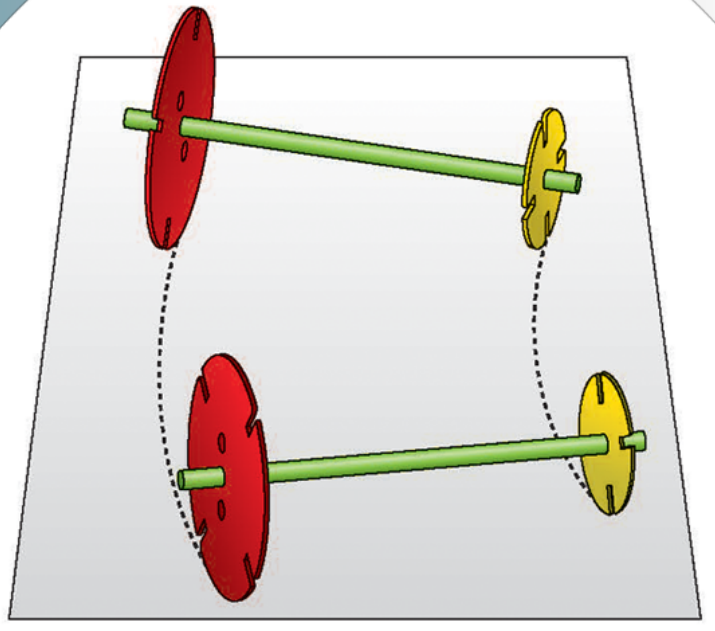
March 12, 2019

MOTION AND MATTER—*Investigation 2, Part 2*

Investigation 2, Part 2:

Predicting Motion of New Systems



Teacher Notes

Complete Teacher Notes

Full Option Science System FOSS

Investigation 2, Part 2

Focus Question

Full Option Science System FOSS

Wheels are not the only things that roll.

What do you predict the motion of this cup will be if I were to let it roll down a ramp?

- What rules help predict where a rolling cup will end up?

Teacher Notes

IG pg. 136, Steps 1–2

Investigation 2, Part 2

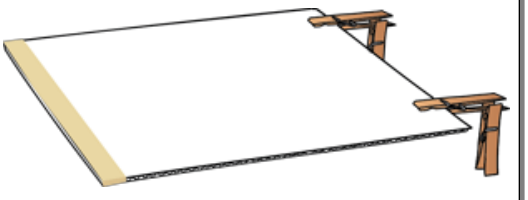
Rolling Cups

Full Option Science System FOSS

Explore how paper cups roll on ramps.

Time

Materials (per pair)
1 ramp
4 clothespins
2 paper cups



Why did the cup roll in a curve instead of straight?

What determines which direction the cup will roll?

What else did you discover about rolling cups from your investigations?

How does a rolling cup compare to a wheel-and-axle system?

Teacher Notes

IG pg. 136, Steps 3–4

Investigation 2, Part 2

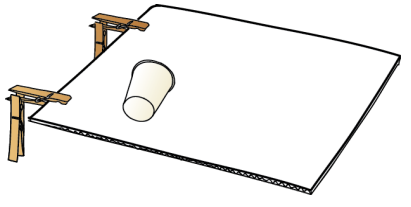
More Paper Cup Challenges

Full Option Science System FOSS

Try these challenges. You may get any additional materials you think you need from the materials station.

1. Pretend your cup is a car and the ramp is a parking garage. Roll the cup off the ramp so that it ends up parked under the ramp.
2. Modify your paper-cup system so that it rolls down the ramp in a straight line.
3. Add weight to your paper-cup system. What happens?

Record your designs and observations in your notebooks.



Time

Teacher Notes

IG pg. 137–138, Steps 5–9

Investigation 2, Part 2

Clean Up!

- Carefully disassemble the cups.
- Return all materials to the materials station.

Teacher Notes

IG pg. 138, Step 10

Investigation 2, Part 2

Weighted Systems

What effect did the pennies have on the rolling cups?

-

Teacher Notes

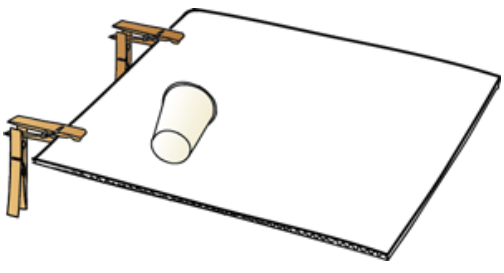
IG pg. 138, Step 11

Investigation 2, Part 2

Focus Question

Full Option Science System FOSS

- What rules help predict where a rolling cup will end up?



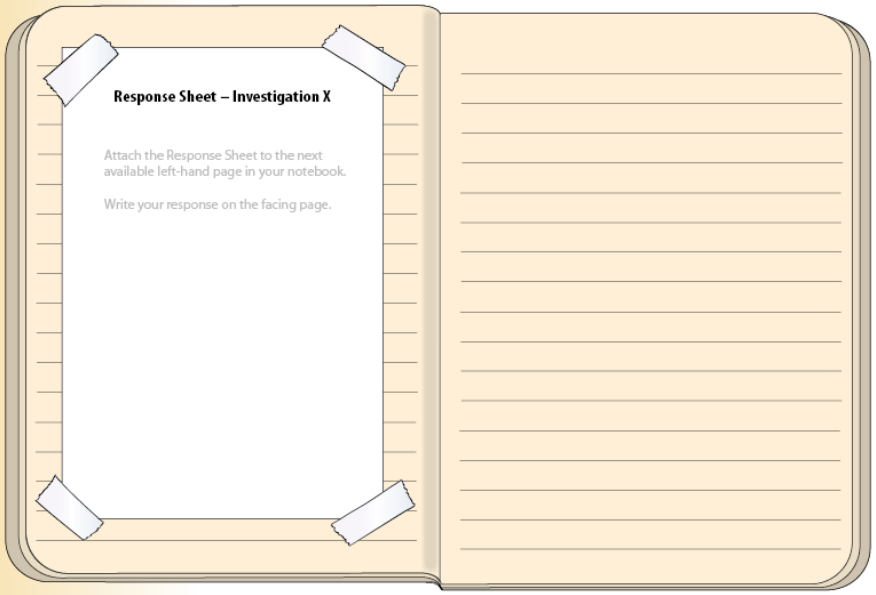
Teacher Notes

IG pg. 138, Step 12

Investigation 2, Part 2

Response Sheet

Full Option Science System FOSS



Teacher Notes

IG pg. 139, Step 13

Investigation 2, Part 2

Reading in Science Resources

Full Option Science System FOSS

Table of Contents

Investigation 2: Patterns of Motion

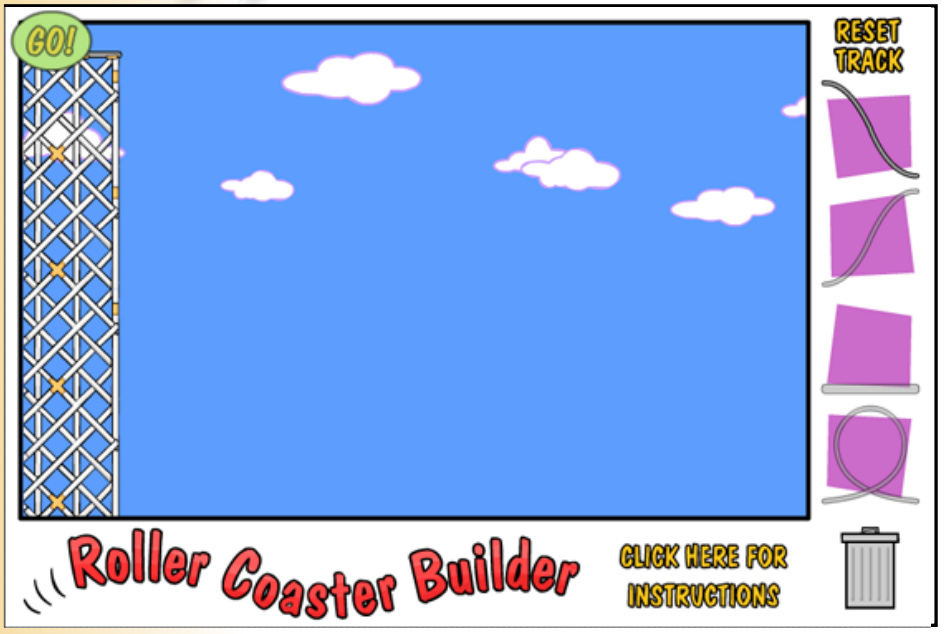
Teacher Notes

IG pg. 140, Steps 14–15

Investigation 2, Part 2

Roller Coaster Builder

Full Option Science System FOSS



Teacher Notes

IG pg. 141, Step 16

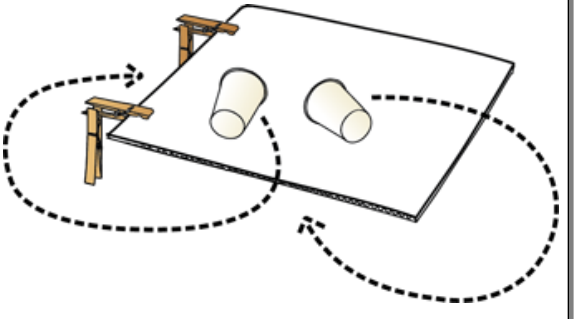
Investigation 2, Part 2

Wrap-Up/Warm-Up

Full Option Science System FOSS

- What rules help predict where a rolling cup will end up?

Pair up with a partner to share your answer to the focus question.



Teacher Notes

IG pg. 141, Step 17

Investigation 2, Part 2

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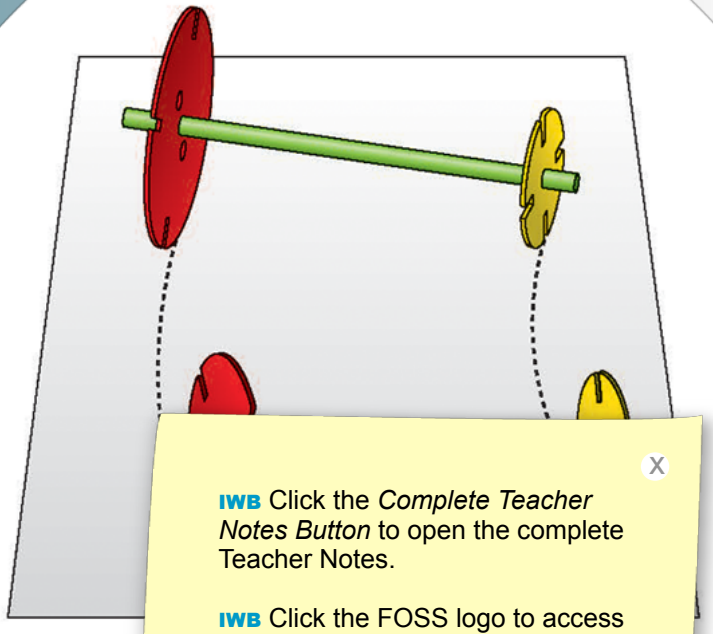
Investigation 2, Part 2:

Predicting Motion of New Systems



X

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 2, Part 2

Focus Question

Full Option Science System FOSS

Wheels are not the only things that roll.

What do you predict the motion of this cup will be if I were to let it roll down a ramp?

Motion and Matter, IG pg 136, Steps 1–2

Review the wheel-and-axle systems from Part 1.

Tell students that wheels are not the only things that roll. Hold up a paper cup and tell students that cups can roll too.

Ask the question in Step 1, but do not demonstrate or do anything to indicate the actual answer.

IWB Click the arrow to reveal the focus question.

Ask students to write the focus question in their notebooks and record their preditions about how the cups will roll on the ramps.

Teacher Notes

IG pg. 136, Steps 1–2

Investigation 2, Part 2

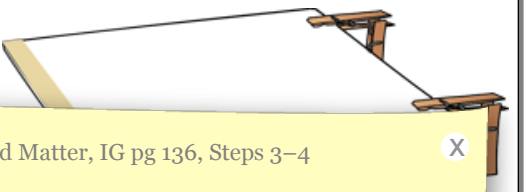
Rolling Cups

Full Option Science System FOSS

Explore how paper cups roll on ramps.

Time

Materials (per pair)
1 ramp
4 clothespins
2 paper cups



Motion and Matter, IG pg 136, Steps 3–4

Have students explore with rollling paper cups.

After several minutes have students stop and discuss their observations. You can guide the discussion using the questions in Step 4.

IWB Click the arrow to reveal the questions from Step 4.

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

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

Teacher Notes

IG pg. 136, Steps 3–4

Investigation 2, Part 2

More Paper Cup Challenges

Full Option Science System FOSS

Try these challenges. You may get any additional materials you think you need from the materials station.

1. Pretend your cup is a car and the ramp is a parking garage. Roll the cup off the ramp so that it ends up parked under the ramp.
2. Modify your paper-cup system s ramp in a straight line.
3. Add weight to your paper-cup sy

Record your designs and observations in your notebooks.

Time

Motion and Matter, IG pg 137–138, Steps 5–9

Have students tackle the paper-cup challenges in Steps 5–8.

Provide extra materials at the materials station.

After students have had a chance to work through these challenges, have them record their results in their notebooks and share out. Allow students to demonstrate interesting discoveries.

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

Teacher Notes

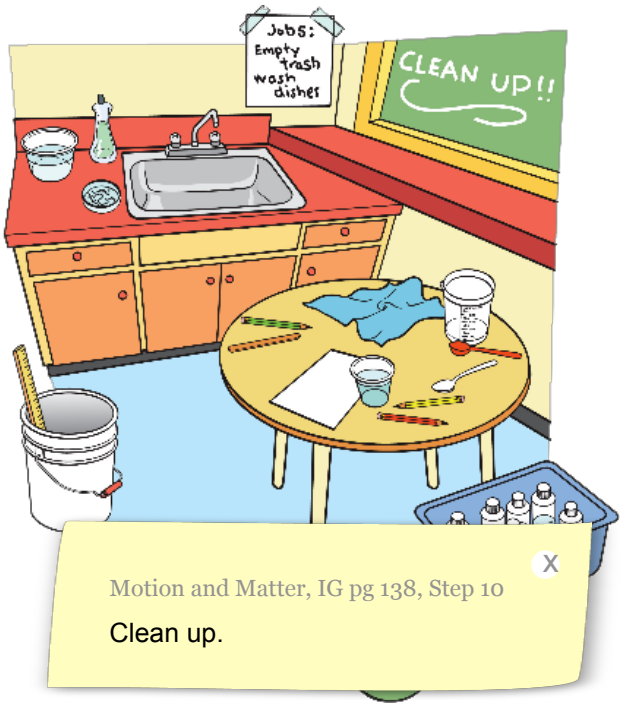
IG pg. 137–138, Steps 5–9

Investigation 2, Part 2

Clean Up!

Full Option Science System FOSS

- Carefully disassemble the cups.
- Return all materials to the materials station.



Teacher Notes

IG pg. 138, Step 10

Investigation 2, Part 2

Weighted Systems

Full Option Science System FOSS

What effect did the pennies have on the rolling cups?

-

Motion and Matter, IG pg 138, Step 11 X

Ask students what effect pennies had on their paper-cup systems and record their responses. Start with the first bullet and add additional bullets as needed.

See Step 11 for possible student responses.

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

Teacher Notes

Investigation 2, Part 2

Focus Question

Full Option Science System FOSS

- What rules help predict where a rolling cup will end up?

Motion and Matter, IG pg 138, Step 12

Ask students to answer the focus question in their notebooks. See Step 12 for what students should include in their summary.

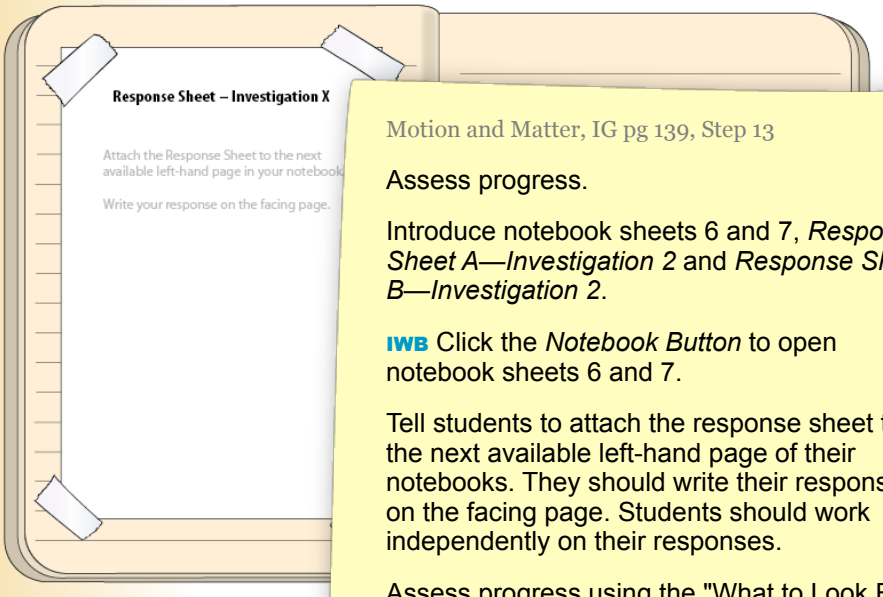
Teacher Notes

IG pg. 138, Step 12

Investigation 2, Part 2

Response Sheet

Full Option Science System FOSS



Motion and Matter, IG pg 139, Step 13

Assess progress.

Introduce notebook sheets 6 and 7, *Response Sheet A—Investigation 2* and *Response Sheet B—Investigation 2*.

IWB Click the *Notebook Button* to open notebook sheets 6 and 7.

Tell students to attach the response sheet to the next available left-hand page of their notebooks. They should write their responses on the facing page. Students should work independently on their responses.

Assess progress using the "What to Look For" in Step 13.

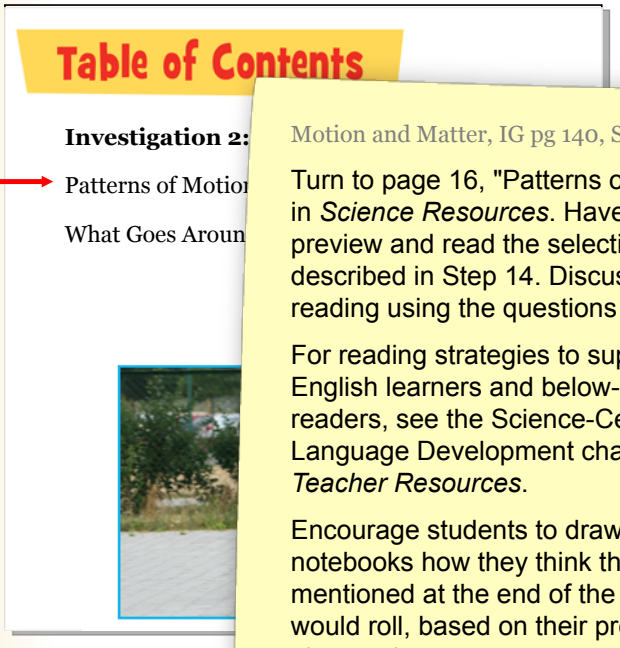
Teacher Notes

IG pg. 139, Step 13

Investigation 2, Part 2

Reading in Science Resources

Full Option Science System FOSS



Motion and Matter, IG pg 140, Steps 14–15

Turn to page 16, "Patterns of Motion," in *Science Resources*. Have students preview and read the selection as described in Step 14. Discuss the reading using the questions in Step 15.

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

Encourage students to draw in their notebooks how they think the items mentioned at the end of the article would roll, based on their previous observations.

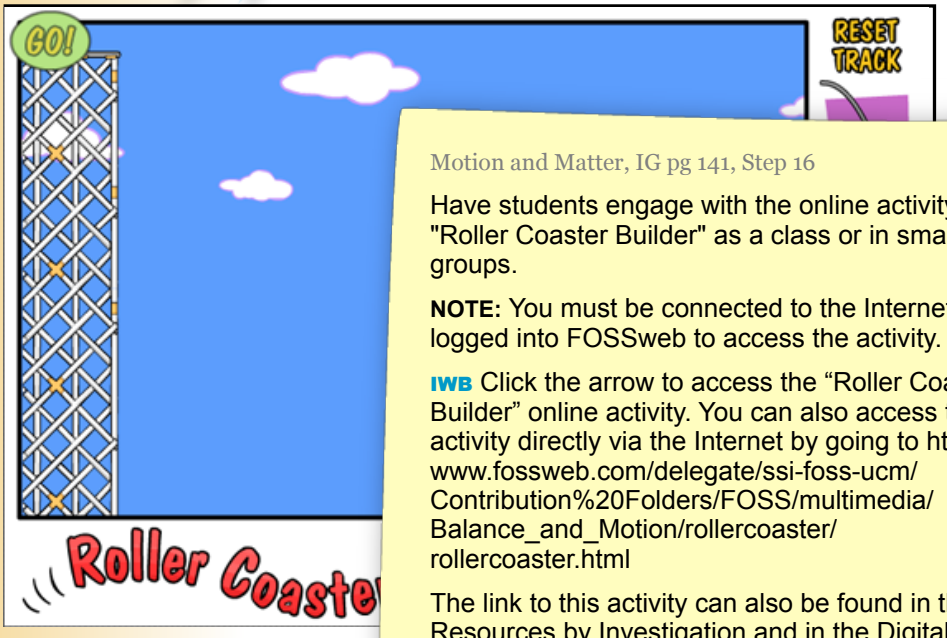
Teacher Notes

IG pg. 140, Steps 14–15

Investigation 2, Part 2

Roller Coaster Builder

Full Option Science System FOSS



Motion and Matter, IG pg 141, Step 16

Have students engage with the online activity "Roller Coaster Builder" as a class or in small groups.

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

IWB Click the arrow to access the “Roller Coaster Builder” online activity. You can also access the activity directly via the Internet by going to http://www.fossweb.com/delegate/ssi-foss-ucm/Contribution%20Folders/FOSS/multimedia/Balance_and_Motion/rollercoaster/rollercoaster.html

The link to this activity can also be found in the Resources by Investigation and in the Digital-Only Resouces sections, and for students in the Online Activites on FOSSweb.

Teacher Notes

IG pg. 141, Step 16

Investigation 2, Part 2

Wrap-Up/Warm-Up

Full Option Science System FOSS

- What rules help predict where a rolling cup will end up?

Pair up with a partner to share yo
answer to the focus question.

Motion and Matter, IG pg 141, Step 17

Wrap-Up/Warm-Up

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

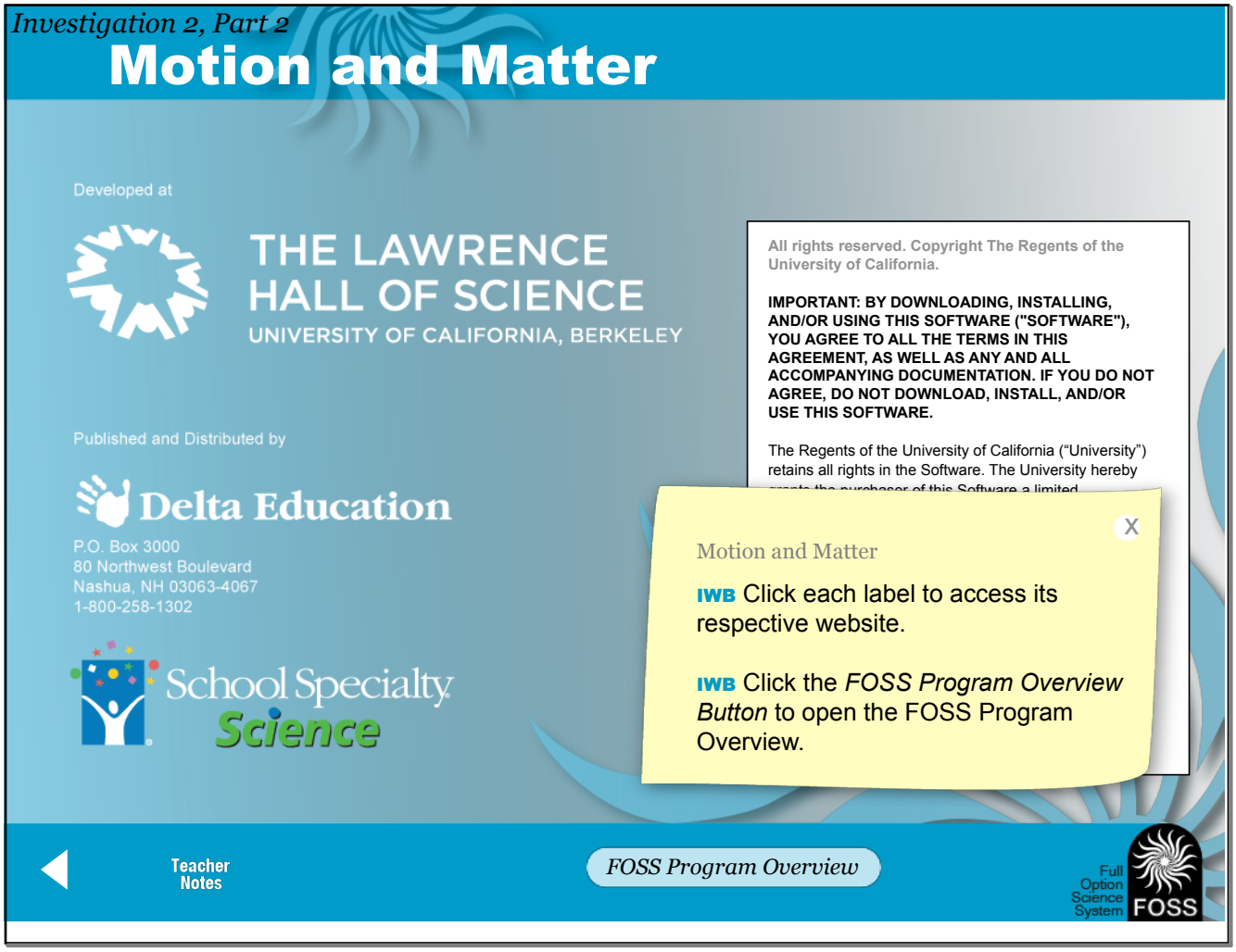
See the Science-Centered Language Development chapter in *Teacher Resources* for suggestions for how students can share responses.

See Step 14 for what to look for as you observe student discussions.

If you are using this as a warm-up, see Step 17 for a strategy on how to use this session for next steps.

Teacher Notes

IG pg. 141, Step 17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