

Science in the Kitchen

<u>Week/Date</u>	<u>Topic</u>	<u>Q405 Focus</u>
Oct. 4	Living things in the kitchen	NOS/Observation and inference
Oct. 11	Physical changes in the kitchen	The use of evidence to form explanations and facilitate scientific discussions
Oct. 18	Chemical changes in the kitchen	Relationship between hands-on and follow-up activities
Oct. 25	Physics in the kitchen	Formative Assessment
Nov. 1	Kitchen creations	Integration of science to other disciplines
Nov. 8	Convention in the kitchen	none

TOPIC	ENGAGE	EXPLORE	EXPLAIN
Week 1: <i>Living things in the kitchen</i>	What things in your kitchen are or were living? Read about the caterpillar's diet.	Classifying living things. What happens to living these things in your kitchen? (mold, decay)	Revisit questions and elicit explanations while providing accurate explanations through further questioning.
Week 2 <i>Physical changes in the kitchen</i>	How do things mix together and change in your kitchen?	What things in your kitchen are products of physical changes?	Revisit questions and elicit explanations while providing accurate explanations through further questioning.
Week 3 <i>Chemical changes in the kitchen</i>	How do things mix together and change in your kitchen?	What things in your kitchen are products of chemical changes?	Revisit questions and elicit explanations while providing accurate explanations through further questioning.
Week 4 <i>Physics in the kitchen</i>	Do unusual, unexplainable or mystifying things happen in your kitchen?	What do you think causes the mystifying things happening in your kitchen?	Revisit questions and elicit explanations while providing accurate explanations through further questioning.

TOPIC	ELABORATE
WEEK 5 <i>Kitchen creations</i>	How are we able to make these things in our kitchen? What living things are a part of the creations? Are there physical or chemical changes happening? Is there anything mystifying happening?

Week 1 - Living things in the kitchen.

A) Learning objectives:

Students will describe how food is made of plants or plant parts.

Students will show how different plant parts have something similar, something different.

Students will indicate that seeds are found in the plant part called a fruit.

B) Standards

NSES standards:

Category	Standard	Concept
Science as Inquiry	Abilities necessary to do scientific inquiry	Ask a question about objects, organisms, and events in the environment. Plan and conduct a simple Investigation Use data to construct a reasonable explanation. Communicate results
Life Science	The characteristics of organisms	Organisms have basic needs. Each plant or animal has different structures that serve different functions in growth, survival, and reproduction. All animals depend on plants.

C) Materials

Each group of four students:

1. 1 Plastic knife
2. 2 Bean or pea-pods
3. 4-6 different fruits (bell peppers, melons, cherries, plums, apples, cherry tomatoes, corn, kiwi) per group
4. 2 Paper or plastic plates
5. (For entire class)- paper towels, newspaper, white glue,
6. Zip-lock bags, bread slices (2 for each group)
7. 4-6 leafy vegetables. () per group.
8. 20 seeds per group (sunflower, pea, popcorn, wheat grains)

D) Description

Engage:

1. We'll read a story book like, 'Very hungry caterpillar'.

Explore:

1. Compare fruits, vegetables and seeds that students would find in their kitchen.

2. Have students draw some in their journals.
3. Classify/ sort all the vegetables, fruits and seeds and record them in a chart.
4. Discuss the properties of fruits, vegetables, seeds using their charts.
5. Introduce exceptional vegetables as fruits and exceptional fruits as vegetables.
6. Discuss what bread is made up of and what happens to it after it becomes stale or molds.
7. Show decayed food. Ask how/why do they think it happened?

Explain:

1. Explain how different parts of plants are used in our diet.
2. Explain how each plant, fruit and seed is different from each other.
3. Explain role of each plant part.
4. Explain how good food habits and cleanliness matters in the kitchen.
5. Show decay video. www.pbskids.org/sid

WEEK 1:	ENGAGE (15 minutes)	EXPLORE (75 minutes)	EXPLAIN (45 minutes)
TEACHER'S ROLE	Read <i>The Very Hungry Caterpillar</i>	Introduce things and ask questions; guide	Encourage students to share explanations/thoughts/inferences
STUDENT'S ROLE	Note all of the things that the caterpillar ate	Compare, classify, sort, document, interact	Share explanations/thoughts/inferences

Content knowledge:

Our food has different parts of plants.

Many plants grow from seeds and seed containing part of the plant is called as Fruit.

Q405 connection:

Students will be making observations and inferences during the “explore” and “explain” activities. We will use the words “observation and inference” when we are asking them to make one or the other, and when we are discussing what we found in the exploration.

Week 2: Physical changes in the kitchen:

A) Learning objectives:

Students will explain that some food items are either solutions or mixtures.

Students will demonstrate or explain how to separate solutions and mixtures.

B) Standards:

Category	Standards	Concepts
Science as Inquiry	Abilities necessary to do scientific inquiry	Ask a question about objects, organisms, and events in the environment. Plan and conduct a simple Investigation Use data to construct a reasonable explanation. Communicate results
Physical Science	Properties and changes of properties in matter.	A substance has characteristic properties. A mixture of substances often can be separated into the original substances using one or more of the characteristics properties.

C) Materials

Salt, gravel, filter paper, strainer, magnet, evaporation dishes, stirrer, match-box, beads, buttons, other small plastic objects

D) Description

Engage:

We'll enact morning breakfast making. We'll make bowls of cereal and question how our combination of cereal and milk represents a mixture.

Explore:

This part will have 6 stations:

STATION1- Making and separating mixtures (Students will make different mixtures, e.g tea and red sand, iron fillings and rice grains, gravel and water, beads with buttons, etc) and will separate them using different techniques.

Can you give some daily life examples of mixtures? Why do you call them mixtures?

STATION2- Separating salt solution.

Show them 50 ml glass of water and 50 ml of glass of water and salt.

Ask them, what do you think about the weight of these two solutions? Are they same, different? Why do you think so?

Let them weigh these two solutions on the balance to decide, which solution weighs more. Ask them how we could separate salt from the water. They can separate salt solution by evaporation.

STATION3- Creating and observing crystals.

Students will make saturated solution of the sugar and water. They will retrieve sugar by evaporation. They will observe sugar crystals before dissolving in water and after retrieving it back, under microscope.

STATION 4- Changes caused by cold and changes caused by heat. Students will see how water changes state.

Explain:

Explain how mixtures are made by adding two substances in any proportion.

Explain that when we mix one solid item with a liquid, it makes a solution. Explain how both solutions as well as mixtures can be separated by simple ways.

Explain how water changes with coldness and heat.

Explain how physical changes do not change the substance itself.

WEEK 2:	ENGAGE (15 minutes)	EXPLORE (75 minutes)	EXPLAIN (45 minutes)
TEACHER'S ROLE	Role-play: Make cereal and ask how these things have changed	Introduce things and ask questions at stations; guide through investigation	Encourage students to share explanations/thoughts/inferences
STUDENT'S ROLE	Observe changes and provide inferences	Interact, document in journal, separate, investigate	Share explanations/thoughts/inferences

Q405 connection: During the explain section we will ask students to use what their experiences in today's stations to form explanations for the things that are changing in the kitchen.

Week 3: Chemical changes in the kitchen:

A) Learning objectives:

Students will explain that when eating cooked food, its ingredients or cooking methods can change its properties, hence a chemical change.

Students will use yeast to measure the sugar content of food items.

Students will explain that yeast is a living thing, which produces carbon dioxide gas.

B) Standards:

Category	Standard	concepts
Science as Inquiry	Ability to carry out Scientific inquiry	Ask a question about objects, organisms, and events in the environment. Plan and conduct a simple Investigation Use data to construct a reasonable explanation. Communicate results
Physical Science	Properties and changes of properties in matter.	Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties.

C) Materials

For entire class: 1 gallon of 2% or whole milk, vinegar and salt, Corn flour, sugar, baking powder, margarine, 6 eggs, blueberries (washed and drained) sodium acetate, 6 zip bags, 1 liter, container- 1 liter, 6 Thermometers- Celsius, sugar, cookie, wheat flour, cereals, Baker's dry yeast (2 packets) permanent marking pens

D) Description

Engage: We'll make 'Instant Ice'. Add sodium acetate in the boiling water. Mix it well and then cool it in the refrigerator. Pour the liquid in an ice tray and touch it. It will get converted into ice immediately.

Explore:

This part will have 3 stations:

STATION1- Preparation of a pancake.

What do you think happens to pancake batter when we bake it?

Students will work in group to make pancakes. Students will make observations at every stage. They will draw pictures at every stage.

STATION2- Preparation of cheese.

How do we make cheese?

Students will work again in group. Students will predict what will happen, before making cheese. They will compare their predictions, after making cheese.

STATION3- Use of yeast as an Indicator.

All of you have seen yeast in the kitchen. Do you know it is living thing in resting state? What do you think the yeasts will need to break out their resting state?

Students will use different sweet snacks from the kitchen to check the sugar content of the snack.

A) Explain:

Through comparison of the observations of these pre and post recipes, ask students, what differences they see.

Ask them to make a chart of these post-observations.

Explain characteristics of chemical changes.

Explain how chemical changes are different than physical changes.

WEEK 3:	ENGAGE (15 minutes)	EXPLORE (75 minutes)	EXPLAIN (45 minutes)
TEACHER'S ROLE	Demonstrate "Instant Ice" ask questions	Introduce things and ask questions at stations; guide through investigation	Encourage students to share explanations/thoughts/inferences
STUDENT'S ROLE	Observe changes and provide inferences	Interact, document in journal, observe, investigate	Share explanations/thoughts/inferences

Content knowledge:

Chemical changes are irreversible.

Yeast can be used to indicate sugar.

Q405 Connection: The hands-on activities in the stations will provide information, experiences and ideas that may be addressed in the discussion as well as week 5 activities.

Week 4: Physics in the kitchen:

A) Learning objectives:

Students will describe how a pressure difference can make things operate differently.

Students will explain why they see raisins dancing in the soda.

B) Standards

Category	Standard	Concept
Science as Inquiry	Ability to carry out scientific inquiry	Ask a question about objects, organisms, and events in the environment. Plan and conduct a simple Investigation Use data to construct a reasonable explanation. Communicate results
Physical Science	Physical properties of matter	

C) Materials: Sodium acetate, raisins, eggs, tea-bags, 6 cans of colorless soda, a tall, clear glass or plastic cup, several raisins

D) Description

Engage:

We'll perform a demonstration of a tea-bag. Take out all the tea from the tea bag; make a small cylinder of the tea-bag. Light the tea bag with match-stick, it will burn up to the bottom and then will fly up to the roof. This will initiate curiosity in the students and will create platform for the discussion.

Explore:

1. Pour the can of clear soda or carbonated water into the tall glass. Drop 6 or 7 raisins into the glass. Watch the raisins for a few seconds. Make your observations. Raisins will dance in the soda.
2. Egg in the bottle: Take one boiled egg and a narrow-necked bottle. Burn 3-4 match-sticks and put them inside the bottle. Now quickly put boiled egg on the mouth of bottle. Observe what happens. Record your observations.
3. Floating egg: A raw egg can be made to float in very salty water. Fill half a glass with salt water, and top it off with fresh water without letting the two mix (pouring the water over the back of a spoon helps), Now, gently lower an egg into the glass and suspend it between the layers. You can also mix a solution of salt water, through trial

and error, that matches the specific gravity of the egg. The egg will float at whatever level it is placed in the jar. When a little salt is added, it will float to the top. If a little fresh water is added, it will sink.

Explain:

1. Explain them why and how because of buoyancy these raisins dance in the soda.
2. *** The raisins dance because the carbon dioxide bubbles attach to the raisins in their creases. This helps the raisins float to the surface. Once there, the bubbles break and the raisin then sinks back down.
3. Explain them how pressure difference is created in the air inside the bottle and outside air. Explain them how egg gets sucked into the bottle.
4. Explain why the egg floats in the water layers.

WEEK 4:	ENGAGE (15 minutes)	EXPLORE (75 minutes)	EXPLAIN (45 minutes)
TEACHER'S ROLE	Demonstrate flying tea-bag and encourage questions about it	Introduce things and ask questions at stations; guide through investigation	Encourage students to share explanations/thoughts/inferences
STUDENT'S ROLE	Observe event and ask questions	Interact, document in journal, observe, infer, investigate	Share explanations/thoughts/inferences

Q405 Connection: We will be able to determine if students have learned about changes in the kitchen if they relate today's activities and discussions with the previous day's topics. We will be asking questions along the way to determine how students are thinking about things that happen in their kitchens. We will see if they can make observations and inferences appropriately.

Week 5: Kitchen creations

A) Learning objectives:

Students will identify which part of plant was used in a food.

Students will identify the recipe made as a mixture or a solution, physically changed or chemically change.

B) Standards

Category	Standard	Concept
Science as Inquiry	Ability to carry out scientific inquiry	Ask a question about objects, organisms, and events in the environment. Plan and conduct a simple Investigation Use data to construct a reasonable explanation. Communicate results

C) **Materials:** Rice grains, container, microwave, salt, 1 gallon of 2% milk, Ice-cream cups, sugar-1 packet, match box, different salad materials and dressings, coke.

D) Description

Engage: We'll make rice and ice-cream with the help of students and ask them questions about their thinking about:

- if this is physical or chemical change?

- which plant part is used in the rice making? How this plant part is important for us and for plant? Etc.

Explore: We'll provide students with different material and they will create their own recipes in the group (they will either make butter or salad or trail mix)

Explain: If we look carefully, we can see many events happening in the kitchen that can be explained using science. We can do small science experiments to learn, with help of adult assistance.

Q405 Connection: We will use math when measuring amounts. We will discuss the cultural importance of rice for certain countries. We will provide information on the history of ice cream. The students will have the opportunity to write the recipes and decorate them.

WEEK 5:	ENGAGE (15 minutes)	EXPLORE (75 minutes)	EXPLAIN (45 minutes)
TEACHER'S ROLE	Elicit students to help make ice cream and rice	Introduce things and ask questions at stations; guide through investigation	Encourage students to share explanations/thoughts/inferences
STUDENT'S ROLE	Volunteer, assist, observe changes and provide inferences	Interact, document in journal, observe, infer, investigate, use new knowledge to help form explanations	Share explanations/thoughts/inferences

