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

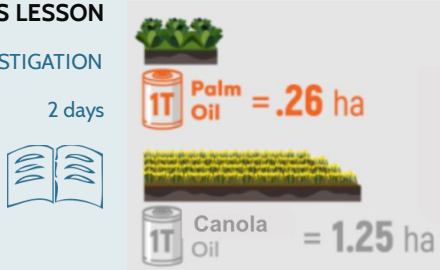
PREVIOUS LESSON

We examined headlines that claimed that our candy buying could affect orangutan populations in the wild. We examined candy ingredients and realized that one ingredient, palm oil, is produced in the same location in which orangutans live. We read about rainforests in Indonesia being cut down to make room for growing oil palm. We wondered how increasing oil palm trees can lead to a decrease in orangutans.

THIS LESSON

INVESTIGATION

2 days



We investigate what it means to be a plantation system and decide that there are different meanings biologically and historically. We then wonder if there is a substitute for palm oil. We obtain information about soybean and canola oil, the two other most commonly consumed vegetable oils. We figure out that all three oils come from farming plants, which requires clearing either prairie or rainforest. We analyze data and realize that palm oil requires much less land and produces way more oil than the other oils. We conclude that any oil would require clearing land for farming and that palm oil is very efficient, producing a lot of oil in a small amount of land, so it is probably not going away. This makes us wonder if there is somewhere else to grow palm oil so that we won't harm orangutans.

NEXT LESSON

We will identify places around the world that have suitable abiotic conditions for growing oil palm plants. We will compare those locations to that of tropical forests. We will figure out that both kinds of plants share the same abiotic requirements and compete for the same space. This will make us wonder more about how farmers harm the ecosystems in these areas that were there first.

BUILDING TOWARD NGSS

MS-LS2-1, MS-LS2-2, MS-LS2-4, MS-LS2-5

WHAT STUDENTS WILL DO

Define a pattern of design problems for systems that provides food resources that humans need (cause) but transforms the land and the biosphere once occupied by native plants and animals (effect).

WHAT STUDENTS WILL FIGURE OUT

- Different kinds of oils that we consume in foods and products come from farmed crops.
- Native plants are removed to make space for crops.
- In comparison to other oils, palm oil requires less land to grow.

Lesson 2 • Learning Plan Snapshot

Part	Duration	Summary	Slide	Materials
1	10 min	**NAVIGATION** Have students discuss their prior knowledge about ingredients from plants and make sense of palm oil as a product and oil palm as a plant by showing a video.	A	chart paper, markers, computer and projector, How to Make Palm Oil video
2	5 min	**PLANTATION SYSTEM INTRODUCTION** Have students examine photographs of oil palm plantations and use what they know to describe what they think a plantation or plantation system means.	B	
3	10 min	**PLANTATION READING IN SMALL GROUPS** Arrange students into small groups to read about one kind of plantation and to answer a set of guiding questions.	C	*Sugar Plantations in the Americas*, *Cotton Plantations in the United States*, *Palm Plantations in Indonesia*
4	10 min	**PRESENTATION AND TIMELINE CONSTRUCTION** Have groups present their plantation system to the class and add notes to a timeline about when and where the plantation existed.	D-E	*Sugar Plantations in the Americas*, *Cotton Plantations in the United States*, *Palm Plantations in Indonesia*, class whiteboard, chart paper, markers
5	10 min	**DISCUSS BIOLOGICAL VERSUS SOCIAL MEANING** Have students discuss what they learned about plantation systems in a purely biological meaning and also historically and socially. Settle on wanting to use a different word to describe oil palm plantations.	F	
				End of day 1
6	5 min	**NAVIGATION** Focus on the lesson question and revisit ideas for how to investigate possible palm oil substitutes.	G-I	Driving Question Board
7	20 min	**EXAMINE SOYBEAN AND CANOLA OILS AS POSSIBLE SUBSTITUTES** Read and examine data about soybean oil and canola oil. Compare these oils to palm oil.	J-L	*Soybean farms in the Midwest*, *Canola farms in Canada*, *Growing Oil Palm in Indonesia*
8	10 min	**BUILDING UNDERSTANDINGS DISCUSSION** Discuss how all three crops require clearing land for farming, which means reducing native forest or grassland ecosystems. Discuss how palm oil is more efficient at producing oil per area of land than all other oils.	M-N	class whiteboard, chart paper, markers
9	5 min	**ADD TO OUR PROGRESS TRACKER** Record what we have figured out about possible palm oil substitutes in our individual Progress Tracker.	O	
10	2 min	**NAVIGATION** Revisit the DQB and navigate toward the Lesson 3 question: “Can we grow oil palm trees somewhere else so that we’re not cutting down rainforests?”	P	
				End of day 2

Lesson 2 • Materials List

	per student	per group	per class
Lesson materials	• science notebook • *Sugar Plantations in the Americas* • *Cotton Plantations in the United States* • *Palm Plantations in Indonesia* • *Soybean farms in the Midwest* • *Canola farms in Canada* • *Growing Oil Palm in Indonesia*		• chart paper • markers • computer and projector • How to Make Palm Oil video • class whiteboard • Driving Question Board

Materials preparation (15 minutes)

Review teacher guide, slides, and teacher references or keys (if applicable).

Make copies of handouts and ensure sufficient copies of student references, readings, and procedures are available.

Prior to day 1, locate and watch the *How to Make Palm Oil* video located at https://www.teachersopensciedfieldtest.org/palmoil .

Lesson 2 • Where We Are Going and NOT Going

Where We Are Going

This lesson has three important purposes: (1) to have a candid conversation about the different meanings of the word plantation and to adopt a different word going forward, (2) within this unit storyline, this lesson serves to answer some of students' initial questions from Lesson 1 ("Is there a substitute for palm oil?"), while also further complicating the problem for them. Through this lesson, students realize that all oils come from plants, and farming these plants requires clearing native rainforests or grasslands for space. Thus, using another oil would just harm a different ecosystem and the animals that live there; and (3) this lesson also serves to complicate the problem with students realizing that palm oil is the most efficient oil to grow because it requires the least amount of land, so the problem with clearing rainforests for palm oil is likely not going away. Using a substitute oil is not a quick and easy solution.

Where We Are NOT Going

Management of land use is a key idea that will be built throughout this unit, and Lesson 2 serves as an initial introduction to this idea. In Lesson 5, students will broaden their understanding of this phenomena beyond just farming plants for oil to land use changes for farming all plants, as well as animals like livestock, and/or clearing land for neighborhoods and communities. At the end of the full version of this unit (not included in this field test), students will consider land uses that include not only forest or grassland and agriculture as introduced in this lesson, but also developed areas and possibly wetlands.

LEARNING PLAN for LESSON 2

1 · NAVIGATION

10 min

MATERIALS: chart paper, markers, computer and projector, How to Make Palm Oil video

Review ingredients from plants. Review what students know about ingredients that come from plants. This is similar to the list created in Lesson 1, but focused specifically on plant origins. Record on the classroom whiteboard or chart paper a list of ingredients and the plants they come from. Listen and record examples like:

Ingredients in Food	Plant
Maple syrup	Maple tree
Sugar	Sugar cane
Chocolate	Cacao
Flour	Wheat
Corn syrup	Corn
Corn meal	Corn
Peanuts	Peanuts

Discuss palm oil ingredient and oil palm plant. Display **slide A** that depicts part of the class model from Lesson 1 that includes palm oil and oil palm plans. Ask students what they notice about the two words.✱ Listen for students to point out that palm oil and oil palm look similar but are mirror images. Ask students:

- What are some ways for us to remember that palm oil is the product or ingredient while oil palm in the plant?

Work together to discuss strategies and tips for helping to remember and tell the two words apart as they investigate in this unit.

ADDITIONAL GUIDANCE

Add "palm oil" and "oil palm" to your word wall and include a photograph to help students remember the difference between the two words.

Watch a video on how to extract palm oil. Ask 2-3 students to predict how we extract palm oil from oil palm plants based on what students learned in the Maple Syrup unit (e.g., Lesson 12). Watch the *How to Make Palm Oil* video located at https://www.teachersopensciedfieldtest.org/palmoil , which shows how palm kernel are heated and oil is extracted.

Spend about 2-3 minutes sharing noticings from the video, and how this process was similar or different from processes read about in the previous Maple Syrup unit. Use the discussion about the video as a way to practice using words, such as oil palm plant, palm oil kernel, and palm oil.

✱ ATTENDING TO EQUITY

We use palm oil in reference to the product or ingredient and oil palm in reference to the trees. People in the industry tend to distinguish between the two, while the popular press and media mostly use only palm oil. The distinction between the two terms may be difficult for your students, and particularly challenging for your emergent multilingual learners. Use this conversation as an intentional moment to build understanding of these two terms, which students encountered in Lesson 1 and will continue to encounter often in this unit.

2 · PLANTATION SYSTEM INTRODUCTION

5 min

MATERIALS: None

Have students do a Turn and Talk about plantation. Display **slide B**, which shows different images of oil palm plantations. Give students 2-3 minutes to turn to a partner and share what they think of when they hear the word "plantation" and see the images.✱

Elicit from partners ideas they would like to share with the class. This is an opportunity to share what they think about when they hear the term "plantation".

✱ ATTENDING TO EQUITY

As mentioned in Lesson 1, *plantation* is used to describe where oil palms are farmed. This terminology is commonly used for oil palm agriculture globally and is also

Say, *I was surprised to see that the word plantation is still used today to describe where oil palm is grown. To me, it seemed like a word we don't use anymore because it's a word that represents a tragic time in American history. I wondered why they call these places "plantation" instead of a farm, which is what I tend to call places that grow crops. Let's do a little more investigation about plantation systems and what a plantation means. This may help us understand what is going on in these places.*

widespread in other crop industries, like banana and rubber. In the United States, many students may associate the word *plantation* with exploited or slave labor, particularly in the American south leading to the Civil War. This is your opportunity to have a conversation with students about the meaning of the word both in terms of its biological meaning and its historical and social use.

3 · PLANTATION READING IN SMALL GROUPS

10 min

MATERIALS: science notebook, *Sugar Plantations in the Americas*, *Cotton Plantations in the United States*, *Palm Plantations in Indonesia*

ADDITIONAL GUIDANCE

There are two copies of each reading. One copy is the color copy located in the back of the Student Edition behind the reading section. The other copy is a handout to download and print. If you want students to mark the text, they can use the handout version. Otherwise, students can read the text using their Student Editions. The readings include: (1) *Sugar Plantations in the Americas*, (2) *Cotton Plantations in the United States*, (3) *Palm Plantations in Indonesia*.

Preview the purpose of the activity. Arrange students into groups of 3 for the reading activity. Multiple groups will read the same text as there are only 3 of them. Display **slide C** which includes directions for the activity and a set of guiding questions for students. The guiding questions include:

- When did this plantation system start?
- Where was this type of plantation prominent?
- How would you describe the plantation system?
- How was it similar or different from farms that we have in the U.S. today?

Give students about 5-7 minutes to read the text silently on their own. Then prompt students to discuss with their group the guiding questions on **slide C**, referencing the text to support their answers.

4 · PRESENTATION AND TIMELINE CONSTRUCTION

10 min

MATERIALS: science notebook, *Sugar Plantations in the Americas*, *Cotton Plantations in the United States*, *Palm Plantations in Indonesia*, class whiteboard, chart paper, markers

Background about the word plantation. Display **slide D.** Introduce students to background information about the word plantation. Since plantation started to be used around 1450, draw a timeline on the class whiteboard or chart paper from the year 1450 to present day. Say, *Let's use what we read about to construct a new understanding of plantations long ago and what they mean today .*

Have groups with the sugar cane plantation system to present first. Display **slide E.** Several groups read about sugar cane plantations in the Caribbean. Ask these groups to designate one person to represent their group. Each group should send one group member to the front of the class to represent their group's thinking. Have the groups report out what they learned about the plantation system using the guiding questions.

As the students share, have one group representative document on the whiteboard or chart paper dates, locations, and information about the plantation system.

Repeat the same presentation and timeline process with cotton plantations and oil palm plantations.

5 · DISCUSS BIOLOGICAL VERSUS SOCIAL MEANING

10 min

MATERIALS: None

Facilitate a whole group discussion looking across the cases. Display **slide F**. Use the prompts on the slide to generate a shared understanding of what the word "plantation" means biologically and historically and socially.

Suggested prompt	Sample student response
How would you describe a plantation if you considered the biological meaning only?	*They are large areas of land in which only one crop was grown.* *A large estate of land that grew one crop.* *A large piece of land that farms one type of crop.*
How would you describe a plantation if you considered the historical and social meaning?	*Slavery and forced labor.* *Taking land from islanders or indigenous people.* *Wealthy, white European trying to make money.*

Focus on oil palm plantations today. Say, *We're going to study the oil palm plantations more to help us figure out what is happening to the rainforests and orangutans. Sometimes we may come across the word plantation and we know more about what these plantations means now that we've done some more investigation. The people in Indonesia that work on oil palm plantations aren't necessarily slaves, but it is hard work and many do not get paid very much. I'm wondering if we could consider calling these places a different word that doesn't have all the negative historical and social meanings we learned about?*

Generate alternative words. Give students time to talk with a partner to brainstorm other words that could be used instead of plantation. Then elicit from students alternative words, which could include: *Farm, orchard, grove.*

Decide as a class to use an alternative word that does not have the same negative social and historical meanings as the word "plantation". Use this word through the remainder of the unit.

ADDITIONAL GUIDANCE

The development team decided to use the term "farm" for the remainder of the unit. We did not want to put students in an uncomfortable position should the frequent use of the word plantation upset them. Using a word like plantation regularly can also normalize a very problematic issue. Most unit documents will use "palm farm" or "oil palm farm." It is your choice what word to use going forward and ideally your class will agree on a word they prefer. Plantation is the language of the trade, so you may choose to adopt that language and continue to use it throughout. The tradeoff to our decision to call palm plantation "farms" is that by calling them farms we background unfair labor practices on some plantations today. We decided that using a familiar word that is comfortable to students outweighed using the more accurate, but socially-laden word.

End of day 1

6 · NAVIGATION

5 min

MATERIALS: Driving Question Board

Focus students on one DQB question posed by many students: "Is there a substitute for palm oil?" Reference the DQB and remind students that many of them wondered if foods and products could use some other kind of oil.✱ Project **slide G** and have a few students share with the whole class information that the class thought would be helpful to answer this question.

Suggested prompt	Sample student response
What information did we say would be helpful to answer this question?	*Information about other oils or substances that can do the same thing that palm oil does in food or beauty products.*
What other kinds of vegetable oils have you seen before?	*Vegetable oil, olive oil, canola oil, peanut oil, and sesame oil.*

Introduce other types of vegetable oil. Say, *There are a lot of different kinds of oils, and they can help products or foods achieve the right consistency, like palm oil does. Let's take a look at the vegetable oils that are consumed worldwide.* Project **slide H** and lead a brief class discussion about what students notice about these oils and their prior experiences.

Suggested prompt	Sample student response
What do you notice about vegetable oil that is consumed worldwide?	*Palm oil and soybean oil are used the most.* *There are not that many kinds of oils commonly used.*
Is anything surprising to you?	*There isn't any oil called "vegetable oil."* *Olive oil is not on the list.*
Do you have any experience using any of these oils?	*Accept all answers.*

Observe common vegetable oil ingredients. Project **slide I** and have students look at the main ingredients in different vegetable oils.✱ Point out that the main ingredients in these two vegetable oils are soybean and canola oil.

✱ SUPPORTING STUDENTS IN ENGAGING IN ASKING QUESTIONS AND DEFINING PROBLEMS

Referencing the DQB reminds students that the purpose of the unit work is to investigate questions students have posed that the class is taking up together. Many students will likely have wondered if there is a substitute for palm oil. Reminding them that this question came from the class can help to motivate the class and maintain student interest.

✱ ATTENDING TO EQUITY

Students may not realize that "vegetable oil" is often made from soybean, canola, sunflower, or a mixture of several different kinds of oil. They may also not realize that these oils are found in many of the foods they eat. Prompt students to look at the ingredients list on vegetable oils and other processed foods that they have at home and report back to share if they contain soybean, canola, palm, sunflower, or any other oil. This is an important way of helping students connect the learning in this unit as relevant to their lives; it is directly connected to foods that students eat and products that they consume.

7 · EXAMINE SOYBEAN AND CANOLA OILS AS POSSIBLE SUBSTITUTES

20 min

MATERIALS: science notebook, *Soybean farms in the Midwest*, *Canola farms in Canada*, *Growing Oil Palm in Indonesia*

Focus on soybean and canola oils as possible substitutes. Say, *Palm oil is the most commonly consumed vegetable oil. Let's investigate soybean and canola oils, the next most commonly consumed oils, to see if they could be possible substitutes.* ✱

Pre-reading strategy. Tell students you have short readings about the two kinds of oil. Share a purpose for reading in pairs: to learn more about soybean and canola oils and compare them to palm oil. Divide students into groups of four and then into pairs within each group. Have each pair decide if they want to read about either *Soybean farms in the Midwest* or *Canola farms in Canada*. You have two copies of these cases. The first copy is printed in color in the Reference section of the *Student Edition*. A second copy is included as a handout (*Reference: Soybean farms in the Midwest* and *Reference: Canola farms in Canada*) for printing, writing on, and attaching to students' science notebooks. You can use either option for this activity.

✱ ATTENDING TO EQUITY

To support student motivation and relevance, if students live near large-scale soybean or canola farms, ask students to consider what the native habitat was in their area before these farming operations. Likewise, ask your students if they have ever driven through large-scale agriculture

Make a box and T-chart organizer for comparisons. Present **slide J** and model how to make a box and T-chart. Give students time to make that chart in their science notebooks. Explain that notes about what the different kinds of oils have in common can go in the "similar" category, and notes about how palm oil and soybean/canola oil are different can go in each of the bottom boxes.

Similar

Different	
Palm oil	**Canola oil/Soybean oil**

ADDITIONAL GUIDANCE

For the differences, encourage students to compare the same property or characteristic by placing those ideas across from each other on the chart. For example, for where it is grown, it might say that palm oil is grown where there are rainforests, BUT canola/soybean oil are grown where there are prairies.

Read about soybean and canola oils. Give students time to work in pairs to read about either *Soybean farms in the Midwest* or *Canola farms in Canada*. Then have students compare what they have read about canola or soybean oil to what they have read about *Growing Oil Palm in Indonesia*.

Share information about canola and soybean oils. Project **slide K** and give students time to work in groups of four to share about their oils, compare all three oils, and discuss whether canola or soybean oil are possible substitutes for palm oil.

Example box and T-chart:

Similar
• *All three oils are used in foods, as well as products.* • *Growing all of these oils means clearing land to grow the crops.* • *Farming causes some populations of organisms who lived there to decline (orangutans and bison).*

Different	
Palm oil	**Canola oil/Soybean oil**

or seen what this looks like on television or the internet. Ask students if they have ever been to a tallgrass or shortgrass prairie. This can help students relate to people who live near the palm oil industry by connecting to their own experiences of living near or experiencing large soybean or canola farms (or other crop).

• Cut down rainforests • Uses less land (½ football field for 1 ton) • Affects orangutans • Comes from the fruit and kernel	• Cut down prairies • Uses more land (2-4 football fields for 1 ton) • Affects bison and other species • Comes from the seeds

Discuss similarities and differences as a whole class. Have a few groups of students share out their responses to how palm oil is similar to and different from canola and soybean oils.

Suggested prompt	Sample student response
How is your oil similar to and different from palm oil and the other group's oil?	*Similar:* • *All three oils are used in foods, as well as products.* • *Growing all of these oils means clearing land to grow the crops.* • *Farming causes some populations of organisms who lived there to decline (orangutans and bison).* *Different:* • *Palm oil uses less land than canola and soybean oils.* • *Canola and soybean oils are both grown in places with prairie, but palm oil is grown where there used to be rainforest.*

Unpack differences in land required to produce canola, soybean, and palm oils. After students share differences between the oils in terms of land use (e.g., when you hear students say "palm oil requires less land for the same amount"), say, *I have additional information about land use. Let's see if this helps us understand these differences more*. Project **slide L** and continue the whole-class discussion.

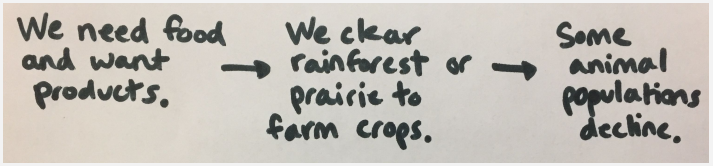
Suggested prompts	Sample student responses	Follow-up questions
How do these oils compare in terms of how much land is used? How much oil is produced?	*Palm oil uses less land than the others. Palm oil produces more oil in the same amount of land.*	*Why might the amount of oil produced on the same amount of land matter?* *Why might the amount of land used matter?* *Who does it matter for?*
Do you think canola or soybean oil could be possible substitutes for palm oil? Use evidence from the readings to back up your claims.	*Yes, it seems like you could substitute these oils because they are also used in food and other cosmetic products.* *No, you also have to clear land to grow these oils, which is bad for ecosystems; it's just for different ecosystems in different parts of the world.*	

8 · BUILDING UNDERSTANDINGS DISCUSSION

10 min

MATERIALS: class whiteboard, chart paper, markers

Discuss patterns across the cases. Have groups return to a whole-class discussion to share patterns and similarities that they have noticed across these three cases and then answer the lesson question(**slide M**).✱ Focus students first on patterns from the readings to discuss the similarities of how we get resources from the environment. As students share out the patterns, chart the cause-and-effect relationships they share on the whiteboard or a piece of chart paper.



Then discuss if either of these oils are a good substitute for palm oil (**slide N**). Have students share arguments based on the evidence they have gathered from the readings and infographics to answer the question: "Is there a substitute for palm oil?"

KEY IDEAS

Purpose of the discussion: To realize that humans depend on the land and the biosphere to get what we need, specifically to grow crops that we use for food, as well as in other products.

We know from the Maple Syrup unit that almost all ingredients in processed foods can be traced back to plants. Students should realize that other oils can be substitutes for palm oil but that palm oil is more efficient in terms of land use, which means less native forest or grassland needs to be cleared to grow it. This is part of why its production is increasing and why is it not realistic to stop growing it.

Listen for students' ideas:

- All oils can be used for food or in other products.
- All oils come from plants grown as crops, and those crops need land to grow.
- There was a native ecosystem there before we started growing crops.
- To farm or grow crops, we clear land, which means that we remove or change the ecosystem that was there before.
- Palm oil is more efficient than other oils because it requires less land to grow and produces more oil per land than other oils.

Suggested prompts	Sample student responses	Follow-up questions
What patterns do you notice that are similar across these three different types of oil?	*All three of these crops used to make oil are grown for food or used in products.* *All three of these crops need land to grow.* *We clear ecosystems to grow all three of these crops.*	*Are there patterns in what happens to the ecosystem that was there before farming happened?*
Are canola or soybean oil a possible substitute for palm oil?	*Yes, they can both be used in food or cosmetic products.*	*Are they a good substitute?* *What would make another oil a good substitute?*

✱ SUPPORTING STUDENTS IN DEVELOPING AND USING PATTERNS

Have students start by thinking about patterns in land use across the three farming cases. Then, prompt students to think about what kinds of cause-and-effect relationships might be present here.

Suggested prompts	Sample student responses	Follow-up questions
Are canola or soybean oil a good substitute for palm oil?	*It doesn't seem like canola or soybean oil are better. These oils also need land to grow, which means prairies have to get cut down. Even though orangutans would be okay, other animals, like bison, would suffer.* *Palm oil uses a lot less land and produces a lot more oil in the same amount of land as the other options.*	*Which oil is better in terms of how much land is needed?*

At this point you will want to define and discuss "land use change" and add this term to your word wall.

9 · ADD TO OUR PROGRESS TRACKER

5 min

MATERIALS: science notebook

Revisit the DQB question and answer the lesson question individually. Remind students about how many of them wondered if there was a substitute and that was the lesson question.

Set up the Progress Tracker for an individual reflection. Explain to students that we want to take some individual time to capture what we have figured out from our reading about different types of oils. Have students turn to the Progress Tracker section in their notebooks. Use **slide O** to guide students in drawing a T-chart on the first page of this section and to complete the 2 columns, filling in the lesson question: "Is there a substitute for palm oil?" This should be followed by their response.✱

Give students 3-5 minutes to quietly update their Progress Tracker, using words and drawings to show what they have figured out about possible palm oil substitutes. Ask students to draw a line underneath their responses when they are done. Prompt students to use patterns from readings they have reviewed.

✱ ATTENDING TO EQUITY

The individual Progress Tracker is a space for students to be creative and to synthesize learning in their own words and drawings at the end of a lesson. It is not supposed to follow a prescriptive plan or structure and should be a low-stakes opportunity for students to make sense of what they are learning without the worry and anxiety that comes with knowing their work will be graded. Students have already engaged in discussion about this question, so the Progress Tracker provides an additional modality for students to express their understanding and reasoning in their own way. Encourage students to express what they have learned using a mode that makes sense for them.

10 · NAVIGATION

2 min

MATERIALS: science notebook

Revisit the DQB to navigate to the next lesson. Project **slide P**. Say, *It seems like palm oil is the most efficient oil and is a better ingredient than other oils. So the problem is more complicated, and it's unlikely that palm oil will go away. Let's revisit our DQB to see what other questions we had about palm oil.*

Give students a minute to review questions on the DQB and then take suggestions for next possible questions from the class. If no one brings up questions about trying to grow palm oil somewhere else, prompt students with: "If palm oil is not going away, how could we still grow palm oil and not hurt orangutans?"

Additional Lesson 2 Teacher Guidance

SUPPORTING STUDENTS IN MAKING CONNECTIONS IN ELA

CCSS.ELA-LITERACY.RST.6-8.2: Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

On day 1, students read about *Sugar Plantations in the Americas*, *Cotton Plantations in the United States*, and *Palm Plantations in Indonesia* and figure out that plantations have a biological meaning and a social and historical meaning. They share their prior knowledge about plantation prior to reading and update their understanding after reading and discussion.

On day 2, *Soybean farms in the Midwest*, *Canola farms in Canada*, and *Reading: Growing Oil Palm in Indonesia* and the box and T-chart organizer provide an opportunity for students to synthesize the central ideas of the text around the question: "How is the palm oil similar to and different from canola or soybean oil?"