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Photo by Joanne Johnson

Assessing with Learning Progressions in Science

FOSS MIXTURES AND SOLUTIONS

Instructional Tools |

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Northwest Educational Service District 189
Together We Can

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Instructional Tools

In this packet you will find a set of instructional supports for science materials. These documents represent the work-in-progress of teachers in the Assessing with Learning Progressions in Science Project, a Math Science Partnership through the Northwest Educational Service District in Washington State. While we encourage others to use the materials, please know the power of these tools lies in the collaborative discussion and analysis that occurs during their creation. We strongly suggest that anyone utilizing these tools make them your own, adjusting them to fit your teaching context and district priorities. Professional development tools to aid you in this process are available on the ALPS project web page www.nwesd.org/nwalps. For access to editable versions of these documents please contact Nancy Menard nmenard@nwesd.org.

Overview of the Tools (not every unit tool-set will include all of these tools)

Unit Overview

The unit overview grid lays out learning targets or important scientific ideas from Washington State Standards for each investigation in the module and clarifies the success criteria for each learning target. It also details the formative assessments that have been designed to assess each target in the investigation.

Learning Progressions

A learning progression is a graphical representation of the path students take toward mastery of a science "big idea". The ALPS *Learning Progression* documents include a description of an important big idea from the *Washington State Science Learning Standards* and the progression of building-block learning targets that students master on their way toward an understanding of that big idea. For each building-block learning target the student success criteria is identified and one or more formative assessment tasks to elicit evidence of student understanding are suggested.

Formative Assessment Tasks

The suggested formative assessment tasks are examples of tools used by the teachers in the ALPS project to gather evidence of student understanding. The *Assessment Task Cover Sheet* details each assessment and gives administration tips and suggestions for instructional adjustments based on some of the common student struggles they encountered.

Student Work Samples

Selected student work samples from students in ALPS classrooms give a picture of the range of student responses gathered from sample formative assessments. The *Student Work Sample Cover Sheet* describes the student work samples and the teacher's interpretation of student understanding.

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Mixtures & Solutions Unit Overview

Lesson	Learning Targets & Success Criteria		Assessment
	Prerequisite Teaching		Use book: ***Uncovering Student Ideas in Science*** Vol. 4 by Page Keely Give science probe: Called "Sugar Water" to gain understanding of student misconceptions of the differences between mixtures and solutions. You will give this assessment tool again at the end of investigation 2. Also give the assessment called: Mixtures and Solutions: "Sara's Experiment"- This will be given 3 times throughout the kit in order to help teacher identify student growth and misconceptions.
Investigation 1 Parts 1	**Matter**	Mixtures are combinations of substances whose chemical properties are preserved. ✓ I can…explain the difference between a mixture and solution.	(After you teach Inv. 1: Part 2) Show your students the video: "The Science of Macaroni Salad: What's a Mixture?" by Josh Kurz- You can find it on Ted Talks or You Tube **I Think-We Think**
Additional Teaching needed for clarification prior to Inv. 1 part 2 and 3		The FOSS Kit doesn't clearly address the conservation of mass, so it is important that prior to teaching Inv. 1 Part 2, that a discussion of what conservation of mass is and how it works in order for the students to later see that even when the salt is dissovled in water, the mass didn't change even though the salt was not visually present in the solution.	Suggested Video Clips to assist in teaching the conservation of mass: Brain Pop-"Conservation of Mass" YouTube- "5b Conservation of Mass" by Eric Gosselin
Investigation 1 Parts 2-3	**Matter**	The total amount of mass is conserved when it undergoes a physical change ✓ I can…explain that dissolved substances have not disappeared, and cite evidence to determine that the substance is still there	Annotated Student Drawings Give "Sugar Water" Probe here in order to check for student misconceptions.

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Lesson	Learning Targets & Success Criteria		Assessment
Investigation 1 Part 4	Application	Possible solutions should be tested to see if they solve the problem. ✓ I can…..design a procedure to solve a problem.	Foss Kit-Student Handout "Separating a Dry Mixture" –page 7
Investigation 2 Parts 1-3 Investigation 3 Parts 1 &2	Matter	Substances have characteristic intrinsic properties such as density and solubility, which are independent of the amount of the sample. ✓ I can…use solubility and density to identify unknown substances.	Use book: *Uncovering Student Ideas in Science Vol. 1* by Page Keely Give science probe: Called "Lemonade" to gain understanding of student misconceptions of solubility. Saturation Puzzle (Based on OSPI Application template)
Investigation 3 Part 3	Application	Possible solutions should be tested to see if they solve the problem. ✓ I can…design a procedure to solve a problem	Mystery Solution (Based on the Application Template from OSPI) Give "Sara's Experiment"-Assessment #2 and the "Lemonade" Probe
Investigation 4 Parts 1-3	Matter	Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances. ✓ I can…identify the evidence that a chemical reaction took place.	Concept Cartoon Give "Sara's Experiment"-Assessment #3

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Learning Progression: Application

FOSS Mixtures and Solutions

Learning Target 1:

4-5 APPE

Possible solutions should be tested to see if they solve the problem.

Inv. 1 Part 4

Inv. 2 Part 3

Inv. 3 Part 3

Success Criteria:
I can…design a procedure to solve a problem.

Formative Assessment:

Mystery Solution

Inv. 3 Part 3

Application Template from OSPI

FA4

Learning Target 2:

4-5 APPF

Solutions to problems must be communicated, if the problem is to be solved.

Inv. 1 Part 4

Inv. 2 Part 3

Inv. 3 Part 3

Inv. 4 Part 4

Success Criteria:
I can…distinguish a well written report of observations and conclusions from a poorly written report. I can explain what makes one report better.

Formative Assessment:
Inv.4, Part 2

FOSS Student Sheet #16 "Response Sheet—Fizz Quiz"

Big Idea:

EALR 3 Application collaborate to design and produce a product or procedure to solve a problem.

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MIXTURES AND SOLUTIONS

Big Idea: **Application Work on individually collaborating to design and produce a product or procedure to solve a problem.**

Formative Assessment Task Cover Sheet

Learning Target #1, Assessment Task	
Assessment Task Details	**Teacher Background**
Brief Description of the Assessment Task: Mystery Solution Use the modified OSPI application template.	**Administration Tips:** Inv. 1 Part 4 Inv. 2 Part 3 Inv. 3 Part 3
Learning Target: Possible solutions should be tested to see if they solve the problem.	
Success Criteria: I can…design a procedure to solve a problem.	
Student Task Sheet Included: yes Student Work Samples Included: yes	

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Name _____ Date _____

Mixtures & Solutions Learning Progression #2

Mystery Solution

Problem: Do these three mystery solutions have different concentrations?

Plan Summary: Write a summary of a plan. Include a scientific reason for the plan or for selecting one of the materials.

Test Solution/Results: Describe what evidence you will collect to solve the problem.

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MIXTURES AND SOLUTIONS

Big Idea: **Application**

Work on individually collaborating to design and produce a product or procedure to solve a problem.

Target #1, Assessment: Application Template

Formative Assessment Student Work Cover Sheet

Student Work Description

Sample 1: Student understood what materials to use and the scientific reason for using it.

Sample 2: Student understood what materials to use but lacks the scientific reason for the plan and the materials.

Sample 3: Student has insufficient information leading to an incomplete plan.

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Name [redacted]

Date

Mixtures & Solutions Learning Progression #2

Sample 1

Problem: Do these three mystery solutions have different concentrations?

Plan Summary: Write a summary of a plan. Include a scientific reason for the plan or for selecting one of the materials.

Matierials: 50ml of each solution, 4 cups, gram blocks, suringe, balance

procedure: 1) put 50ml of solution in each cup
2) place one of the solution on balance
3) use gram blocks on cup to weigh
4) repeat steps 2-3 on both cups
5) subtract 50g from each solution

We are trying it because that will find us what ways the most and has the most.

Test Solution/Results: Describe what evidence you will collect to solve the problem.

We will know when the problem is solved when we have wayed everything and know what ways the most

results: Green 7g, Blue 3g, and Red 5g

Green has more salt

Name [redacted]

Date [redacted]

Mixtures & Solutions Learning Progression #2

Sample 2

Problem: Do these three mystery solutions have different concentrations?

Plan Summary: Write a summary of a plan. Include a scientific reason for the plan or for selecting one of the materials.

materials: 3 cups 50 ml of water 50 ml of solution
scale weights

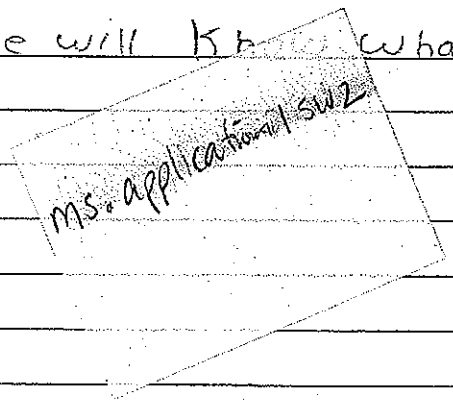
Plan: 1) get matirials
2) Put one solution on scale
3) Weigh
4) subtract 50 ml of water
5) do the same to the othe solutions

Test Solution/Results: Describe what evidence you will collect to solve the problem.

We will have 3 fractions and we will know what the 3 consentration is.

results
red: 5 over 50
blue: 7 over 50
Green: 9 over 50

green is the most concentrated



FA4

Name ______________________

Date ______________________

Mixtures & Solutions   Learning Progression #2

Sample 3

Problem: Do these three mystery solutions have different concentrations?

Plan Summary: Write a summary of a plan. Include a scientific reason for the plan or for selecting one of the materials.

The colors are blue, green, and red and I saw that the blue was more [illegible]
so we are observing the all of the chemcils now we are going to use a siringe and wiengn
to we are going to use a, cup, surenge, scale, mystery chemical

ms_application 1 SW3

Test Solution/Results: Describe what evidence you will collect to solve the problem.

the red dye water was 4grams, the green dye was 6 grams, the blue dye was 0 grams

Learning Progression

FOSS Mixtures and Solutions **Investigations 1-4**

Learning Target 1:

6-8 PS2B

Mixtures are combinations of substances whose chemical properties are preserved.

Inv. 1 Parts 1

Success Criteria:
I can… explain the difference between a mixture and solution.

Formative Assessment:

Sugar Water Probe

Sara's Experiment

I Think-We Think

FA1

Learning Target 2:

4-5 PS2C

The total amount of matter is conserved when it undergoes a physical change.

Inv. 1 Parts 2-3

Success Criteria:
I can…explain that dissolved substances have not disappeared, and cite evidence to determine that the substance is still there.

Formative Assessment:

Annotated Student Drawings

FA2

Learning Target 3:

6-8 PS2A

Substances have characteristic intrinsic properties such as density and solubility, which are independent of the amount of the sample.

Inv. 2 Parts 1-3
Inv. 3 Parts 1 & 2

Success Criteria:
I can…use solubility and density to identify unknown substances.

Formative Assessment:

Lemonade Probe

Saturation Puzzle

(Based on OSPI Application template)

After Inv. 3

Sara's Experiment

FA3

Learning Target 4:

6-8 PS2B

Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances.

Inv. 4 Parts 1-3

Success Criteria:
I can…identify the evidence that a chemical reaction took place.

Formative Assessment:

Concept Cartoon:

*Mixture
*Solution
*Chemical Reaction

Sara's Experiment

FA5

Big Idea:

EALR 4 Matter: Properties and Change
A single kind of matter can exist as a solid, liquid, or gas. Matter is not lost during changes

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MIXTURES AND SOLUTIONS

Big Idea: **A single kind of matter can exist as a solid, liquid, or gas. Matter is not lost during changes of state.**

Formative Assessment Task Cover Sheet

Learning Target #1, Assessment Task	
Assessment Task Details	**Teacher Background**
Brief Description of the Assessment Task: "Sara's Experiment"	**Administration Tips:** "Sara's Experiment"-This will be given 3 times throughout the kit in order to help teacher identify student growth and misconceptions. When to give this assessment: #1- Prior to beginning Mixtures and Solutions #2- End of Investigation 3 #3- End of unit **A rubric has been created in order to assist with streamlining this work and to assist the teacher with growth over time.
Learning Target: Mixtures are combinations of substances whose chemical properties are preserved	
Success Criteria: I can… explain the difference between a mixture and solution.	
Student Task Sheet Included: yes Student Work Samples Included: no	

Learning Target #1, Assessment Task	
Assessment Task Details	**Teacher Background**
Brief Description of the Assessment Task: "Sugar Water" Probe	**Administration Tips:** Use book: *Uncovering Student Ideas in Science Vol. 4 by Page Keely* This probe assessment is intended to also be given at the beginning of the unit, prior to any teaching on the subject matter. This probe is designed to illicit student understanding of mixtures and solutions. This assessment will be given at the end of Investigation 1; Part 3
Learning Target: Mixtures are combinations of substances whose chemical properties are preserved	
Success Criteria: I can… explain the difference between a mixture and solution.	
Student Task Sheet Included: Student Work Samples Included: no	

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MIXTURES AND SOLUTIONS

Big Idea: **A single kind of matter can exist as a solid, liquid, or gas. Matter is not lost during changes of state.**

Learning Target #1, Assessment Task	
Assessment Task Details	**Teacher Background**
Brief Description of the Assessment Task: I Think-We-Think template **Learning Target:** Mixtures are combinations of substances whose chemical properties are preserved **Success Criteria:** I can… explain the difference between a mixture and solution. Student Task Sheet Included: yes Student Work Samples Included: no	**Administration Tips:** (After you teach Inv. 1: Part 2) Show your students the video: "The Science of Macaroni Salad: What's a Mixture?" by Josh Kurz- You can find it on Ted Talks or You Tube **Investigation 1 Part 1:** Students complete the I Think column independently, then discuss in small groups and complete the We Think column. Finally, the sheet is discussed as a whole class. There is a lot of gray area and the goal is that students need to be able to defend their answer, based on the definition of mixtures and solutions. Keep bringing them back to the definitions.

Learning Target #2, Assessment Task	
Assessment Task Details	**Teacher Background**
Brief Description of the Assessment Task: Annotated Student Drawings Students are asked to draw the steps of a salt water solution transforming from a solution into crystals. **Learning Target:** The total amount of matter is conserved when it undergoes a physical change **Success Criteria:** I can…explain that dissolved substances have not disappeared, and cite evidence to determine that the substance is still there Student Task Sheet Included: yes Student Work Samples Included: yes	**Administration Tips:** Investigation 1 Part 1-4 Before the kids begin call the kids attention to the directions that state the salt and water must be labeled in each picture **Suggestions for Instructional Adjustments:** Do a class lesson using the modified OSPI application template for Investigation1 Part 4, Separating a Dry Mixture. See learning target 3.

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MIXTURES AND SOLUTIONS

Big Idea: **A single kind of matter can exist as a solid, liquid, or gas. Matter is not lost during changes of state.**

Learning Target #3, Assessment Task	
Assessment Task Details	**Teacher Background**
Brief Description of the Assessment Task: Lemonade Probe	**Administration Tips:** Use book: ***Uncovering Student Ideas in Science Vol. 1 by Page Keely***
Learning Target : Substances have characteristic intrinsic properties such as density and solubility, which are independent of the amount of the sample	This probe assessment is intended to also be given prior to teaching this learning target and again at the conclusion of Investigation 2. This probe is designed to illicit student understanding of mixtures and solutions.
Success Criteria: I can…use solubility and density to identify unknown substances.	
Student Task Sheet Included: yes Student Work Samples Included: no	

Learning Target #3, Assessment Task	
Assessment Task Details	**Teacher Background**
Brief Description of the Assessment Task: Saturation Puzzle Use the modified OSPI application template.	**Administration Tips:** Investigation 2 Parts 1-3 and Investigation 3 Parts 1-2
Learning Target : Substances have characteristic intrinsic properties such as density and solubility, which are independent of the amount of the sample	
Success Criteria: I can…use solubility and density to identify unknown substances.	
Student Task Sheet Included: Student Work Samples Included: no	

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MIXTURES AND SOLUTIONS

Big Idea: **A single kind of matter can exist as a solid, liquid, or gas. Matter is not lost during changes of state.**

Learning Target #4, Assessment Task	
Assessment Task Details	**Teacher Background**
Brief Description of the Assessment Task: Concept Cartoon: Students will identify which zipbag shows a chemical reaction.	**Administration Tips:** Investigation 4 Parts 1-3
Learning Target: Compounds are substances that are chemically formed and have different physical and chemical properties from the reacting substances.	
Success Criteria: I can…identify the evidence that a chemical reaction took place.	
Student Task Sheet Included: yes Student Work Samples Included: no	

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MIXTURES AND SOLUTIONS

Big Idea: **A single kind of matter can exist as a solid, liquid, or gas. Matter is not lost during changes of state.**

Target #1, Assessment: Sarah's Experiment-Student work samples explained

Formative Assessment Student Work Cover Sheet

Student Work Description

Sample 1: Student understood how to use the terminology correctly within their response. Student provided the evidence that supported their thinking in each of the three scenarios.

Sample 2: Student understood how to use most of the terminology correctly within their response. Student provided some evidence that supported their thinking in each of the three scenarios. In this particular sample, the student was missing the evidence that showed that the student understood that the mass did not change for question 2. For question 3, the student didn't classify the salt water as a mixture and a solution.

Sample 3: Student attempted at using the vocabulary appropriately. However, the student didn't correctly identify the mass and/or if the substance was a mixture or a solution or both.

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Mixtures and Solutions:

Read the description of Sara's experiment and then answer the questions below:

Sara conducted three experiments where she mixed a powder with a liquid.
Each experiment followed the same procedure.

1) Put 50mL of liquid into a flask
2) Put in 10 grams of powder into an un-inflated balloon
3) Place the balloon on top of the flask, make sure it is tightly sealed
4) Pour the powder from the balloon into the liquid and observe.

Sarah's observations:

Experiment 1: cornstarch and water

The liquid became cloudy and white when the powder was added, swirling the flask did not change the appearance of the liquid, when stirring stopped, some of the white powder settled on the bottom of the flask. The balloon did not inflate.

Experiment 2: Baking Soda and Vinegar:

Bubbles formed in the vinegar and the balloon inflated, the liquid became cloudy when the powder was first added, but it was clear after the bubbles stopped , the flask felt cooler than before the powder was added.

Experiment 3: Salt and Water

The liquid became slightly cloudy when the powder was added and small crystals of the powder could be seen on the bottom of the flask, when the flask was swirled the liquid became clear again and no crystals could be seen. When the swirling stopped the liquid remained clear. The balloon did not inflate.

Using the words listed below, describe what happened when the powder and liquid were combined. You must use every term in each description. Provide the evidence that supports your thinking to prove your understanding of the term.

Terms: Dissolve, mixture, solution, chemical-reaction, mass, disappear

1) Cornstarch and water:

2) Baking Soda and Vinegar:

3) Salt and Water

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Mixtures and Solutions: Answer Key

Read the description of Sara's experiment and then answer the questions below:

Sara conducted three experiments where she mixed a powder with a liquid.
Each experiment followed the same procedure.

1) Put 50mL of liquid into a flask
2) Put in 10 grams of powder into an un-inflated balloon
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4) Pour the powder from the balloon into the liquid and observe.

Sarah's observations:

Experiment 1: cornstarch and water

The liquid became cloudy and white when the powder was added, swirling the flask did not change the appearance of the liquid, when stirring stopped, some of the white powder settled on the bottom of the flask. The balloon did not inflate.

Experiment 2: Baking Soda and Vinegar:

Bubbles formed in the vinegar and the balloon inflated, the liquid became cloudy when the powder was first added, but it was clear after the bubbles stopped , the flask felt cooler than before the powder was added.

Experiment 3: Salt and Water

The liquid became slightly cloudy when the powder was added and small crystals of the powder could be seen on the bottom of the flask, when the flask was swirled the liquid became clear again and no crystals could be seen. When the swirling stopped the liquid remained clear. The balloon did not inflate.

Using the words listed below, describe what happened when combined each powder and liquid. You must use every term in each description.

Terms: Dissolve, mixture, solution, chemical-reaction, mass, disappear

1) **Cornstarch and water:** ***The cornstarch did not totally dissolve in the water, it floated around. So this is a mixture but not a solution because the cornstarch didn't disappear. There was no chemical reaction because the balloon did not inflate. The mass would remain the same.***

2) **Baking Soda and Vinegar:** ***The baking soda dissolved into the vinegar creating a chemical reaction because the balloon filled up. It forms a solution which is a special kind of mixture. The mass would decrease because something is lost in the reaction. The baking soda did not disappear because there was a reaction it just changed.***

3) **Salt and Water:** ***The salt dissolved into the water creating a special kind of mixture called a solution. There was no chemical reaction because the balloon did nothing. The mass stayed the same because the salt didn't disappear it just became invisible.***

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Student Name:_____ Test # ___

Scenario	Item Spec	Point Total
1	Mixture/ Solution: Student identifies the liquid as a mixture not a solution.	/ 1
	Chemical Reaction: A chemical reaction did not occur because the balloon did not inflate.	/ 1
	Dissolve/Disappear: The substance did not dissolve or disappear.	/ 1
	Mass: The mass did not change.	/ 1
2	Mixture/ Solution: Student identifies the liquid as a mixture and solution.	/ 1
	Chemical Reaction: A chemical reaction did occur because the balloon did inflate.	/ 1
	Dissolve/Disappear: The substance dissolved, but changed forms/material.	/ 1
	Mass: The mass did change because of the chemical reaction.	/ 1
3	Mixture/ Solution: Student identifies the liquid as a mixture and solution.	/ 1
	Chemical Reaction: A chemical reaction did not occur because the balloon did not inflate.	/ 1
	Dissolve/Disappear: The substance did dissolve or disappear.	/ 1
	Mass: The mass did not change.	/ 1
	Point Total	/12

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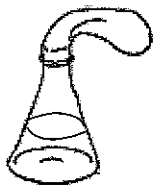
Mixtures and Solutions:

Read the description of Sara's experiment and then answer the questions below:

Sara conducted three experiments where she mixed a powder with a liquid.
Each experiment followed the same procedure.

1) Put 50mL of liquid into a flask
2) Put in 10 grams of powder into an un-inflated balloon
3) Place the balloon on top of the flask, make sure it is tightly sealed
4) Pour the powder from the balloon into the liquid and observe.



Sarah's observations:

Experiment 1: cornstarch and water

The liquid became cloudy and white when the powder was added, swirling the flask did not change the appearance of the liquid, when stirring stopped, some of the white powder settled on the bottom of the flask. The balloon did not inflate.

Experiment 2: Baking Soda and Vinegar:

Bubbles formed in the vinegar and the balloon inflated, the liquid became cloudy when the powder was first added, but it was clear after the bubbles stopped , the flask felt cooler than before the powder was added.

Experiment 3: Salt and Water

The liquid became slightly cloudy when the powder was added and small crystals of the powder could be seen on the bottom of the flask, when the flask was swirled the liquid became clear again and no crystals could be seen. When the swirling stopped the liquid remained clear. The balloon did not inflate.

Using the words listed below, describe what happened when combined each powder and liquid. You must use every term in each description.

Terms: Dissolve, mixture, solution, chemical-reaction, mass, disappear

1) Cornstarch and water:

This combonation is not a solution it's just a regular mixture. That's because the powder didn't disappear or dissolve. There was no chemical-raction, and the mass didn't change.

2) Baking Soda and Vinegar:

Baking soda and vinegar is a special tipe of mixture called a solution. This is because after the chemical-reaction ended it looks clear, but you could also say that it disappeard or dissolved. I believe the mass did change.

3) Salt and Water

This is a mixture and solution. It does dissolve, and disappear, but it has no chemical-reaction. The masss does not change with this solution.

Student - High Sample 1

Student Name: _____ Test # 2

Scenario	Item Spec	Point Total
1	Mixture/ Solution: Student identifies the liquid as a mixture not a solution.	1 / 1
	Chemical Reaction: A chemical reaction did not occur because the balloon did not inflate.	1 / 1
	Dissolve/Disappear: The substance did not dissolve or disappear.	1 / 1
	Mass: The mass did not change.	1 / 1
2	Mixture/ Solution: Student identifies the liquid as a mixture and solution.	1 / 1
	Chemical Reaction: A chemical reaction did occur because the balloon did inflate.	1 / 1
	Dissolve/Disappear: The substance dissolved, but changed forms/material.	1 / 1
	Mass: The mass did change because of the chemical reaction.	1 / 1
3	Mixture/ Solution: Student identifies the liquid as a mixture and solution.	1 / 1
	Chemical Reaction: A chemical reaction did not occur because the balloon did not inflate.	1 / 1
	Dissolve/Disappear: The substance did dissolve or disappear.	1 / 1
	Mass: The mass did not change.	1 / 1
	Point Total	12 /12

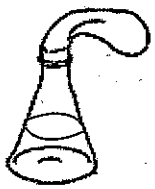
Teacher note: Student understood how to use the terminology correctly with-in each response and provided evidence to prove their thinking.

Mixtures and Solutions:

Read the description of Sara's experiment and then answer the questions below:

Sara conducted three experiments where she mixed a powder with a liquid.
Each experiment followed the same procedure.

1) Put 50mL of liquid into a flask
2) Put in 10 grams of powder into an un-inflated balloon
3) Place the balloon on top of the flask, make sure it is tightly sealed
4) Pour the powder from the balloon into the liquid and observe.



Sarah's observations:

Experiment 1: cornstarch and water

The liquid became cloudy and white when the powder was added, swirling the flask did not change the appearance of the liquid, when stirring stopped, some of the white powder settled on the bottom of the flask. The balloon did not inflate.

Experiment 2: Baking Soda and Vinegar:

Bubbles formed in the vinegar and the balloon inflated, the liquid became cloudy when the powder was first added, but it was clear after the bubbles stopped , the flask felt cooler than before the powder was added.

Experiment 3: Salt and Water

The liquid became slightly cloudy when the powder was added and small crystals of the powder could be seen on the bottom of the flask, when the flask was swirled the liquid became clear again and no crystals could be seen. When the swirling stopped the liquid remained clear. The balloon did not inflate.

Using the words listed below, describe what happened when combined each powder and liquid. You must use every term in each description. 123 123 123 123 123 123

Terms: Dissolve, mixture, solution, chemical-reaction, mass, disappear

1) **Cornstarch and water:**
Their was no chemical-reaction and the mass didn't change. This was a mixture not a solution. The cornstarch didn't disapear or disapear.

2) **Baking Soda and Vinegar:**
Their was a chemical-reaction so the mass changed. This was a mixture and a solution. After a while it disapeared but did dissolve.

3) **Salt and Water**
Their is no chemical-reaction and the the mass didn't change. This was a mixture not a solution. It dissowed but didn't disapear.

Student-medium
Sample-2

Student Name: _____ Test # 3

Scenario	Item Spec	Point Total
1	Mixture/ Solution: Student identifies the liquid as a mixture not a solution.	1 / 1
	Chemical Reaction: A chemical reaction did not occur because the balloon did not inflate.	1 / 1
	Dissolve/Disappear: The substance did not dissolve or disappear.	1 / 1
	Mass: The mass did not change.	1 / 1
2	Mixture/ Solution: Student identifies the liquid as a mixture and solution.	1 / 1
	Chemical Reaction: A chemical reaction did occur because the balloon did inflate.	1 / 1
	Dissolve/Disappear: The substance dissolved, but changed forms/material.	1 / 1
	Mass: The mass did change because of the chemical reaction.	1 / 1
3	Mixture/ Solution: Student identifies the liquid as a mixture and solution.	0 / 1
	Chemical Reaction: A chemical reaction did not occur because the balloon did not inflate.	0 / 1
	Dissolve/Disappear: The substance did dissolve or disappear.	0 / 1
	Mass: The mass did not change.	0 / 1
	Point Total	8 /12

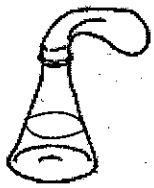
Teacher notes:
Q3: Student did not correctly identify that the mixture was also a solution, therefor did not get the rest of the Points

Mixtures and Solutions:

Read the description of Sara's experiment and then answer the questions below:

Sara conducted three experiments where she mixed a powder with a liquid.
Each experiment followed the same procedure.

1) Put 50mL of liquid into a flask
2) Put in 10 grams of powder into an un-inflated balloon
3) Place the balloon on top of the flask, make sure it is tightly sealed
4) Pour the powder from the balloon into the liquid and observe.



Sarah's observations:

Experiment 1: cornstarch and water

The liquid became cloudy and white when the powder was added, swirling the flask did not change the appearance of the liquid, when stirring stopped, some of the white powder settled on the bottom of the flask. The balloon did not inflate.

Experiment 2: Baking Soda and Vinegar:

Bubbles formed in the vinegar and the balloon inflated, the liquid became cloudy when the powder was first added, but it was clear after the bubbles stopped , the flask felt cooler than before the powder was added.

Experiment 3: Salt and Water

The liquid became slightly cloudy when the powder was added and small crystals of the powder could be seen on the bottom of the flask, when the flask was swirled the liquid became clear again and no crystals could be seen. When the swirling stopped the liquid remained clear. The balloon did not inflate.

Using the words listed below, describe what happened when combined each powder and liquid. You must use every term in each description.

Terms: [illegible]

1) **Cornstarch and water:**
It turned out to be a mixture because it was just Cloudy nothing happand. But Mass built up in it. Did not become a Soulution because there was no bubbling Fizzing or bubbling there was no chemical Reaction it Did not Dissipear

2) **Baking Soda and Vinegar:**
It turned out to be a chemical Reaction because the Soulution started bubbleing and Fizzing Then the bag started to puff up with gas. It Did not Dissolve or did not become a mixture then it started to fill up with mass

3) **Salt and Water** It Slowy dissipeard but not quit.
The Salt Dissolved in the Water its still there but you can not see it cause it dissipeared it became a mixture but not a Soulution it Simply a chemical Reaction then mass started buildmy up but did not Disappear.

Student - ISW

Sample - 3

Student Name: _____ Test # 3

Scenario	Item Spec	Point Total
1	Mixture/ Solution: Student identifies the liquid as a mixture not a solution.	1/1
	Chemical Reaction: A chemical reaction did not occur because the balloon did not inflate.	1/1
	Dissolve/Disappear: The substance did not dissolve or disappear.	1/1
	Mass: The mass did not change.	0/1
2	Mixture/ Solution: Student identifies the liquid as a mixture and solution.	1/1
	Chemical Reaction: A chemical reaction did occur because the balloon did inflate.	1/1
	Dissolve/Disappear: The substance dissolved, but changed forms/material.	0/1
	Mass: The mass did change because of the chemical reaction.	0/1
3	Mixture/ Solution: Student identifies the liquid as a mixture and solution.	0/1
	Chemical Reaction: A chemical reaction did not occur because the balloon did not inflate.	0/1
	Dissolve/Disappear: The substance did dissolve or disappear.	0/1
	Mass: The mass did not change.	0/1
	Point Total	5/12

Teacher note:

Q1: Student did not correctly identify mass.

Q2: Student did identify that the solution didn't dissolve/ disappear or mass

Q3: Student did not identify correctly that the mixture is also a solution, Therefor did not get the rest of the points.

Name _____ Date _____

Mixtures & Solutions

Target #1: **I Think-We Think Assessment**

Classify the following substances as **"mixtures"** or **"solutions"**. Complete your classification in the "I THINK" column. Share your classifications with a partner and note any changes in the "WE THINK" column.

	I THINK	WE THINK
Tap water		
Salsa		
Chocolate chip cookie		
Gasoline		
Soapy water		
Orange juice		
Soda pop		
Air		
Glass		
Iced tea		

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MIXTURES AND SOLUTIONS

Big Idea: **A single kind of matter can exist as a solid, liquid, or gas. Matter is not lost during changes of state.**

Target #2, Assessment: Annotated Student Drawing

Formative Assessment Student Work Cover Sheet

Student Work Description

Sample 1: Student understood the various stages of creating and evaporating salt solution.

Sample 2: Student understood the various stages of creating and evaporating a salt solution. However, in the saltwater solution the salt was still visible which can be a sign of a misunderstanding about the salt needed to be completely dissolved for it to be a solution.

Sample 3: Student understood the various stages of creating and evaporating a salt solution.

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Name _____

Date _____

Mixtures & Solutions - Target #2

ANNOTATED STUDENT DRAWINGS

Draw a picture to represent the various stages of creating and evaporating a salt solution.

In each picture you **MUST** label the salt and water.

Before Making the Solution	Solution
During Evaporation	After Evaporation

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Name [redacted]

Date _____

Mixtures & Solutions

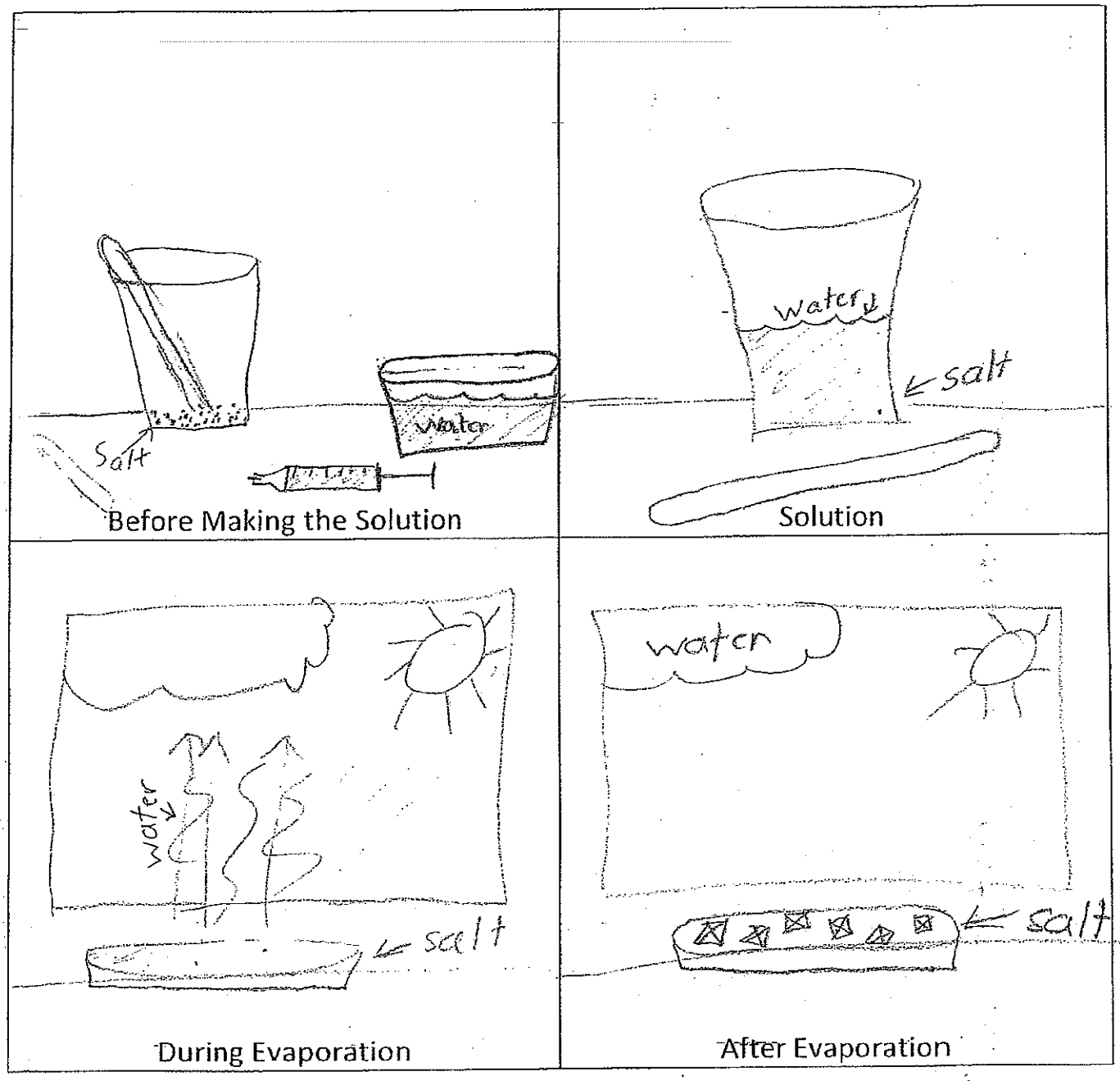
Learning Progression #1

Sample 1

ANNOTATED STUDENT DRAWINGS

Draw a picture to represent the various stages of creating and evaporating a salt solution.

In each picture you **MUST** label the salt and water.



Name [redacted]

Date [redacted]

ixtures & Solutions

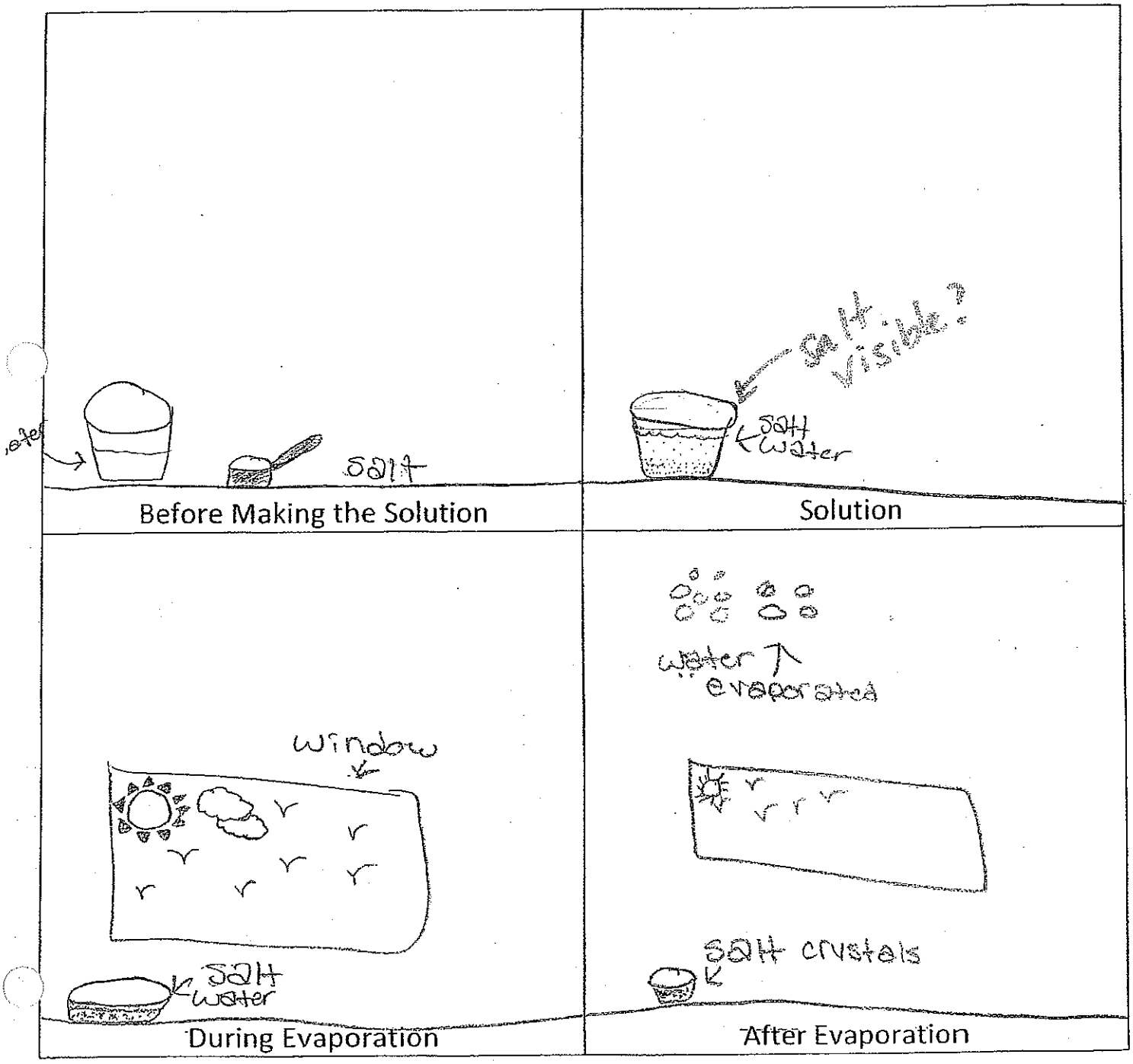
Learning Progression #1

Sample 2

ANNOTATED STUDENT DRAWINGS

Draw a picture to represent the various stages of creating and evaporating a salt solution.

In each picture you **MUST** label the salt and water.



Name [redacted]

Date [redacted]

Mixtures & Solutions

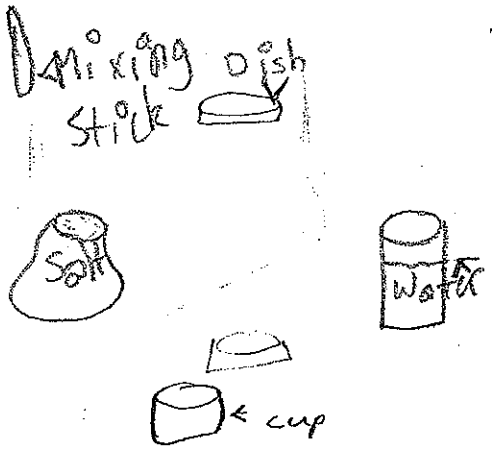
Learning Progression #1

Sample 3

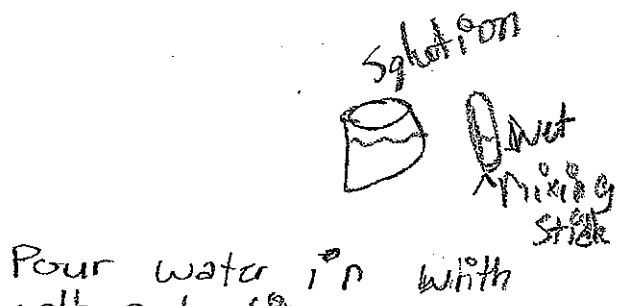
ANNOTATED STUDENT DRAWINGS

Draw a picture to represent the various stages of creating and evaporating ~~a sugar~~ salt solution.

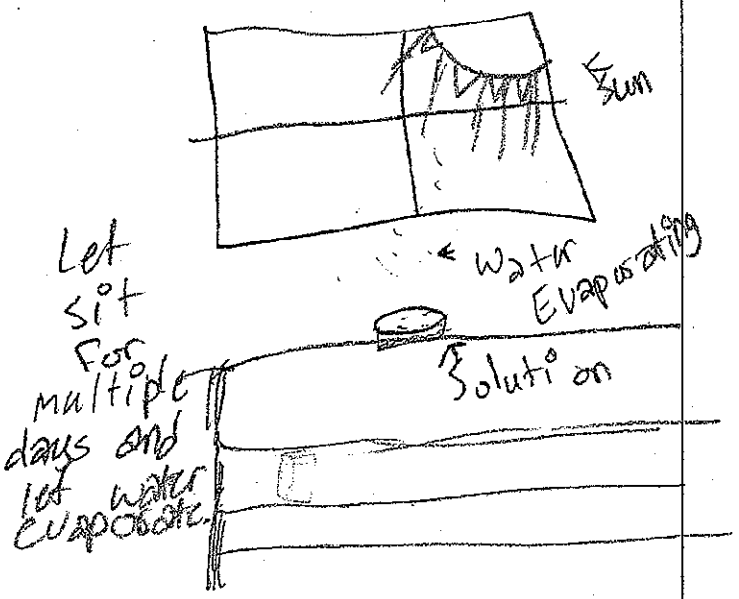
Each picture **MUST** include: ~~*Glass jar *Water *Sugar~~ * Dish * water * salt



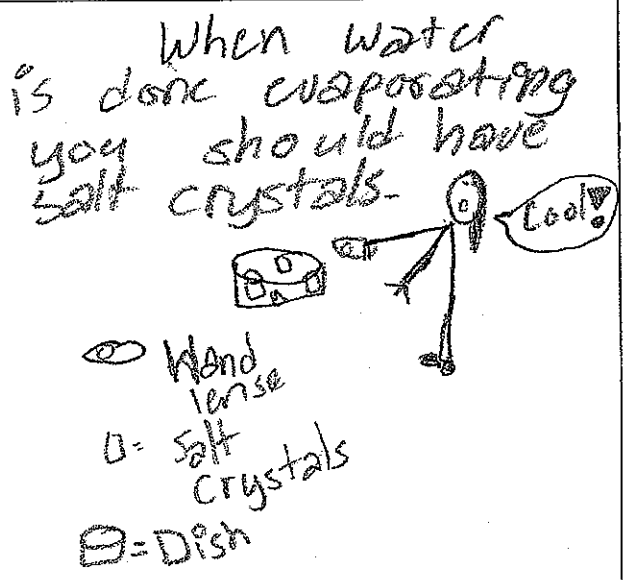
Before Making the Solution



Solution



During Evaporation



After Evaporation

Name _____ Date _____

Mixtures & Solutions Target #3

Mystery Solution

Problem: This chemical was in the kit with the salt and citric acid, but there was no label on the container. It might be some salt or some citric acid, or it might be something else. I'd like to figure out what kind of chemical it is. What should we do?

Plan Summary: Write a summary of a plan. Include a scientific reason for the plan or for selecting one of the materials.

_____
_____
_____
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Test Solution/Results: Describe what evidence you will collect or observe to identify the mystery chemical.

_____
_____
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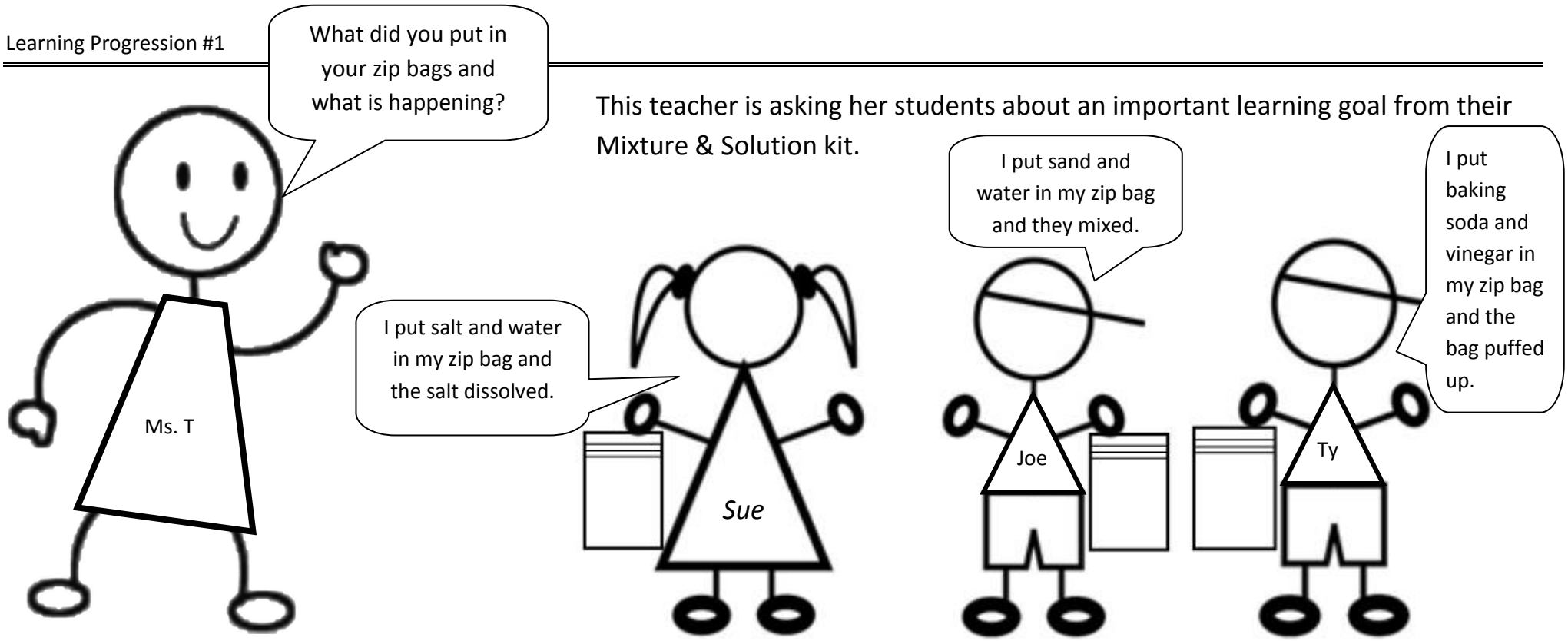
Name _____

Date _____

Mixtures & Solutions

Learning Progression #1

This teacher is asking her students about an important learning goal from their Mixture & Solution kit.



Which student's zip bag shows a chemical reaction? How do you know?

_____

_____

_____

_____

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Additional Information

- Puppy training pads (available at most pet stores and large department stores) are helpful for protecting tables and preventing unwanted spills onto the floor. They are more effective than newspaper. These can be used year after year until soiled.
- Be aware that different brands of clear cups have different weights, this causes false results.
- A suggestion could be using postal scales instead of the unreliable balance scales.
- Investigation 1; Part 2: On the student hand out have students measure the mass of the salt and the mass of water separately. Then have students predict the mass of the salt water solution. After that, have students measure the mass of the salt and water solution.

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Mixtures and Solutions

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