

MOTION AND MATTER—*Investigation 4, Part 1*

Investigation 4:
Mixtures

Part 1:
**Mixing
Solids and
Liquids**



Teacher
Notes

Complete Teacher Notes



Investigation 4, Part 1

Focus Question



What are some materials you mix together every day?

Do the starting materials change when they are mixed?

Is the mass of the **mixture** the same as the mass of the materials that were mixed?



A mixture is two (or more) different materials distributed evenly throughout one another.

► What happens when you mix two materials?



Teacher
Notes

IG pg. 219, Steps 1–2

Science Safety



- 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.



Teacher
Notes

Investigation 4, Part 1

Materials and Procedure

**Materials available:**

1 basin
5 plastic cups
1 balance and mass set
4 craft sticks
4 sticky notes
1 1/2 L container
1 syringe
1 graduated cylinder
4 safety goggles

- sand
- gravel
- salt
- chalk powder
- water

Time

Procedure guidelines:

- Work in your groups to design a plan for investigating one mixture of solids and three mixtures made with solids and liquids.
- You must organize your data, including the masses of the starting materials and mass of the mixture.
- Use one 5 mL spoonfuls for each of the three different solid materials.
- Measure 50 mL of water for each solid and liquid mixture.
- Check with me before starting.






Investigation 4, Part 1

Results



► What happens when you mix two materials?

 sand and water	 calcium carbonate and water	 salt and water



Teacher
Notes

IG pg. 221, Step 9

Investigation 4, Part 1

Dissolving and Solutions



When a solid material is mixed with water and disappears, we say that the material **dissolves**. This mixture is called a **solution**. Solutions are **transparent**.

What happened to the salt?
Where did it go?



**Mixing salt
and water**



**Salt mixture after
5 minutes**

What evidence do you have that the salt is still there?
The total mass of each mixture was equal to adding the mass of each of the materials.
No mass is lost or gained when mixing or separating. This is called **conservation of mass**.



Investigation 4, Part 1

Clean Up!



- Return all equipment to the materials station.
- Rinse cups thoroughly and set them out to dry.
- Separate the gravel from the sand with a screen.



Investigation 4, Part 1

Vocabulary Review



IG pg. 222, Step 13

Investigation 4, Part 1

Focus Question



- ▶ What happens when you mix two materials?



Include everything that you have learned so far in this investigation.



Teacher
Notes

IG pg. 222, Step 14

Reading in Science Resources



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Teacher
Notes

IG pg. 223–224, Steps 15–17

Investigation 4, Part 1

Wrap-Up/Warm-Up



- What happens when you mix two materials?



Pair up with a partner to



- discuss your answers to the focus question;
- discuss what a solution is and what happens when a material dissolves.



Teacher
Notes

IG pg. 224, Step 18

Investigation 4, Part 1

Motion and Matter

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Science

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Notes

FOSS Program Overview



MOTION AND MATTER—*Investigation 4, Part 1*

Investigation 4: **Mixtures**

Part 1: **Mixing Solids and Liquids**



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](#)



Focus Question



What are some materials you n

Do the starting materials chang

Is the mass of the **mixture** the
materials that were mixed?



Motion and Matter, IG pg 219, Steps 1–2



Explore students' prior knowledge of mixtures by asking them to name materials they mix together.

Ask the questions in Step 1.

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

IWB Click the arrow to reveal the definition for mixture and the focus question.

Explain to students that they will make four different mixtures with solid and liquid materials to find out what happens when things are mixed together.

Ask students to write the focus question in their notebooks.

New Word Introduce *mixture*.

mixture: two or more materials together

Add the new word to the word wall.



Teacher
Notes

IG pg. 219, Steps 1–2

Science Safety



- 1** Listen carefully to your teacher's instructions. Follow all directions. Ask questions if you don't know what to do.
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- 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,
- 11**
- 12**

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

Ma

Material

- 1 basi
- 5 plas
- 1 bal
- 4 cra
- 4 stick
- 1 1/2
- 1 syri
- 1 gra
- 4 saf

- sar
- gra
- sal
- ch
- wa

Motion and Matter, IG pg 219–221, Steps 3–8



SAFETY NOTE: Remind students to wear safety goggles when working with chemicals.

Distribute notebook sheet 13, *Mixtures to Observe*, as you review the ground rules.

Ask students to make four different mixtures—one mixture of solids and three mixtures with solids and water.

Distribute notebook sheet 14, *Mixtures Data*, or tell students that they have to make a plan to investigate the mixtures. Show them the available materials, and go over the specifics as listed in Step 3.

NOTE: The procedural guidelines on the slide have been condensed from those in Step 3.

Give students time to prepare their plans, and get started after they check them with you. See Step 6 for things to check for in student plans.

If students need help measuring mass using a balance, have them use the "Measuring Mass" tutorial before or while they write their plans. 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 Activities on FOSSweb.

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

See Step 5 for providing a scaffold by using notebook sheet 14.

IWB Click the *Notebook Button* to open notebook sheets 13 and 14.

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

Assess science and engineering practices progress using the "What to Look For" in Step 8.

New Word Introduce *salt*.

salt: a solid white material that dissolves in water; also known as sodium chloride

New Word Introduce *chalk*.

chalk: one form of the material calcium carbonate

New Word Introduce *calcium carbonate*.

calcium carbonate: a solid material; powdered chalk

New Word Introduce *gravel*.

gravel: small pieces of rock and pebbles larger than grains of sand

Add all new words to the word wall.



IG pg. 219–221, Steps 3–8

Investigation 4, Part 1

Results



► What happens to materials?



sand and water

Motion and Matter, IG pg 221, Step 9

X

Ask students to share their answers to the focus question. Discuss what happened when students mixed sand and gravel. You can invite three students to the board to draw what happened in each of the solid and liquid mixtures and ask them to clarify their observations. See Step 9 for what to expect.

IWB Students can use the *Pen Tool* to write their observations.

As students share what they know about calcium carbonate and water, introduce the words *suspended* and *cloudy* as descriptive words.

New Word Introduce *suspended*.

suspended: when a powder floats in a liquid, making it cloudy

New Word Introduce *cloudy*.

cloudy: not clear

Add all new words to the word wall.



Teacher
Notes

IG pg. 221, Step 9

Investigation

D

Motion and Matter, IG pg 221–222, Steps 10–11

X

Focus student attention on the salt and water mixture. Introduce solutions and dissolving.

Ask students to share the mass data they recorded and introduce "conservation of mass" as described in Step 11.

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

You may choose to have students evaporate the water from the salt solution as further evidence that the salt is dissolved in the water. If so, provide an evaporation dish to each group. Have students pour 10–15 mL of solution into an evaporation dish and place the dish in a warm location where it can be observed but not disturbed.

New Word Introduce *dissolve*.

dissolve: to mix a material uniformly into another

New Word Introduce *solution*.

solution: a mixture formed when one or more substances dissolve in another

New Word Introduce *transparent*.

transparent: clear

New Word Introduce *conservation of mass*.

conservation of mass: the concept that no mass is lost or gained when mixing and separating materials; the mass of the parts is equal to the mass of the total mixture

Add all new words to the word wall.



IG pg. 221–222, Steps 10–11

Investigation 4, Part 1

Clean Up!



- Return all equipment to the materials station.
- Rinse cups thoroughly and set them out to dry.
- Separate the gravel from the sand with a screen.



Motion and Matter, IG pg 222, Step 12

Clean up.

Put away everything except the evaporation dishes, if you chose to use them.

IG pg. 222, Step 12



Investigation 4, Part 1

Vocabulary

Motion and Matter, IG pg 222, Step 13



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.

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

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:

mixture: two or more materials together

salt: a solid white material that dissolves in water; also known as sodium chloride

chalk: one form of the material calcium carbonate

calcium carbonate: a solid material; powdered chalk

gravel: small pieces of rock and pebbles larger than grains of sand

transparent: clear

conservation of mass: the concept that no mass is lost or gained when mixing and separating materials; the mass of the parts is equal to the mass of the total mixture



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IG pg. 222, Step 13

Investigation 4, Part 1

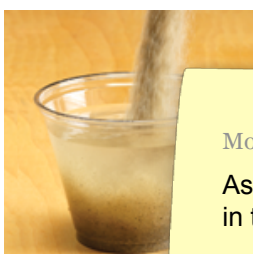
Focus Question



► What happens when you mix two materials?



Include everything that you have learned so far in this investigation.



Motion and Matter, IG pg 222, Step 14

Ask students to answer the focus question in their notebooks.

Assess progress using the suggestions in Step 14.

X



Teacher
Notes

IG pg. 222, Step 14

Investigation 4, Part 1

Reading in Science Resources



Motion and Matter, IG pg 223–224, Steps 15–17

X

Tab

Inve

Mixt

Reac

Care

Turn to page 46, "Mixtures," in *Science Resources*. Have students preview and read the selection as described in Step 15. Discuss the reading using the questions in Step 16.

Have students engage in the online activities for this Investigation. They can access the "Conservation of Mass" and "Measuring Volume" tutorials for review or the "Measuring Volume and Mass" virtual investigation to gain more skills on measurement.

The links to these activities for students are in the Online Activities on FOSSweb.

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

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



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Notes

IG pg. 223–224, Steps 15–17

Investigation 4, Part 1

Wrap-Up/Warm-Up



- What happens when you mix two materials?



Pair up with a partner to

- discuss your answers to the focus question;
- discuss what a solution is and what happens when a material dissolves.

Motion and Matter, IG pg 224, Step 18

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 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.



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IG pg. 224, Step 18

Investigation 4, Part 1

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