March 12, 2019

MOTION AND MATTER—*Investigation 4, Part 2*

Investigation 4, Part 2:

Reactions

Teacher Notes

Complete Teacher Notes

Full Option Science System FOSS

Investigation 4, Part 2

Focus Question

- What happens when you mix two materials?

Teacher Notes

IG pg. 228, Steps 1–2

March 12, 2019

Science Safety

Full Option Science System FOSS

1. Listen carefully to your teacher's instructions. Follow all directions. Ask questions if you don't know what to do.
2. Tell your teacher if you have any allergies.
3. **Never put any materials in your mouth. Do not taste anything unless your teacher tells you to do so.**
4. Never smell any unknown material. If your teacher tells you to smell something, wave your hand over the material to bring the smell toward your nose.
5. Do not touch your face, mouth, ears, eyes, or nose while working with chemicals, plants, or animals.
6. **Always protect your eyes. Wear safety goggles when necessary. Tell your teacher if you wear contact lenses.**
7. Always wash your hands with soap and warm water after handling chemicals, plants, or animals.
8. Never mix any chemicals unless your teacher tells you to do so.
9. Report all spills, accidents, and injuries to your teacher.
10. Treat animals with respect, caution, and consideration.
11. Clean up your work space after each investigation.
12. Act responsibly during all science activities.

Investigation 4, Part 2

Baking Soda and Vinegar

Materials:

Station 1
4 safety goggles
1 balance and mass set
3 plastic cups

Station 2
1 spoonful of baking soda in one cup

Station 3
50 mL vinegar in another cup

In our procedure, we will

- ***determine*** the mass of the baking soda and vinegar *before* mixing.
- ***predict*** what the mass of the baking soda and vinegar will be *after* mixing.
- ***determine*** the mass of the baking soda and vinegar *after* mixing.

Teacher Notes

IG pg. 228–229, Steps 3 and 5

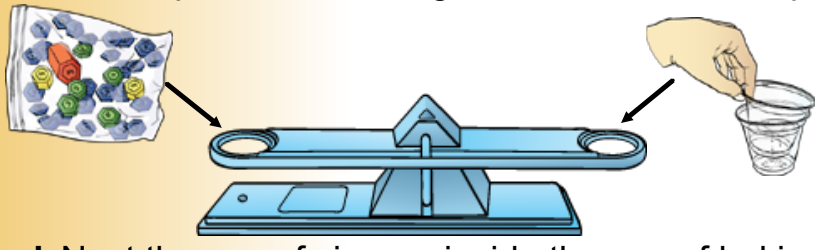
Investigation 4, Part 2

Baking Soda and Vinegar

Full Option Science System FOSS

Procedure:

a. Put on safety goggles.
b. Put 50 mL of vinegar into one cup.
c. Put 1 spoonful of baking soda into another cup.



Time

d. Nest the cup of vinegar inside the cup of baking soda.
e. Weigh the nested cups and **record** the mass.
f. Leave the mass pieces in the balance.
g. Take off the nested cups and SLOWLY pour the vinegar into the baking soda cup. Take turns. Stir with a stick.
h. Predict the mass of the mixture (more, same, or less than the parts). **Record** your prediction.
i. Put the mixture into the empty vinegar cup.
j. Find and **record** the final mass.

Teacher Notes

IG pg. 228–229, Steps 4–6

Investigation 4, Part 2

Results

Full Option Science System FOSS

Group	Starting mass	Ending mass	Difference
1			
2			
3			
4			
5			
6			
7			
8			

Teacher Notes

IG pg. 229–230, Steps 7–10

Investigation 4, Part 2

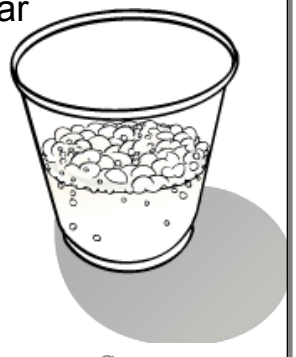
Chemical Reactions

You mixed a solid substance and a liquid substance in a cup. As a result of the mixing, a gas substance formed. The gas was a new material.

When two or more materials are mixed, and a new material with different properties forms, a **chemical reaction** has occurred.

The gas that is formed when baking soda and vinegar mix together is called **carbon dioxide**.

Why do you think the mass of the baking soda and vinegar mixture was less than the mass of the starting materials?



IG pg. 231, Steps 11–12

Teacher Notes

Investigation 4, Part 2

Clean Up!

Full Option Science System FOSS

- Return all equipment and materials to the materials station.
- Rinse the cups and set them out to dry.

Teacher Notes

IG pg. 231, Step 13

Investigation 4, Part 2

Vocabulary Review

Teacher Notes

IG pg. 231, Step 14

Investigation 4, Part 2

Focus Question

Full Option Science System FOSS

- What happens when you mix two materials?

Describe all that you learned can happen when two materials are mixed.

Teacher Notes

IG pg. 231–232, Steps 15–16

Investigation 4, Part 2

Reading in Science Resources

Full Option Science System FOSS

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IG pg. 233–234, Steps 17–19

March 12, 2019

Investigation 4, Part 2

Wrap-Up/Warm-Up

Full Option Science System FOSS

- What happens when you mix two materials?

Discuss the focus question in your groups.

Teacher Notes

IG pg. 234, Step 20

March 12, 2019

Investigation 4, Part 2

Motion and Matter

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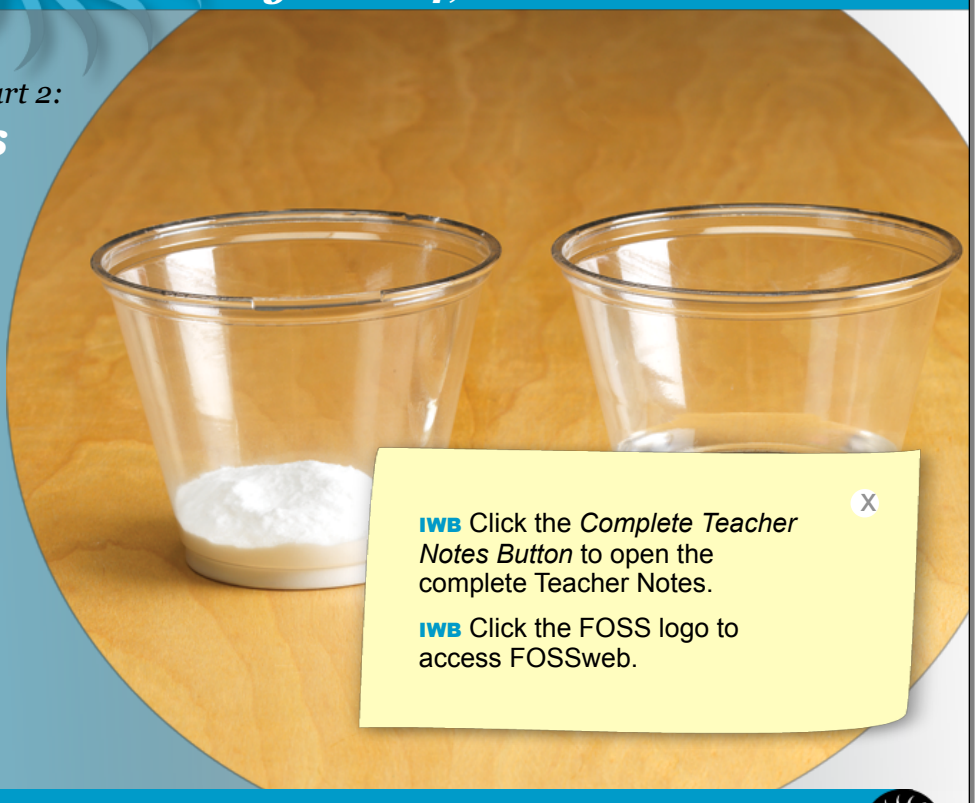
MOTION AND MATTER—*Investigation 4, Part 2*

Investigation 4, Part 2:
Reactions



IWB Click the *Complete Teacher Notes Button* to open the complete Teacher Notes.

IWB Click the FOSS logo to access FOSSweb.

Teacher Notes

Complete Teacher Notes

Full Option Science System FOSS

Investigation 4, Part 2

Focus Question

Full Option Science System FOSS

- What happens when you mix two materials?

Motion and Matter, IG pg 228, Steps 1–2

Review with students what might happen when you mix solid and liquid materials.

Introduce the new materials: a liquid—vinegar—and a solid powder—baking soda.

Tell students that they will continue to investigate the same focus question. Students can either refer to the previous investigation or write the focus question again in their notebooks.

New Word Introduce *vinegar*.

vinegar: a sour liquid used in cooking and cleaning

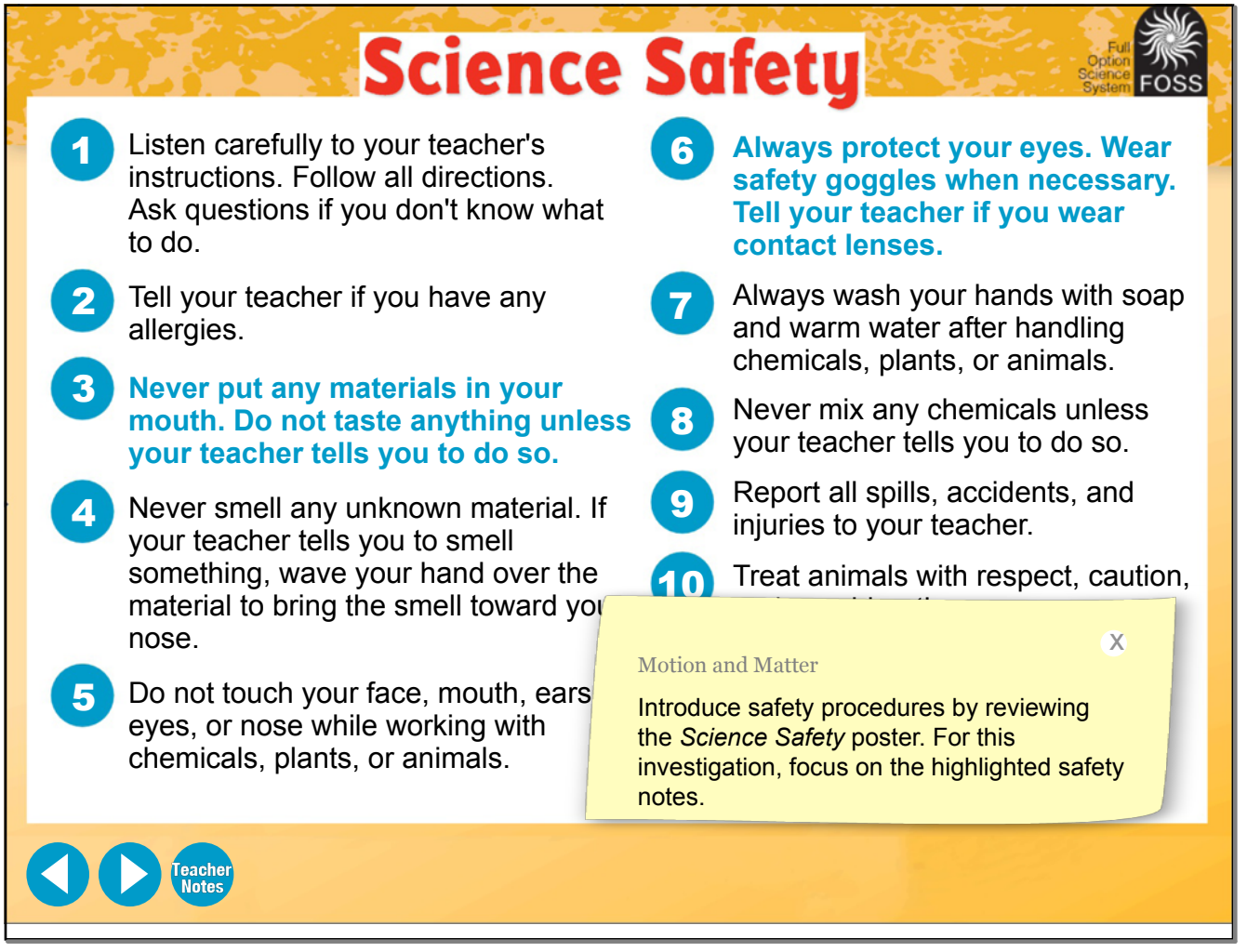
New Word Introduce *baking soda*.

baking soda: a white powdery solid used in baking and cleaning

Add all new words to the word wall.

Teacher Notes

IG pg. 228, Steps 1–2


Science Safety
Full Option Science System FOSS
1 Listen carefully to your teacher's instructions. Follow all directions. Ask questions if you don't know what to do.
2 Tell your teacher if you have any allergies.
3 Never put any materials in your mouth. Do not taste anything unless your teacher tells you to do so.
4 Never smell any unknown material. If your teacher tells you to smell something, wave your hand over the material to bring the smell toward you
nose.
5 Do not touch your face, mouth, ears eyes, or nose while working with chemicals, plants, or animals.
6 Always protect your eyes. Wear safety goggles when necessary. Tell your teacher if you wear contact lenses.
7 Always wash your hands with soap and warm water after handling chemicals, plants, or animals.
8 Never mix any chemicals unless your teacher tells you to do so.
9 Report all spills, accidents, and injuries to your teacher.
10 Treat animals with respect, caution,
X
Motion and Matter
Introduce safety procedures by reviewing the Science Safety poster. For this investigation, focus on the highlighted safety notes.
Teacher Notes

Investigation 4, Part 2

Baking Soda and Vinegar

Materials:

Station 1
4 safety goggles
1 balance and mass set
3 plastic cups

Station 2
1 spoonful of baking soda in one cup

Station 3
50 mL vinegar in another cup

In our procedure, we will

- ***determine*** the mass of the baking soda and vinegar *before* mixing.
- ***predict*** what the mass of the baking soda and vinegar will be *after* mixing.
- ***determine*** the mass of the

Motion and Matter, IG pg 228–229, Steps 3 and 5

Discuss the main points of the investigation (see Step 3), and show students how you have set up the materials.

The procedure follows on the next slide.

Teacher Notes

IG pg. 228–229, Steps 3 and 5

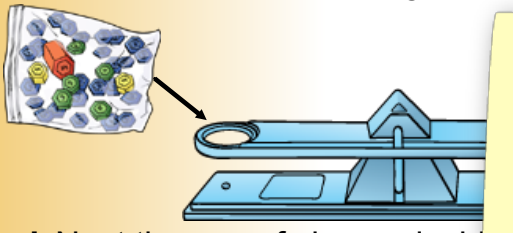
Investigation 4, Part 2

Baking Soda and Vinegar

Full Option Science System FOSS

Procedure:

a. Put on safety goggles.
b. Put 50 mL of vinegar into one cup.
c. Put 1 spoonful of baking soda into another cup.



d. Nest the cup of vinegar insid
e. Weigh the nested cups and
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g. Take off the nested cups and
into the baking soda cup. Ta
h. Predict the mass of the mixt
Record your prediction.
i. Put the mixture into the emp
j. Find and **record** the final m

Teacher Notes

Motion and Matter, IG pg 228–229, Steps 4–6

Distribute notebook sheet 15, *Baking Soda and Vinegar*.

Go step-by-step through the procedure, which is condensed from the notebook sheet. Don't actually mix the baking soda and vinegar during the demonstration.

As students work through the investigation, make sure you check their procedures. (See Step 6.)

IWB Click the *Notebook Button* to open notebook sheet 15.

IWB Use the *Pen Tool* to write when you want students to finish the activity.

Investigation 4, Part 2

Results

Full Option Science System FOSS

Group	Starting mass	End
1		
2		
3		
4		
5		
6		
7		
8		

Motion and Matter, IG pg 229–230, Steps 7–10

Ask each Reporter to transcribe his or her group's results in the table.

Discuss the possibility of repeating the investigation for accuracy. (See Step 8.)

Analyze the results. Give students time to discuss the discrepancy between the mass of the baking soda and vinegar before mixing and the mass of the mixture.

Ask students the follow-up questions in Step 9 to try to figure out why the masses are different this time.

Ask students to compare their group data to the rest of the class. Ask the question in Step 10 and discuss.

IWB Reporters can use the *Pen Tool* to record their responses.

Teacher Notes

IG pg. 229–230, Steps 7–10

Investigation 4, Part 2

Chemical Reactions

Full Option Science System FOSS

You mixed a solid substance and a liquid substance in a cup. As a result of the mixing, a gas [illegible] new material.

When two or more material[s] different properties forms, a[ ]

The gas that is formed whe[n] together is called **carbon d[ioxide]**.

Why do you think the mass[of the] mixture was less than the [sum of the]

Motion and Matter, IG pg 231, Steps 11–12

Carefully lead students through the discussion in Steps 11 and 12. It is important that they understand what a chemical reaction is and that gas has mass. That is why the mass decreased when the bubbles formed and popped.

New Word Introduce *chemical reaction*.

chemical reaction: an interaction between materials. The interaction produces one or more new materials that have different properties from the starting materials.

New Word Introduce *carbon dioxide*.

carbon dioxide (CO_2): a gas made of carbon and oxygen

Add all new words to the word wall.

IWB You can use the *Pen Tool* to record students' responses.

Teacher Notes

IG pg. 231, Steps 11–12

Investigation 4, Part 2

Clean Up!

Full Option Science System FOSS

- Return all equipment and materials to the materials station.
- Rinse the cups and set them out to dry.

Motion and Matter, IG pg 231, Step 13

Clean up.

IG pg. 231, Step 13

Teacher Notes

Investigation 4, Part 2

Vocabulary Review

Full Option Science System FOSS

Motion and Matter, IG pg 231, Step 14

Review vocabulary.

IWB You can use the *Pen Tool* to write class definitions beside the words or use this slide as a vocabulary resource/reminder.

IWB Click each word to reveal its definition at the top of the page.

NOTE: This file was developed based on the FOSS 3rd Edition for Measuring Matter. Please make sure to also review the following words with students:

vinegar: a sour liquid used in cooking and cleaning

baking soda: a white powdery solid used in baking and cleaning

These words should find a permanent place on a word wall in your classroom so that they are always accessible to students.

Teacher Notes

IG pg. 231, Step 14

Investigation 4, Part 2

Focus Question

Full Option Science System FOSS

What happens when you mix two materials?

Describe all that you learned can happen when two materials are mixed.

Motion and Matter, IG pg 231–232, Steps 15–16

Ask students to answer the focus question in their notebooks.

Assess progress as suggested in the "What to Look For" in Step 16.

Teacher Notes

IG pg. 231–232, Steps 15–16

Investigation 4, Part 2

Reading in Science Resources

Full Option Science System FOSS

Motion and Matter, IG pg 233–234, Steps 17–19

Turn to page 51, "Reactions," in *Science Resources*. Have students read the selection as described in Step 17.

Use a Frayer model to help develop this concept. See a description of this activity in Step 17. You can create a new slide to do this activity or use chart paper.

Discuss the reading as described in Step 18.

Have students engage in the "Chemical Reactions" tutorial to review the criteria for a chemical reaction and the concept of conservation of mass. The link to this activity for teachers is in the Resources by Investigation and in the Digital-Only Resources, and for students in the Online Activites on FOSSweb.

NOTE: You must be connected to the Internet and logged into FOSSweb to access the tutorial.

For reading strategies to support English learners and below-grade-level readers, see the Science-Centered Language Development chapter in *Teacher Resources*.

Teacher Notes

IG pg. 233–234, Steps 17–19

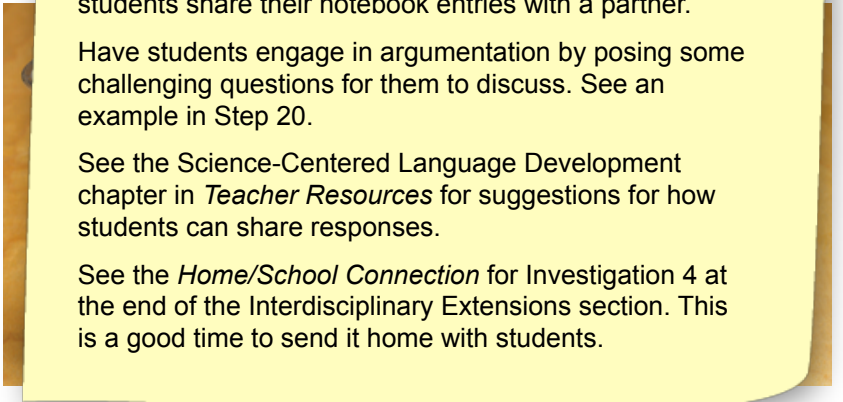
Investigation 4, Part 2

Wrap-Up/Warm-Up

Full Option Science System FOSS

- What happens when you mix two materials?

Discuss the focus questic



Motion and Matter, IG pg 234, Step 20

Wrap-Up/Warm-Up

Conclude this part or start the next part by having students share their notebook entries with a partner.

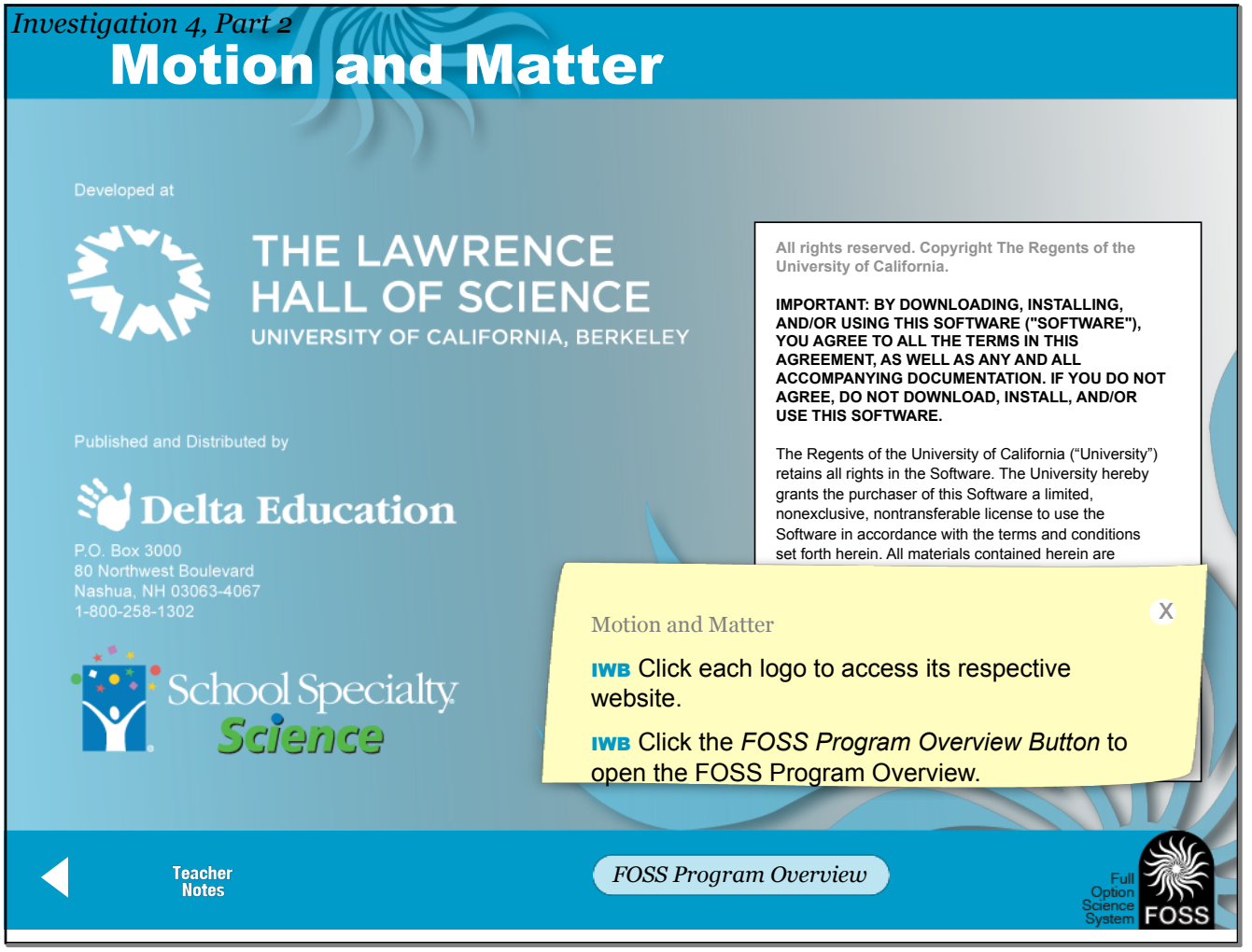
Have students engage in argumentation by posing some challenging questions for them to discuss. See an example in Step 20.

See the Science-Centered Language Development chapter in *Teacher Resources* for suggestions for how students can share responses.

See the *Home/School Connection* for Investigation 4 at the end of the Interdisciplinary Extensions section. This is a good time to send it home with students.

Teacher Notes

IG pg. 234, Step 20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