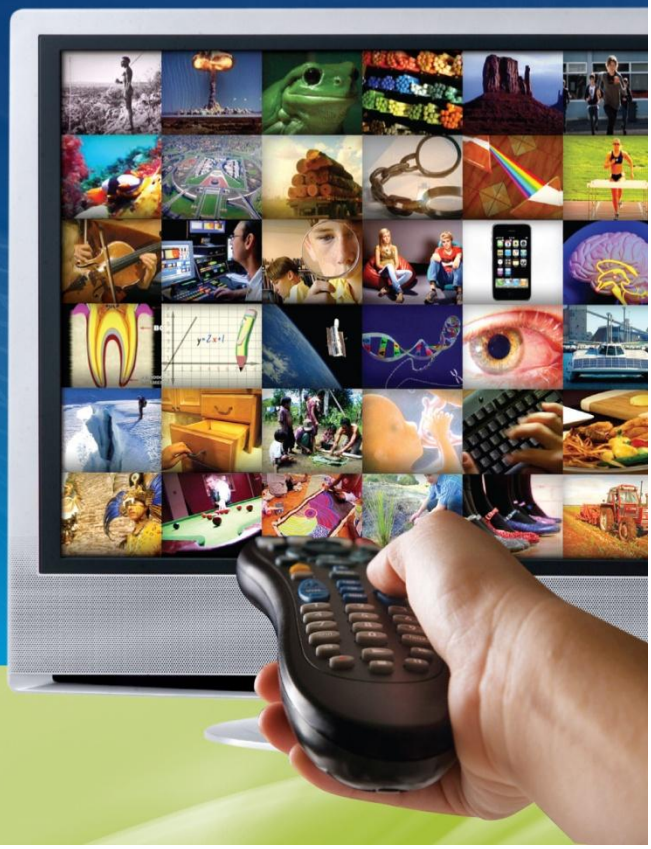
Program Support Notes



Classroom VIDEO EDUCATION WITH VISION

Science in the Kitchen

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For Teachers

Introduction

This program will completely change the way you view the average family kitchen! Where once you would have opened the pantry or the fridge and just seen food, you will now look for solutions, suspensions, chemical reactions, melting, mixing and dissolving; in fact all things scientific.

Science in the Kitchen transforms an average family kitchen into a chemistry laboratory where our student 'scientist' conducts simple experiments using common ingredients found in any kitchen.

By linking to students' prior knowledge and life experience, this program demonstrates in a clear, practical and entertaining way a number of key scientific concepts that students often find confusing:

- States of Matter – solids, liquids and gases
- Chemical and Physical Reactions
- Scientific Methods and Procedures (including Safety in the Laboratory)

Student Outcomes

Students will:

- access prior knowledge and build new knowledge about states of matter and the physical and chemical reactions and changes that take place when chemicals are mixed
- acquire and use the correct scientific terminology related to the study of chemistry
- develop an awareness that science is happening all around us
- understand that the reason we study science is to help us make sense of our world
- identify and discuss the extent to which science impacts on our daily lives

Guiding Questions

Through observation and investigation, students can learn about the chemical and physical changes or reactions that are a part of our everyday lives. Questions to explore:

- What are the states of matter?
- What are chemicals?
- What are chemical reactions and how do they occur?
- What are physical changes and how are they different from chemical reactions?
- What is the Scientific Method and why do scientists follow these steps when conducting experiments?

Key Vocabulary

- matter, states of matter
- hypothesis
- solid
- liquid
- gas
- chemical
- physical
- reaction
- reactant
- materials
- melt, melting
- dissolve, dissolving
- freeze, freezing
- mix, mixing, mixture
- solution
- saturate, saturation
- evaporate, evaporation, evaporating
- solvent
- molecule
- atom

Timeline

00:00:00	Introduction
00:01:50	Recipes and chemical reaction
00:05:39	Solids, liquids and gases
00:09:58	Mixtures and suspension
00:14:08	Credits
00:14:47	End program

Related Titles

Science in the Garage
What's so Special about Science?
How Is It Made? TV Show - Fuel - Water – Bread - Go Facts Series
Science Method – How it Works

Recommended Resources

http://betterkidcare.psu.edu/AngelUnits/OneHour/KitchenScience/KitchenLessonA.html
http://www.bbc.co.uk/schools/ks2bitesize/science/materials/changing_state/play.shtml
http://www.chem4kids.com/files/matter_intro.html
http://www.thenakedscientists.com/HTML/content/kitchenscience/
http://pbskids.org/zoom/games/kitchenchemistry/virtual-start.html

Teachers Guide

Initiate Prior Learning

Worksheet 1: KWHL and Think, Pair, Share

Provide each student with a copy of the **KWHL Work Sheet (1).** Start with the Kitchen Science KWHL. Ask the students to think about and then write in the 'K' column, at least one thing they already *know* about kitchen 'science'. Next ask them to write one thing they *want* to know in the 'W' column and, in the 'H' column, *how* they will find that information.

Students then pair up and share their ideas and try to add one more idea in each of the K, W and H columns. Groups then share all their ideas and brainstorm even more ideas. Finally, all ideas are recorded on a whole group KWHL chart (using an Interactive Whiteboard (Smart Board) or butcher's paper). At this point, the teacher can also add to the 'W' column, any other key concepts that will be covered in the lesson or unit.

Follow the same procedure with the **KWHL - States of Matter**. This can be used prior to viewing the DVD to check prior knowledge and then to aid recall after the students have seen the video.

Revisit the KWHL At the end of *the lesson or unit, th*e 'L' column, what we have *learned, can be filled in as a whole group activity.*

Extension Activities

Worksheet 2 - Kitchen science: √ or X?

Ask students to work in pairs taking turns to decide on each question. Encourage students to discuss each question and answer and then to write the correct answer where they decide that the statement is wrong. When all pairs have completed the worksheet, check answers. View sections of the DVD again if there is any disagreement or uncertainty about the correct answers.

Worksheet 3: POE Strategy

Distribute **Worksheet 3** to all students and tell them that they are going to watch the vinegar and baking soda experiment again and observe very carefully what happens so they can fill in each of the boxes on the POE worksheet. Display the POE worksheet on the Smart Board (or project it on to the white board) then model what to write in each box. Show the experiment again, pausing after each section so that the students can discuss and then fill in the appropriate section on the worksheet.
Note: The vinegar and baking soda experiment runs from 2.15 to 5.16 of the DVD.

Worksheet 4: States of Matter: Solid, Liquid, Gas

By this stage, your students will have had an opportunity to build some background knowledge about states of matter. Distribute **Work sheet 4** and ask the students to work in pairs to answer each question.

Worksheet 5: Kitchen Science Card Games

Photocopy **Worksheet 5** on to coloured cards and give to each student. Ask them to cut out the cards to play some card matching games.

For more variety:

- Have groups of students use 2 sets of cards to play Go Fish or Snap
- Students can make more cards using the information gained through research.
- Students create their own card game. Have them write out simple rules
- The teacher can also add some cards to reinforce specific vocabulary or concepts.

Activity: Kitchen Science Celebrity Heads

The students can share their prior and new knowledge with the whole class by playing Kitchen Science Celebrity Heads.

To play Kitchen Science Celebrity Heads, select four students to stand in front of the board facing the class. Write one key word from the Key Vocabulary List or a key concept on the board above each student's head. Alternately, a word or phrase relating to Kitchen Science can be written on cards and attached to caps worn by each student.

Each of the students standing in front of the board then takes turns to ask a question to find out what word or concept they are. The whole class answers with either yes or no. If a student's question is answered with a yes then that student can ask another question. If the class answer is no, then the next student asks a question. At the end of their turn, each student may try to guess what they are.

The winner is the first person to correctly guess the word or concept written on the board or card.

Research Activity:

Organise expert science teams to research each of the states of matter. Name the teams the Solids, the Liquids and the Gases! Each team undertakes internet and library research to find out many facts about their focus topic. Ask each team to create a poster listing all the information they have discovered. Display these posters on the classroom walls and ask the students in each group to examine the information and then write at least two questions to ask another team about what they have written. Run a Q & A Panel session so students can show what they have learned in their research.

Word search Activity:

For a little extra fun get students to complete the word search. These words are taking from the Kitchen Science Vocabulary.

Suggested Student Responses

Initiate Prior Learning

WORKSHEET 1 – KWHL

Answers will vary depending on students' prior learning in science.

Extension Activities

WORKSHEET 2

Kitchen science: √ or X?

We learned a lot from the experiments of our kitchen 'scientist'. Test your knowledge. Tick (√) or (**X**) for each of these sentences. Write the correct answer where needed.

1. The 3 states of matter are melting, evaporating and freezing

   The 3 states of matter are solid, liquid and gas. X

2. Anything made up of matter is a chemical.

   _____ √

3. Chemicals are made up of different types of molecules.

   _____ √

4. A chemical reaction occurs when two or more molecules join together and a non-reversible change results.

   _____ √

5. When the vinegar and the baking soda were mixed together a chemical reaction occurred that produced a gas called oxygen

   Carbon dioxide X

6. A physical change is reversible.

   _____ √

7. Freezing and melting are physical changes.

   _____ √

8. Atoms are made up of molecules.

   Molecules are made up of atoms. X

9. The Scientific Method is the name given to the procedure Scientists follow when doing experiments.

   _____ √

10. Water will not boil on top of Mt Everest.

    On Mt Everest, water boils at 68 degrees instead of at 100 degrees Celsius X

WORKSHEET 3

Kitchen Science POE Strategy – Predict, Observe, Explain

Answers will vary but should follow the procedure demonstrated in the experiment in the program. e.g. vinegar and baking soda experiment

WORKSHEET 4

States of Matter: Solid, Liquid, Gas

1. Complete the table below by writing ***yes*** or ***no*** in each box

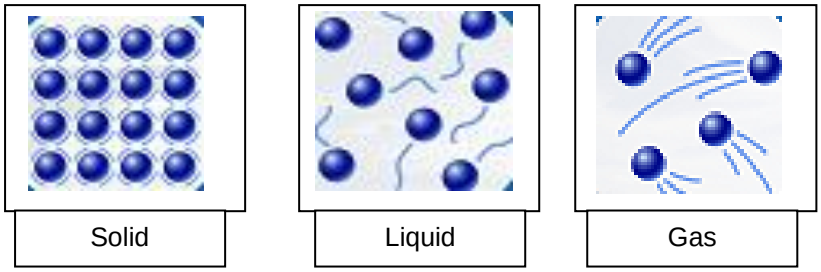
States of Matter	Does it have its own fixed shape?	Is it easy to compress?	Does it spread out or flow easily?
Solid	yes	no	no
Liquid	no	no	yes
Gas	no	yes	yes

2. a) List 3 solids: i) **kitchen bench** ii) **Glass** iii) **Apple**

   b) List 3 liquids: i) **Water** ii) **Vinegar** iii) **Milk**

   c) List 3 gases: i) **oxygen** ii) **carbon dioxide** iii) **hydrogen**

3. Draw diagrams to represent particles in a solid, a liquid and a gas.



WORKSHEET 5

Kitchen Science Card Games

Cut out each of the cards and use them to play the game memory on your own or with a partner

- Molecules are made up of these. ***Atoms***
- This is a non-reversible change. ***A chemical reaction***
- It has a fixed shape and volume. ***Solid***
- This is a reversible change. ***A physical reaction***
- It does not have a fixed volume or shape. ***Gas***
- It flows easily but has a fixed volume. ***Liquid***

WORKSHEET 1 – KWHL

Name_____Date_____

What do you know about Kitchen Science?

K What I **K**now about science that happens in the kitchen	**W** What I **W**ant to know about Kitchen Science	**H** **H**ow will I find out?	**L** What have I **L**earned?

States of matter - solids, liquids and gases

K What I **K**now about states of matter	**W** What I **W**ant to know about states of matter	**H** **H**ow will I find out?	**L** What have I **L**earned?

WORKSHEET 2

Name_____Date_____

Kitchen science: √ or X?

We learned a lot from the experiments of our kitchen 'scientist'. Test your knowledge. Tick (√) or (**X**) for each of these sentences. Write the correct answer where needed.

1. The 3 states of matter are melting, evaporating and freezing

_____ ☐

2. Anything made up of matter is a chemical.

_____ ☐

3. Chemicals are made up of different types of molecules.

_____ ☐

4. A chemical reaction occurs when two or more molecules join together and a non-reversible change results.

_____ ☐

5. When the vinegar and the baking soda were mixed together a chemical reaction occurred that produced a gas called oxygen

_____ ☐

6. A physical change is reversible.

_____ ☐

7. Freezing and melting are physical changes.

_____ ☐

8. Atoms are made up of molecules.

_____ ☐

9. The Scientific Method is the name given to procedure Scientists follow when doing experiments.

_____ ☐

10. Water will not boil on top of Mt Everest.

_____ ☐

WORKSHEET 3

Name_____Date_____

Kitchen Science POE Strategy – Predict, Observe, Explain

Describe the kitchen science experiment of mixing vinegar and baking soda.

What is the question being asked? (What is being investigated?)

What materials are used?

What is the method or procedure?

Predict (Hypothesis)
Write or draw all the things you think you will see.

Explain
Write the reasons why you think it will happen this way.

Observe
Draw or describe what you see.

Explain
Add to or change your ideas about why it happened.

WORKSHEET 4

Name_____Date_____

States of Matter: Solid, Liquid, Gas

1. Complete the table below by writing ***yes*** or ***no*** in each box

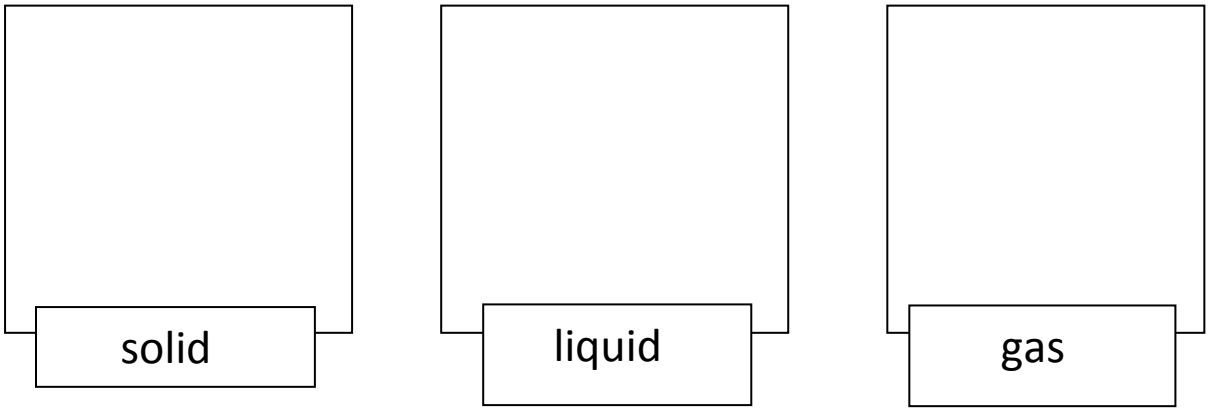
States of Matter	Does it have its own fixed shape?	Is it easy to compress?	Does it spread out or flow easily?
Solid			
Liquid			
Gas			

2. a) List 3 solids: i) _____ ii) _____ iii) _____

   b) List 3 liquids: i) _____ ii) _____ iii) _____

   c) List 3 gases: i) _____ ii) _____ iii) _____

3. Draw diagrams to represent particles in a solid, a liquid and a gas.



WORKSHEET 5

Name_____Date_____

Kitchen Science Card Games

Cut out each of the cards and use them to play the game memory, on your own or with a partner

atoms	**This is a non-reversible change.**	**It has a fixed shape and volume.**
physical reaction	**It does not have a fixed volume or shape.**	**This is a reversible change.**
liquid	**gas**	**Molecules are made up of these.**
chemical reaction	**It flows easily but has a fixed volume.**	**solid**

Word Search Activity

Name_____Date_____

Science in the Kitchen can be fun

See if you can find all the words listed below

K S F Z V M L J L Y J B J L Z N H M
H C K R S A T U R A T I O N D E D A
S S I V E T A R U T A S Y I F G T T
P I Q A H E Z M D E Q L S H N O P F
E K S O R F Z U X T S S I I M T Q B
T O I E C P L I M I O S T J J Z L E
N S A G H J X S N L U A U E O A K U
A S M Z W T M F V G R P N R C C S H
T Z F J D Q O I X O N O D I S L J Y
C G O N E I N P P V I I M O A C W R
A N N C M G U A Y T H E L I M Z T E
E I L V O J V Q U H H I R E Y K T A
R T K F M E Q L I C D E H J V Z L C
E L U C E L O M C L T R E T T A M T
H E V H Z S U Z L A C I S Y H P U I
W M J P U J U O M C M K H K P D A O
D F S S C M Z J E R U T X I M S V N
L N T N E V L O S T H W C N J I I T

atom	liquid	reactant
chemical	materials	reaction
dissolving	matter	saturate
evaporating	melting	saturation
freezing	mixture	solid
gas	molecule	solution
hypothesis	physical	solvent