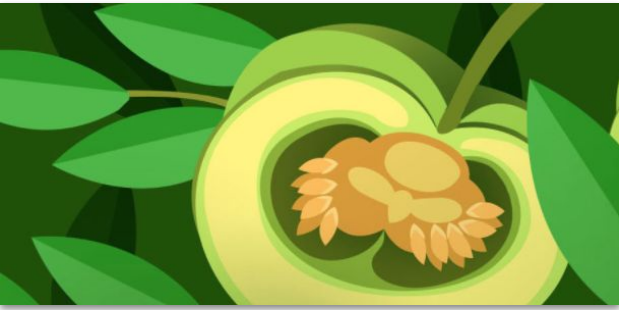
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Break





Plan for the day

- Introduction
- Assessment System
- Progress Build
- Assessments
- Model Lesson
- **Planning**
- Closing

Work time - Planning

- Navigate to a lesson that you'll be teaching in the upcoming week that has a formative assessment opportunity (you might want to refer to the **Embedded Formative Assessment or Assessment System** documents on the Unit Landing Page)
- Review the assessment type and guidance

The screenshot displays the interface for Lesson 1.4, titled "Separating a Food-Coloring Mixture". The top section features a red background with a close-up of several red, spherical capsules. The lesson title is prominently displayed in white text, accompanied by a "Printable Lesson Guide" button. Below this, a horizontal navigation bar lists five steps: 1. TEACHER LED DISCUSSION: Introducing the Harmful Dye Contest, 2. VIDEO ON: Separating the Food Coloring, 3. VIDEO ON: Making The Pasta Model, 4. TEACHER LED DISCUSSION: Discussing Chromatography Results, and 5. WRITING: Writing About Molecules. The main content area is divided into three columns. The left column contains a sidebar menu with links for Overview, Materials & Preparation, Differentiation, Standards, Vocabulary, and Unplugged?. The middle column, titled "Overview", provides a detailed description of the lesson, explaining that students will identify whether Good Food Production, Inc.'s food coloring contains a potentially harmful dye by using chromatography to separate the food coloring into its component dyes. The right column, titled "Digital Resources", lists available materials: Classroom Slides 1.4 (PowerPoint), Classroom Slides 1.4 (Google Slides), All Projections, Classroom Videos 1.4 (Zip), Chromatography Observations chart, Chromatography Diagram: Completed, and Matter Chart: Completed.

Work time - Planning

- Download and review the classroom slides
- Read the unit overview
- Read the Materials and Prep
- Read the differentiation
- Prepare any data collectors or assessment materials needed.

The screenshot displays a digital lesson interface for "Lesson 1.4: Separating a Food-Coloring Mixture". The top section features a red background with a close-up of several red, spherical capsules. Below this, the lesson title is prominently displayed, followed by a button labeled "Printable Lesson Guide". A horizontal navigation bar contains five numbered tabs: 1. TEACHER LED DISCUSSION: Introducing the Harmful Dye Content, 2. HANDS-ON: Separating the Food Coloring, 3. HANDS-ON: Making The Pasta Model, 4. TEACHER LED DISCUSSION: Discussing Chromatography Results, and 5. WRITING: Writing About Molecules. The main content area is divided into three columns. The left column lists "Overview", "Materials & Preparation", "Differentiation", "Standards", "Vocabulary", and "Unplugged?". The middle column, titled "Overview", provides a detailed description of the lesson, explaining that students will identify whether Good Food Production, Inc.'s food coloring contains a potentially harmful dye, observe how water "climbs" a paper strip, and use chromatography to separate the food coloring into its component dyes. The right column, titled "Digital Resources", lists various materials: Classroom Slides 1.4 (PowerPoint), Classroom Slides 1.4 (Google Slides), All Projections, Classroom Videos 1.4 (Zip), Chromatography Observations chart, Chromatography Diagram: Completed, and Matter Chart: Completed.

Lesson 1.4:
Separating a Food-Coloring
Mixture

Printable Lesson Guide

1 TEACHER LED DISCUSSION
Introducing the Harmful
Dye Content

2 HANDS-ON
Separating the Food
Coloring

3 HANDS-ON
Making The Pasta Model

4 TEACHER LED DISCUSSION
Discussing
Chromatography Results

5 WRITING
Writing About Molecules

RESET LESSON

Overview

Students are introduced to their first official assignment as food scientists—to identify whether Good Food Production, Inc.'s food coloring contains a potentially harmful dye. The class observes how water "climbs" a paper strip, and then students use the technique of chromatography to separate the food coloring into its component dyes. Chromatography is a separation technique that involves having a solvent (in this case, water) travel up a medium (in this case, paper) through a test mixture (in this case, food coloring). Different substances travel different distances up the paper, resulting in the separation of the test mixture. After students have started their chromatography tests, the teacher uses pasta shapes to model what may be happening in a chromatography test on the nanoscale. This model helps students see that the properties of different types of

Digital Resources

- Classroom Slides 1.4 | PowerPoint
- Classroom Slides 1.4 | Google Slides
- All Projections
- Classroom Videos 1.4 | Zip
- Chromatography Observations chart
- Chromatography Diagram: Completed
- Matter Chart: Completed

Work time - Planning

Be prepared to share out the:

- Lesson chosen
- Type of assessment
- “Look Fors” or “Assess for Understanding”
- “Now What” or “Tailor Instruction”
- Personal observations or reflections

Amplify Science sample assessment data collection tool

Grade :
Lesson _____

Look for 1:

Look for 2:

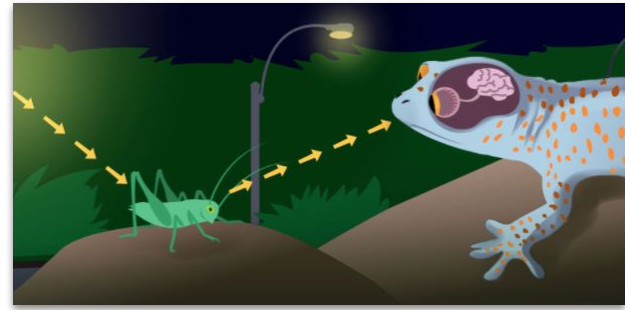
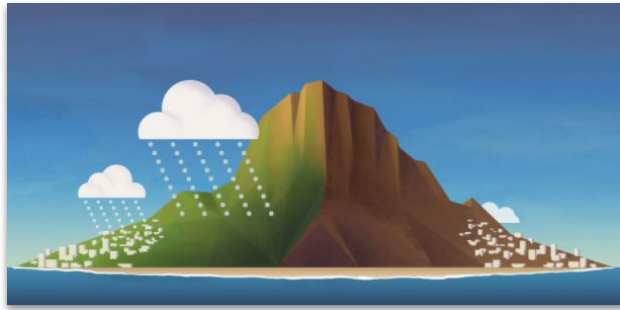
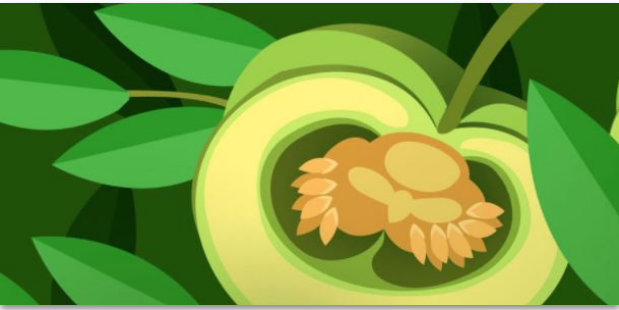
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Share Out

Share:

- Lesson chosen
- Type of assessment
- “Look Fors” or “Assess for Understanding”
- “Now What” or “Tailor Instruction”
- Personal observations or reflections



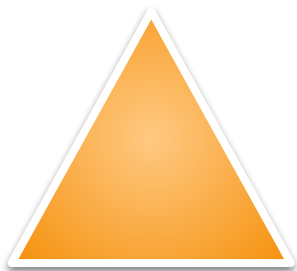


Plan for the day

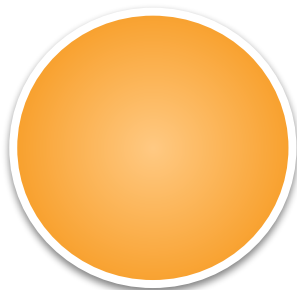
- Introduction
- Assessment System
- Progress Build
- Assessments
- Model Lesson
- Planning
- Closing

Closing reflection

Based on our work today, share:



1-3 big points you're taking away from this session



A question or topic that's still circling in your mind



Something that's "squaring" (resonating) with you from this session

Overarching goals

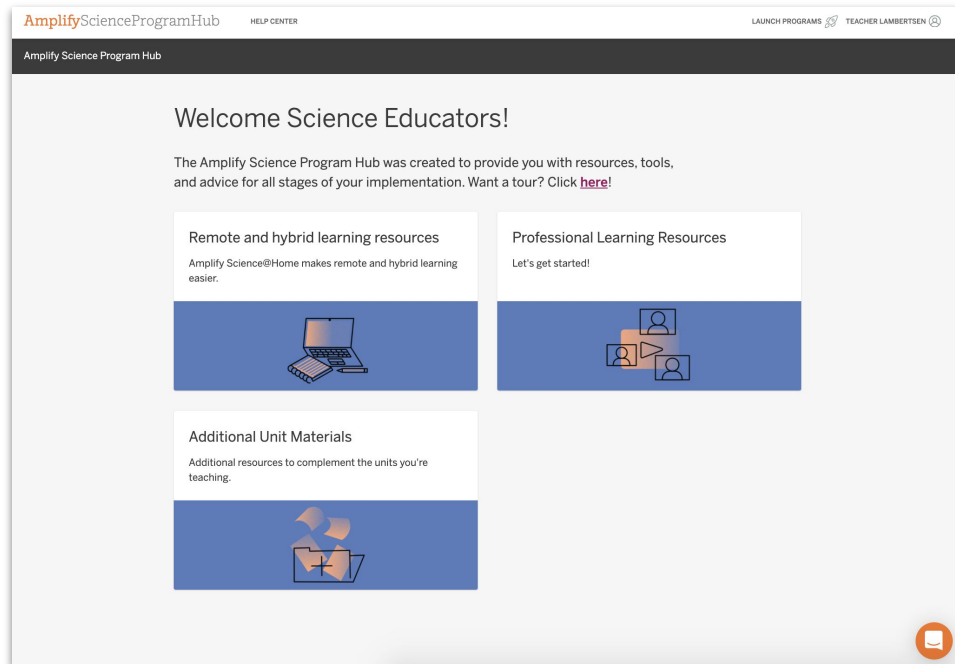
- ☑ Describe the structure and purpose of the Amplify Science Assessment System
- ☑ Plan for the strategic use of assessment resources to analyze and respond to student work

Let's connect
this goal to
our students



Program Hub

- Unit overview videos
- Planning tools
- Remote and hybrid learning resources.



Additional resources and ongoing support

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support.



Amplify Chat

