Chemistry

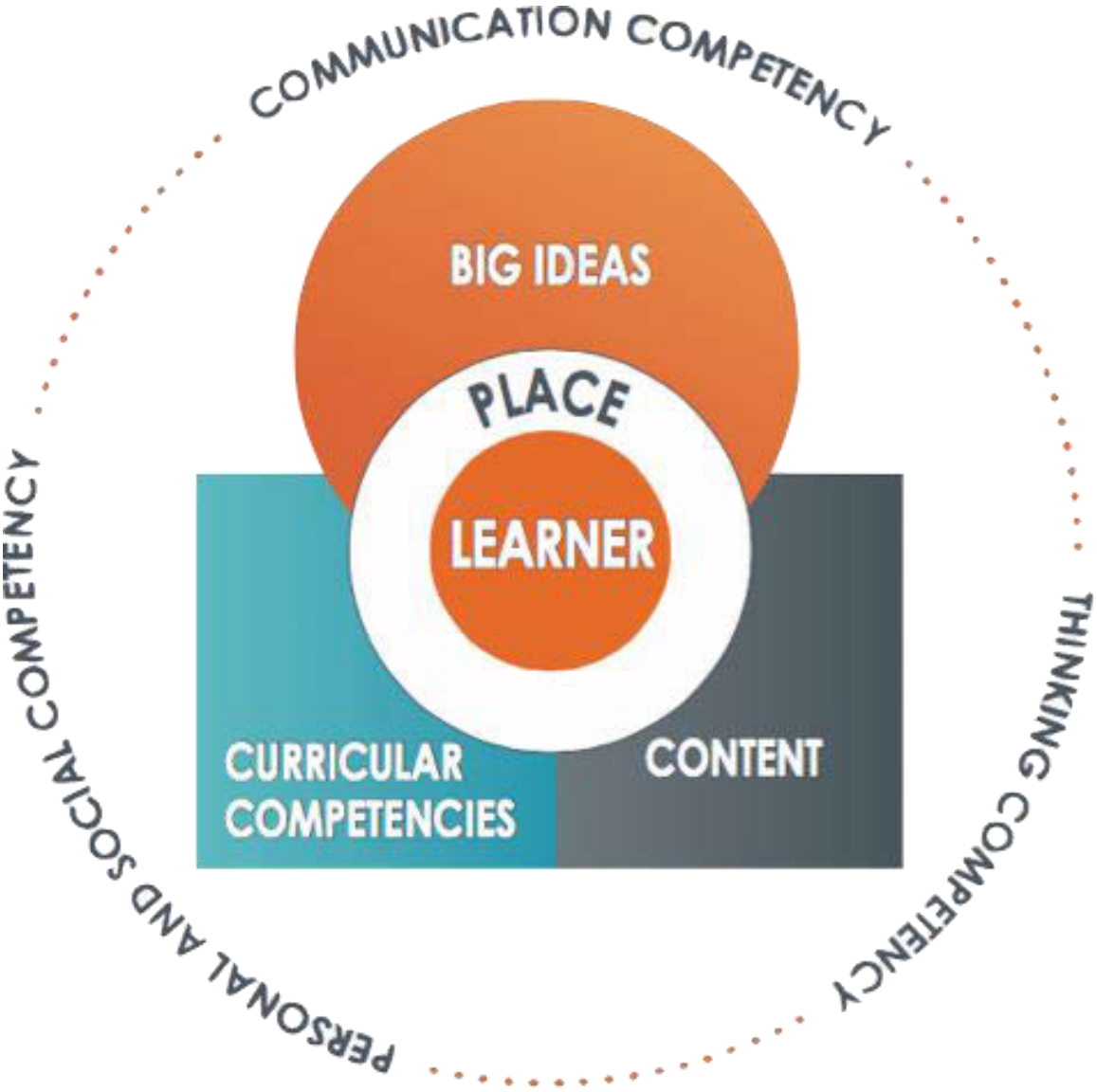
Grade 2

Grade 2 Science - Chemistry

Big Idea

Content

- physical ways of changing materials
- chemical ways of changing materials


COMMUNICATION COMPETENCY
THINKING COMPETENCY
PERSONAL AND SOCIAL COMPETENCY
BIG IDEAS
PLACE
LEARNER
CURRICULAR COMPETENCIES
CONTENT

BIG IDEAS

All living things have a life cycle. (Questions to support inquiry with students; Why are life cycles important? How are the life cycles of local plants and animals similar and different?)	Materials can be changed through physical and chemical processes.	Forces influence the motion of an object.	Water is essential to all living things, and it cycles through the environment. (Questions to support inquiry with students; Why is water important for all living things? How does water cycle through the environment?)

Learning Standards

Curricular Competencies

Students are expected to be able to do the following:

Questioning and predicting ***(**Cycles are sequences or series of events that repeat/reoccur over time. A subset of pattern, cycles are looping or circular (cyclical) in nature. Cycles help scientists make predictions and hypotheses about the cyclical nature of the observable patterns. Key questions about cycles: How do First Peoples use their knowledge of life cycles to ensure sustainability in their local environments? How does the water cycle impact weather?)*

- Demonstrate curiosity and a sense of wonder about the world
- Observe objects and events in familiar contexts
- Ask questions about familiar objects and events
- Make simple predictions about familiar objects and events

Planning and conducting

- Make and record observations
- Safely manipulate materials to test ideas and predictions
- Make and record simple measurements using informal or non-standard methods

Processing and analyzing data and information

- Experience and interpret the local environment
- Sort and classify data and information using drawings or provided tables
- Compare observations with predictions through discussion
- Identify simple patterns and connections

Evaluating

- Compare observations with those of others
- Consider some environmental consequences of their actions

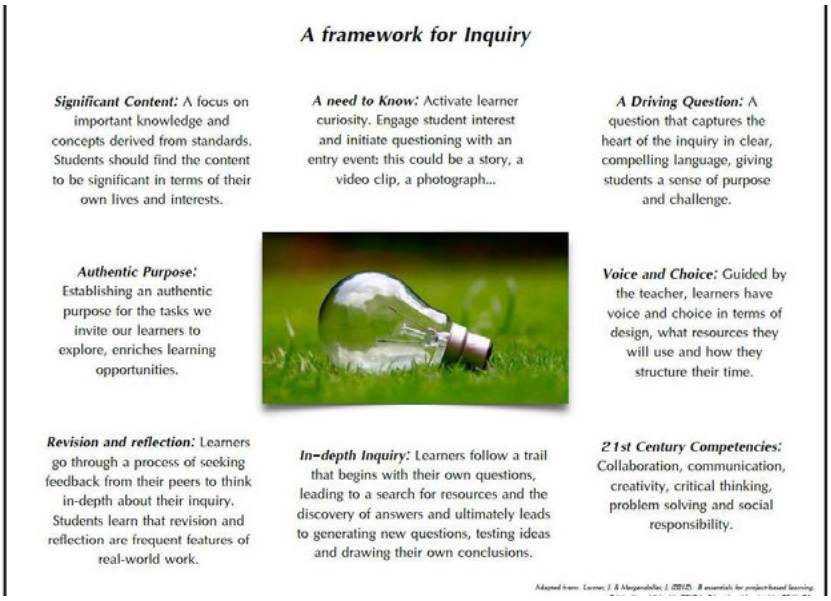
Applying and innovating

Content

Students are expected to know the following:

- **metamorphic** *(metamorphic life cycles: body structure changes (e.g., caterpillar to butterfly, mealworm transformation, tadpoles to frog))* and **non-metamorphic (***non-metamorphic life cycles: organism keeps same body structure through life but size changes (e.g., humans))* life cycles of different organisms
- similarities and differences between **offspring and parent (***a kitten looks like cat and a puppy looks like dog but they do change as they grow; salmon change a great deal as they grow and need fresh and salt water environments to survive)*
- **Aboriginal knowledge** *(stewardship: sustainably gathering plants and hunting/fishing in response to seasons and animal migration patterns; sustainable fish hatchery programs run by local First People)* of life cycles
- **physical (***physical ways of changing materials: warming, cooling, cutting, bending, stirring, mixing; materials may be combined or physically changed to be used in different ways (e.g., plants can be ground up and combined with other materials to make dyes))* ways of changing materials
- **chemical (***chemical ways of changing materials: cooking, burning, etc.)* ways of changing materials
- types of **forces (***contact forces and at-a-distance

• Take part in caring for self, family, classroom and school through personal approaches • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving **Communicating** • Communicate observations and ideas using oral or written language, drawing, or role-play • Express and reflect on personal experiences of place	*forces: different types of magnets; static electricity; balanced and unbalanced forces: the way different objects fall depending on their shape (air resistance); the way objects move over/in different materials (water, air, ice, snow); the motion caused by different strengths of forces)* • **water sources** *(oceans, lakes, rivers, wells, springs; the majority of fresh water is stored underground and in glaciers), including local watersheds* • water — a **limited resource** • the water **cycle (***The water cycle is driven by the sun and includes evaporation, condensation, precipitation, and runoff. The water cycle is also a major component of weather (e.g., precipitation, clouds).)*



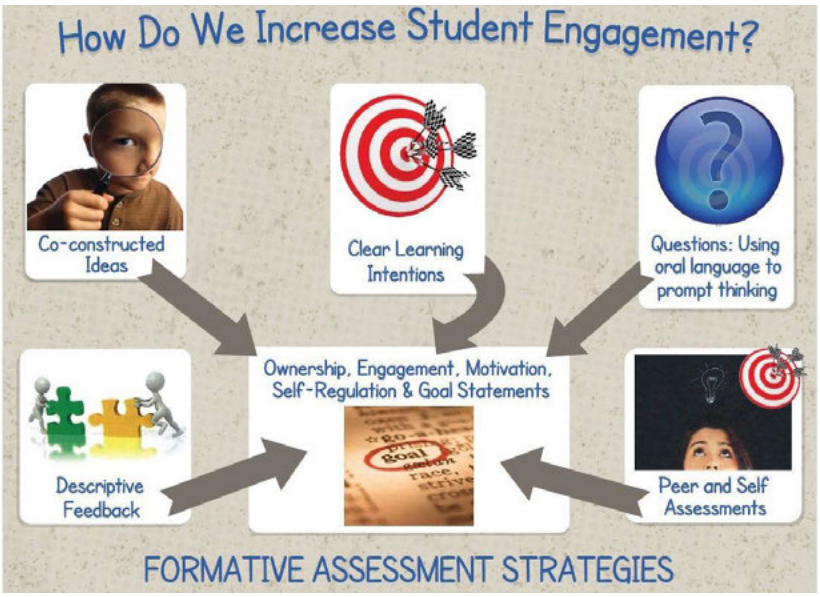
Suggested Ways to Engage Students in Science Inquiry:

Authentic purpose: Explore challenging questions, problems or issues that can be approached and answered in many different ways.
How can we change matter? What matters if we change matter? How can we safely manipulate materials to test ideas and predictions?

In-depth inquiry: Opportunities for students to make and record observations: Stem process tool is provided as a framework for students to draw/write their wondering and ideas as they formulate. Encourage all the 5 W's (who, what, when, where, why) also "*How does matter change? And if I do this……this…. results."* Cause & Effect.

Voice & Choice: Starting from matter in the classroom (i.e. the legs of the desk could be sawed off to lower for a student but what do we do instead?, we could break chalk in half, we can freeze water to make ice cubes, can plug in the kettle to create steam/tea, open the window to cool the air, mixing powder paints with liquid).
Moving to matter outside your window, in the parking lot, on the field (i.e taking air out of tires, adding air to bike tires, physical changes of moving objects around the school).
Begin with place-based physical changes which students notice.

Core Competencies: Experiments in this kit provide opportunities for students to collaborate and build communication skills. Inquiry can follow a gradual release model depending on what students are learning or wish to demonstrate. In this particular unit of science, inquiry needs to be scaffolded to match the background knowledge (KNOW) and abilities of the students (DO). Students will need front end loading and exploration time with physical & chemical changes of matter.



Suggested Ways to Embed Assessment ***for*** Learning Strategies:

Activating and building upon prior knowledge of differences between solids, liquids and gases. Videos and texts within the kit will support this inquiry.

Learning Intention:

Through science study I can engage with others and build my communication skills.

Engagement & motivation: Walk to the beach to see physical changes to matter. After a walk to the beach take a picture walk through the story within the wordless picture book: **Journey of the Sea Glass** by Nicole Fazio. Look for details and invite discussion about what students see while making inferences and predictions. Discuss one possible course of events for this story and how the bottle has been influenced by waves, currents, the sea floor, and sea creatures.

Questions :using oral language to prompt thinking to further investigation:
How does…How can…How/what might stories be told through matter….What is the interplay between matter and our lives? What are the connections between physical and chemical changes in matter?
What are things in my world made of?" (metal, wood, plastic, cardboard or fabric)What might a scientist do to answer this question? What other questions does this bring up? Discuss the difference between objects and the materials which they are made from. Grouping objects by materials is information which will help begin to answer the investigation or question. These observations then become 'scientific data'.

Co-Constructing Criteria:
Communication competency provides a bridge between students' learning, their personal and social identity and relationships, and the world in which they interact.
Posting, sharing and referring to a clear learning intention (or destination)and building the criteria with the students around communicating while experimenting will help to foster self-regulation necessary for maximising learning.
What does communicating with a small group *look like, sound like, feel like? How can we engage with others and build communication skills through science inquiry?*

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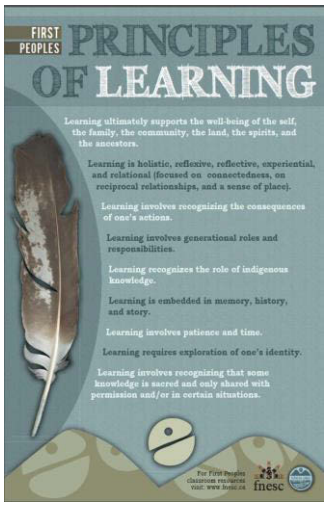


Suggested Ways to Weave Aboriginal Ways of Knowing within this unit:

Learning recognizes the role of Indigenous knowledge:

Materials can be changed through physical and chemical processes: Seaweed harvested, piled up on the beach, covered with mats and left for days before further drying on cedar-wood frames.

Plants can be ground up and combined with other materials to make dyes. (Dying wool further north in BC)

Soaked items: wild onion dandelion, berries, Oregon grape wood can make yellow, red alder bark (red), blackberries (not Himalayan type), blueberries. Search web for ways of making natural paints. Natural pigments come from crushing and grinding clay, minerals, plants, flowers and fruits.

Clothes were cured with salt. Roots were dried in large quantities, traded from one place to another and kept as "back-up" in times of food storage.

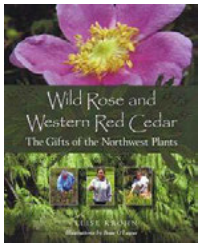
Food experiments with heat and cold; the process of mixing of solids and liquids changes materials.

Resource uses on the west coast:

Bentwood box (math lesson on Learn 71 Ab. Ed.) https://www.youtube.com/watch?v=6d9P-ODggaM (2:22)

Constructing cedar canoe

Cutting down and using all parts of the cedar tree - lessons available online & through Aboriginal Curriculum Support teachers



Activities suggested from Wild Rose and Western Red Cedar text included in kit:

Fruit Leather Salal Berry pg. 25,26

Tea Making pg. 75, 79

Oregon Grape jelly pg. 122

Bath Salts/Salt scrub

Informational study of Devil's Club pg. 111,112

Stinging Nettle

Gathering herbs with adult or teacher; warning to be safe

Dandelion pg. 109, 110

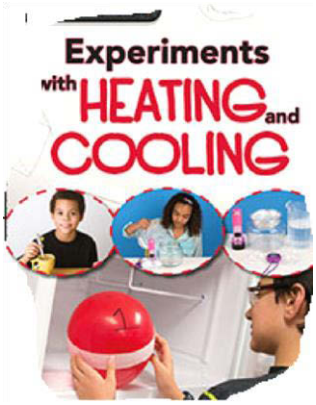
C T PS

Resources

Videos:

PBS kids sample videos
http://pbskids.org/dragonflytv/show/mattermotion.html

Study Jams scholastic:
Physical/Chemical change excellent short video with a great summary
http://studyjams.scholastic.com/studyjams/jams/science/matter/changes-of-matter.htm



Websites:

Information for teachers about matters, mixtures and changing states of matter
http://www.ducksters.com/science/chemistry/

Experiments:

Recommended kit experiments:
Pool Party pg.12-15 Experiments with Heating and Cooling
Belt-busting balloons pg. 8-11 Experiments with Heating and Cooling

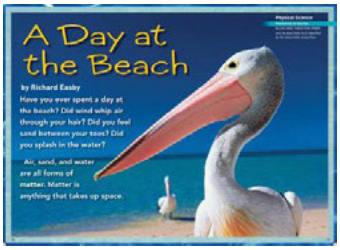
Digital Version available through Destiny:

Candy experiments 2 by Loralee Leavitt:
Pg. 16 Stirring Race
Pg. 30 Candy Ice tunnels Materials: ice cube trays, skittles, jolly ranchers, jawbreakers or conversation hearts

Science World Experiments within kit:

Oobleck (you'll need cornstarch from home)
Ice Cube towers
Solid/Liquid/Gas Game
What's in a bottle?
Incompressible Water
Ice, Water, Steam
Making Frost
The Swirls Around Us

Projectable text:



Accessible text which can be projected from National Geographic:
March 2016 Pioneer Edition: A Day at the Beach
~ solids, liquids, gases → all matter matters
http://ngexplorer.cengage.com/pioneer/
April 2016 Pioneer Edition: Compost
~ compost is a way of turning trash → treasure

C T PS

Significant content:

Physical ways of changing materials -

- Sometimes, physical properties can change. A physical change is something that alters the form or appearance of a material without changing the chemical composition.
- For example: When water (H_2O) changes from solid ice to liquid water, that is a physical change. The chemical makeup (hydrogen and oxygen) is not altered.
- When salt and sugar dissolve in water it is a physical change. The chemical makeup of the salt and sugar are not changed.

Source : Inquiry in Action Chemistry for Life

Chemical ways of changing materials -

- A chemical reaction happens when one or more substances change into entirely new substances with different properties.
- How do we know if a chemical reaction has happened?
- There are different clues that a chemical reaction has occurred: (1) a change in color, (2) a gas is produced, (3) a change in temperature, (4) a precipitate is formed.

Source : Inquiry in Action Chemistry for Life

More Facts:

Cooking and burning are chemical ways of changing materials. They are permanent changes. They cannot be undone by reversing the conditions that brought them about.

Rusting is also a permanent change. Any iron object left in a damp location becomes covered with orange-brown substance –rust. Rusting is a chemical reaction between iron, oxygen and water.

Heat makes many solids, softer and easier to shape. As the temperature rises, most solids eventually melt to the liquid state. Some materials react differently to heat. Heat can trigger chemical reactions between mixtures. In an oven, heat changes a cake mix from a sticky liquid into a fluffy solid.

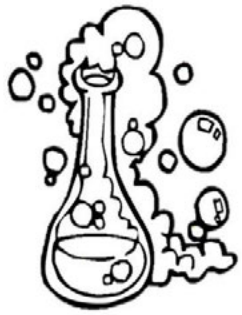
Melting and boiling are reversible changes produced by heat. Steam from a boiling kettle condenses back into drops of water when it comes into contact with a cold surface.

Concrete is a mixture of sand, gravel, cement and water. Cement powder contains calcium oxide (lime) and silica.

When cement is mixes with water, the compounds react and set into a solid. The setting cement glues the sand and gravel particles together to make a permanent solid structure.

Source: Encyclopedia *Changing Materials*

Composting is both a physical & chemical change – but mostly chemical -as the compost decomposes, it gives off heat and changes both colour, and chemical composition.



How does communicating help us to conduct and learn from an experiment?

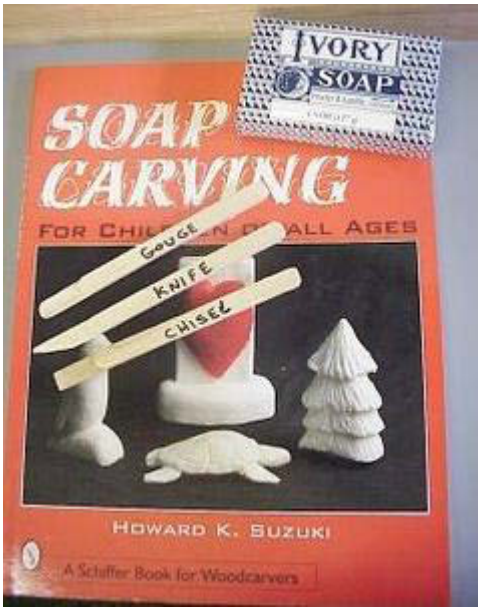
- Yellow: I can do this **independently**.
- Blue: I can do this **with guided support**.
- Orange: I can do this **with direct support**.

Learning Target	Through science study I can engage with others and build my communication skills.

I can make my group feel comfortable (smile at them, use kind words, act like I want to work with them).		I tried to use good communication skills with my group by _____ _____ _____ Next time I will _____ _____ _____
I can share my ideas with my group.		
I can listen to others' ideas.		
I can do my share of the work to help my group get the job done.		
I can explain what we learned from the experiment.		

Soap Carving:

Curricular competencies: Safely manipulate materials to test ideas and predictions, consider some environmental consequences of actions
Learning standards content: Physical ways of changing materials ~ cutting, carving.
Materials: Ivory Soap, other soap brands, popsicle sticks



Websites : (thank you Sam White at Valley View ~ your class smelled and worked beautifully)

http://www.123homeschool4me.com/2016/03/soap-craft-for-kids.html with a cookie cutter- flower

http://www.soapcarving.xyz/ good pictures of things to carve

http://uptownsoap.blogspot.ca/2011/04/incredible-soap-carvings.html bear turtle etc

https://osbourne.org/soap-carving/ *this is the one!!!!*

C T PS

Oobleck

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Activity Length:

30 mins.

Introduction

While playing with oobleck students should identify that normally solids have a definite shape whereas a fluid can change shapes because it flows. Oobleck doesn't quite follow the rules, this suspension only behaves as a fluid some of the time. If you apply a force to it by smacking or squeezing it this fluid will become a solid.

The explanation for the strange behaviour of Oobleck lies in the shape of cornstarch particles, which are long and thin. When cornstarch mixes with water, the starch does not dissolve, but remains in suspension. Move the mixture slowly, and the particles slide past each other. Move it quickly, and the particles tangle with each other so that the mixture hardens.

Using a material that doesn't behave according to the 'rules' is a great way to get students to explore what they already know about the difference between solids and fluids. Check out the properties of oobleck taken to extremes on ellen.

What To Do

1. Dump 3 or 4 boxes of cornstarch into a shallow container.
2. Add about a litre of water, slowly, and mix thoroughly. At just the right consistency, a handful of fluid will dribble out of your hand and solidify if you squeeze it. It will flow again soon after being released.

3. Let students play with the Oobleck — punch it or hit it with a mallet, it doesn't splash. Slowly sink your hand into it and try to pull your hand out quickly.

Teacher tip: For coloured Oobleck, add food colouring to the water before you mix it with the cornstarch.

Objectives:

- Investigate the properties of a non-Newtonian fluid.
- Describe the properties of a solid and a liquid.

Materials:

- cornstarch
- water
- tubs
- mallet
- food colouring (optional)

Key Questions:

- What do fluids and solids do, what determines their shape, and can they be compressed?
- How is Oobleck like a fluid? How is it like a solid?

Extensions:

- Can you think of any fluids that flow better when pressure is applied? What advantages does this type of liquid have? (Latex paint and ketchup are non-Newtonian fluids of the opposite variety to oobleck. Paint will flow off a brush onto a wall but won't easily drip or run. Ketchup won't pour out of containers unless smacked, squeezed or shaken)
- When oobleck is in a bottle it should behave opposite to ketchup- it will flow out easily when inverted but won't flow when you smack, squeeze or shake it. Give it a go!
- Try to paint with oobleck, it will be difficult to smear and will then run away.

Other Resources

Science World Resources | Units | States of Matter
Science World Resources | Exploration | Non-Newtonian | Polyox
Science World Resources | Mysterious Mixtures | Exploration | Ooey Gooey Oobleck *(our Oobleck exploration for kindergarteners)*
Science World at TELUS World of Science | School Programs | Chemistry Make a Virtual Polymer

Solid, Liquid, Gas!

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Activity Length:

30 mins.

Introduction

Students explore atom interactions in different states of matter with this physical game.

All matter is made out of tiny particles, those particles can be single atoms or groups called molecules. For example, water is made out of two hydrogen atoms and one oxygen atom, forming a molecule called H_2O. But water has many different states such as solid (ice), liquid (water), and gas (water vapour). When the particles come close together and have little energy, they stick to each other in a regular arrangement and vibrate slightly, forming a solid. Particles in liquids are still tightly packed, but they have enough energy to roll over each other. In a gas the particles are no longer packed in as they have enough energy to fly around in all directions quickly.

What To Do

Students represent the smallest particle (an atom or molecule depending on the substance).

1. When facilitator yells “solid!”, students (particles) must run together, form a grid pattern and walk on the spot.
2. When facilitator yells “liquid!”, students must walk around reach other but still be quite close.
3. When facilitator yells “gas!”, students must run as far away from each other as possible.

Consider marking out a 'bowl' when solid students will form a shape resting on the bowl but irrespective of its shape. When a liquid students will fill the bowl. When a gas they will fly out of

the bowl.

Objectives:

- Describe the properties of a solid, a liquid, and a gas.

Materials:

- Large space for students to run around

Key Questions:

- Why would it be easier to cut through gas than solid?
- Why does gas and liquid take the shape of its container and a solid doesn't?

Extensions:

- Demonstrate how tightly packed atoms are by having a kid be a "knife". Can he/she run through atoms in a solid as easily as a gas?
- When do students represent atoms (metals) and molecules (non-metals and compounds)? Why? How could this model be changed so that students represent atoms even when demonstrating a molecular substance?
- Are particles attracted to each other? What is the evidence for and against this? How can the attraction be broken? Is this physical or chemical change?

Other Resources

Science World Resources | Full lesson & Other activities | States of Matter
Science World at TELUS World of Science | School Programs | Chemistry

Making Frost

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Activity Length:

10 mins.

Introduction

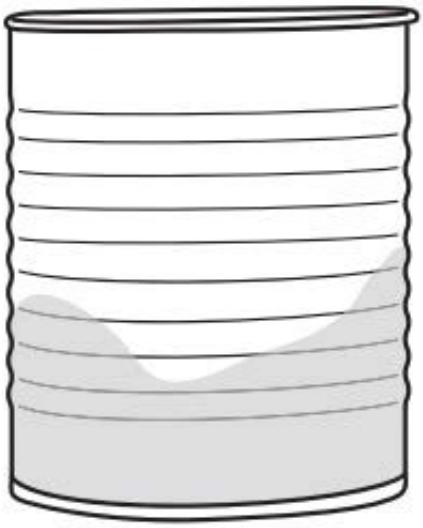
Some mornings, you may find frost on your windshield even if it hasn’t rained or snowed overnight. If it’s not from precipitation, just what is it from? In this activity, students discover how frost forms, using simple household items.

The amount of water vapour a certain amount of air can hold depends on the air's temperature. Air cannot hold as much water when it is cold. As air cools, its molecules contract and water vapour condenses onto surfaces. Frost occurs when that water vapour in the air contacts a very cold surface causing the vapour to turn directly into a solid (ice crystals).

What To Do

1. Fill the small metal can about a quarter full with cold water.
2. Stir in 60ml of salt.
3. Add enough crushed ice to fill the can and mix it all together.
4. Wait and observe to see frost form on the outside of the can.

Explanation
Water condenses on the can because when air comes into contact with the cold can, its temperature drops. Because cold air cannot hold as much water vapour as warm air, the water vapour sticks to the surface of the can.



The condensation freezes to become “frost” because the can and its salt solution inside are below 0°C, the temperature at which water freezes. Strange as it seems, melting icewith salt actually makes the mixture cooler! Salt lowers the melting temperature of ice, so the ice starts to melt. But it takes energy to turn ice into water! This energy comes from heat energy in the ice, so the ice gets colder. The temperature of the salt and ice mixture inside the can is much lower than 0°C.

Objectives:

- Describe and illustrate the water cycle and associate parts of the cycle with weather conditions.
- Observe and describe changes to the properties of water when it is heated or cooled and associate these changes with weather conditions.

Materials:

- small, clean, empty metal can
- water
- salt
- crushed ice

Key Questions:

- What is on the outside of the can?
- Where do the water particles come from? (The air)
- Why does the condensation freeze to become frost?
- What is the difference between rain, clouds and frost?

Extensions:

- Explore conduction, convection and radiation and how temperature influences weather.
- Try another activity that uses salt and ice mixtures and learn more about how salt lowers the melting temperature of ice.

Other Resources

Science World Resources| Full Unit| Weather
Science World Resources | Water | Ice Cube Towers
Gordon R. Gore | Catalyst for Science | Temperature (Lesson 1)
Science World at TELUS World of Science | School Programs | Whether the Weather

Ice, Water, Steam

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Activity Length:

10-15 mins.

Introduction

Every day, we encounter water in its three different forms: liquid, solid (ice), and gas (steam). Most other substances can exist in these three forms as well, but water is unique because it is the only substance that can exist in all three phases at Earth's ordinary temperature conditions.

In this game, students will change from one form of water to the other at their teacher's command.

Fun Fact: Water is one of the few known substances whose solid form is less dense than the liquid. That is why icebergs can float on ocean water.

What To Do

1. The students are all water molecules and will change between three different states of matter: solid (ice), liquid (water) and gas (steam).
2. When they are **ice**, they have to all hold hands in a large group and stop moving.
3. When they are **water**, they have to hold hands in groups of 3 and walk around the gym.
4. When they are **steam**, they have to run around fast on their own and fill the ‘volume’ of the gym.
5. Begin the game by shouting one of the three instructions (ice, water, or steam) and continue by changing the phases.

Objectives:

- Describe properties of the different states of water.

Materials:

- large open area (gymnasium)

Key Questions:

- When you were ice, why did you all hold hands in a large group and stop moving?
- When you were water, why did you hold hands in groups of three and walk around?
- When you were steam, why did you run on your own and try to fill up the gym?

Extensions:

- In addition to shouting either ice, water or steam, the instructions can include “hotter” or “colder”. Students change phases based on the temperature indicated by the teacher.
- To practice change-of-state vocabulary, instructions can include “evaporate”, “condense”, “sublimate”.

Other Resources

Science World Resources | Full Lesson & other activities | Water

Ice Cube Towers

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Activity Length:

30 mins.

Introduction

Students use changes of state to create chilly architecture and some slippery slopes!

Salt lowers the freezing point of water. As it dissolves, the ice melts around each grain of salt. As a result, the ice is unevenly eaten away, forming a pitted, non-skid surface. This is why salt is used to melt ice on roads and walkways.

The salty water also re-freezes on the surface of the ice cubes, joining them together. This happens because the insides of the ice cubes are much colder than the freezing point of water. They are cold enough to draw heat out of the newly melted water and it re-freezes.

What To Do

1. Try to stack ice cubes into a tower.
2. Try again—but this time let the ice cubes sit out on a plate for 2–3 minutes. Then sprinkle lots of salt on the top of each cube before putting the next one on top of it.

Objectives:

- Investigate the interactions of liquids and solids.
- Investigate changes of state.

Materials:

- ice cubes
- salt in a salt shaker
- plate or tray to work on (not paper!)

Key Questions:

- Why do the ice cubes stop slipping off when you add salt?

Extensions:

- Put a piece of string on an ice cube, then sprinkle it with salt. Wait a few moments, then lift the string. The water should melt then re-freeze, sticking the string to the ice cube.

Other Resources

Science World Resources | Full lesson & other activities | Wonderful Water

The Swirls Around Us

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Activity Length:

20–30 mins.

Introduction

In this demonstration, students will observe a solid ice cube melt into both hot and cold liquids. This demonstration is a great visual for students to observe the impact of temperature on melting and can be used as an introduction to investigations of other properties of matter such as density.

The change of state from a solid to liquid is called **melting**. It requires the solid to be at its melting point in order for its molecules to have enough kinetic energy to be able to flow, move more freely, and have attain the properties of a liquid. This simple demonstration using different temperatures of water and ice cubes will highlight the idea that temperature affects the transition of phases.

What To Do

Preparation:

1. Make ice cubes with water coloured with food colouring. At least 1 tray of ice cubes is recommended.

Demonstration:

1. Set-up beakers of different liquids. The hot water may be stored in a thermos and then poured in prior to dropping the ice cubes in.

2. Have the coloured ice cubes ready to be dropped in to each beaker.
3. Have student volunteers drop ice cubes into each beaker. Have them drop the ice cube slowly into the hot water as there may be a bit of some splash back.
4. Have the students observe the swirling liquids. As the ice cube melts, what happens to the liquid?

Objectives:

- Describe the properties of solids and liquids.
- Understand the transitions between states of matter.
- Describe the process of melting and the role of temperature.
- Describe different properties of matter.

Key Questions:

- What is the name of the transition from solid to liquid?
- Which liquid medium does the ice cube melt faster in?
- How do we tell that the ice melts faster in one beaker than the other?

Materials:

- beakers or clear containers for liquids
- hot water, cold water and other types of liquids (salt water, oil) for the extension activities
- coloured ice cubes made with water dyed with food colouring. At least 1 tray is recommended. (You may want to make more if you plan to have groups/pairs of students observe the demonstration on their own and/or if you plan to implement the extension activities.)

Extensions:

- Try different liquids other than water like oil or salt water. Make observations as to what happens with these different liquids when the ice cube melts. For instance, when an ice cube is placed in salt water, the ice cube melts and creates a freshwater layer. Fresh water is less dense than salt water and therefore will float on top. As the layer of fresh water increases, the temperature of the water decreases causing the ice to melt more slowly. In the case of a freshwater medium containing a freshwater ice cube, the densities are the same so there is a continuous flow of warmer temperature because of the convection currents that are created from the warm stream of liquid.

Other Resources

Science World Resources | Full lesson & Other activities | States of Matter
Science World at TELUS World of Science | School Programs | Chemistry

What's in a Bottle?

Go Back
Print

Activity Length:

5 mins.

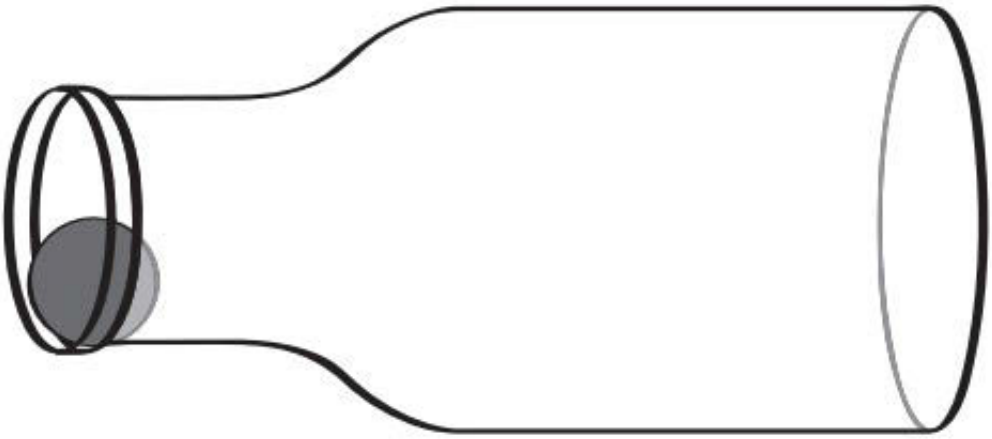
Introduction

Students will investigate a property of air – that it takes up space. The bottle is already full of air. In order for more air, or the ball, to move into the bottle, some air has to come out. The air coming out of the bottle pushes the ball with it.

This is a recommended pre-visit activity to Science World at TELUS World of Science. This demonstration is often part of the Air Show at Centre Stage.

What To Do

1. Hold the bottle horizontally.
2. Put the ball just inside the mouth of the bottle.
3. Challenge your volunteer to blow the ball into the bottle.
4. The ball will fly back toward the volunteer!



Objectives:

- Describe the physical properties of air.

Key Questions:

- Why won't the ball go into the bottle?
- Is the bottle empty?

Materials:

- bottle with a wide mouth (an old-fashioned milk bottle or salad dressing bottle works well for this)
- ball made from scrunched up aluminum foil, about 1–1.5cm in diameter

Other Resources

Science World Resources | Full lesson & other activities | Air

STEM Process Tool

Look Around
(What observations can you make?)

Ask Questions
(What questions come to mind?)

Get an Idea
(What would happen if…What is your hypothesis?)

Try It Out
(Test it! Experiment!)

Think Again
(Analyze your findings…What did you discover?)

Make Sense of It All
(Explain your findings…What did you learn?)

Mathematical vocabulary which can be learned through cooking activities

<table>
<tr>
<td>Counting
enough
not enough
nearly
just over
how many …?
count</td>
<td>Comparing
same as
bigger
smaller
biggest
smallest
less
least
fewer
first, second, third…… tenth
last
most
the same number as</td>
<td>Addition and Subtraction
one more
how many are left/left over
how many more to make….?
how many more than…..is?
how many have gone?</td>
<td rowspan="2">Measuring
Measure
enough
not enough
too much, too little
too many, too few
nearly
close to
about the same as
just under, just over
thick, thin
longer, shorter
longest, shortest
weigh, weighs
heavy, light
heavier, lighter
weight
scales
full
half full
empty
holds</td>
</tr>
<tr>
<td>Instructions
carry on
start from
put
place
what comes next?
arrange</td>
<td>Position
on top of
top, bottom, side
forwards, backwards
over, under
in front, behind
next to
between
roll
turn
stretch</td>
<td>Exploring Pattern and Shapes
shape
flat
curved, straight
round
corner
sides, edge
circle
square
triangle
rectangle
star</td>
</tr>
</table>

An electronic copy of this teacher guide can be found on Learn71 at
https://portal.sd71.bc.ca/group/wyhzgr4/Pages/default.aspx

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