January – Changes

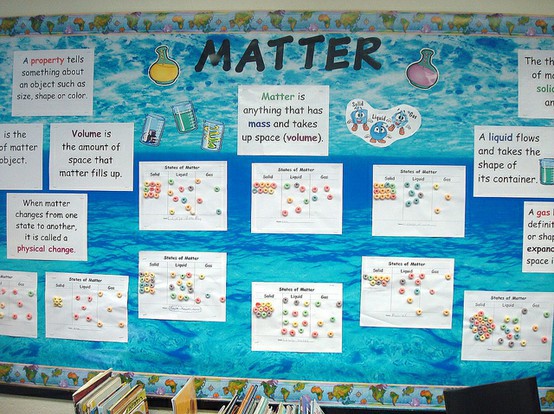
See the bottom of this document for fun experiments, games, videos to use with Changes :o)

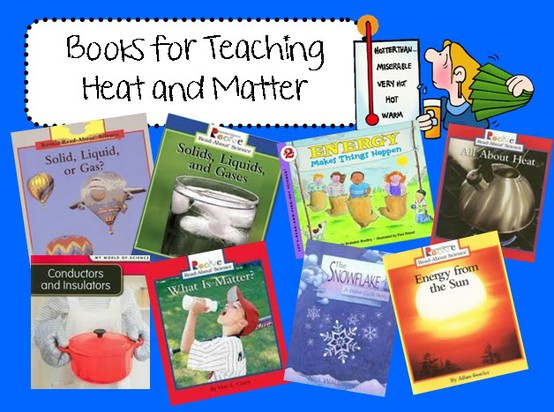
ENRICHMENT IDEAS: PLANS:

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| Tues. 3rd  Students can make a list of 10 ways they have changed (losing teeth, growing taller). They may want to gather baby pictures and school pictures to create a “Change Collage.” | Objectives:   |  |  | | --- | --- | | 3.01 | Identify three states of matter: solid, liquid, and gas.  (See Resources for Objective explanation/description.) | | 3.04 | Show that solids, liquids, and gases can be characterized by their properties.  (See Resources for Objective explanation/description.) |   Changes in state occur when heat energy is introduced and when it is removed.  A baseline student assessment showing  knowledge of solids, liquids, gases, and some changes when solids and liquids are mixed.  Vocabulary:   |  |  | | --- | --- | | gas | a substance that has no shape or volume; most have no color and cannot be seen | | liquid | a substance that has no shape but has volume; it takes the shape of its container | | matter | anything that has weight and takes up space | | properties | something about an object that helps tell what it is | | solid | a substance that takes up space and has its own shape | | states of matter | three forms matter may take – solid, liquid, and gas |   Focus Question: How do things change around us?  Invite students to share what they know about solids and liquids. Ask students to explain the meaning of the word change. Record student responses on the “What We Know about Solids…” poster.   * Distribute one Change Card to each pair of students. Prompt students to think about the solids and liquids in the illustrations and how these might change. * Invite each pair to discuss the picture on their Change Card and identify the different states of matter. * Record students observations on the “Looking At Changes” chart as shown in figure 1-4. * Tell students they will add a solid to a liquid and record the changes that take place. * Guide students to use a hand lens to observe an effervescent tablet. * Circulate the classroom and pose questions to guide students’ observations. Prompt students to record their observations on record sheet 1-A. * Lead a making meaning discussion so that students can share their observations and drawing with the class. * Fill ice cube trays for the next lesson and predict what will happen to the water in them. * Read aloud the poem "Changes All Around Us" found in the Teacher's Guide. * What solids do you see? * What liquids do you see? * How might the solids or liquids in the pictures change over time? * What did the water look like? * What did the water look like before and after the tablet was dropped in? * Describe the tablet. * How did the water and tablet change? * What words could you use to describe the new matter that was formed? * Did anything surprise you? |
| Wed. 4th   * Students can design their own “ice cube keepers.” Students can test materials such as plastic, aluminum foil, Styrofoam, and newspaper. They can record the time it takes the ice to melt and modify the design of their keeper. Students can share the results with their classmates. * Students can research the history of ice cream. Who invented it? What was the first flavor? To celebrate the end of studying the Changes Unit, the class could make ice cream. A recipe for ice cream can be found in the Extensions section at the end of Lesson 2 in the STC Changes Teacher’s Guide. | Objectives:   |  |  | | --- | --- | | 3.02 | Observe changes in states of matter due to heating and cooling of common materials.  (See Resources for Objective explanation/description.) | | 3.03 | Explain how heat is produced and can move from one material or object to another.  (See Resources for Objective explanation/description.) |   Changes in state occur when heat energy is introduced and when it is removed.  Water becomes solid when frozen.   Melting returns solid water to its liquid state by applying heat energy.  Vocabulary:   |  |  | | --- | --- | | boiling point | the temperature at which a heated liquid turns into gas | | evaporation | when a liquid changes to a gas | | freezing | when a liquid changes to a solid because heat is removed from the liquid | | freezing point | the temperature at which a liquid become a solid | | melting | when a solid changes to a liquid because heat is added to the solid | | melting point | the temperature at which a solid becomes a liquid | | water vapor | water that has changed to gas |   Focus Question: How can a liquid such as water change to a solid or a gas?  Invite students to think about the water you poured into the ice cube trays at the end of Lesson 1.  Ask students in what ways do they think the water has changed in the freezer.  Tell students they will design a method for melting an ice cube in the quickest time possible.   * Explain the Melting Race procedures. * Guide students to record the time their ice cube melts (If you have rubber clock stamps - you can stamp 2 clocks in their science notebook, for students to record the start and end times of the race).  If your students can tell time to the minute, they can just use the school clock to record the time. * Circulate the classroom reminding students to keep the bag sealed and to record the time the ice cube in the bag is completely melted. * Lead a class discussion for students to describe how the ice cube has changed. * Record students’ responses in the appropriate columns of the “Properties” poster. * Invite each pair of students to describe the method they used to melt the ice. * Tell students they will observe another change in water and assist students as they pour the water from the zip bag into the Petri dish. * Have students predict what they think will happen to water in both the covered and uncovered Petri dishes over two or three days. * How has the ice cube changed? * What method did you use to melt the ice cube? * Did anything surprise you as you attempted to melt the ice cube? * Why did some of the ice cubes melt faster than others? * What will happen to the covered and uncovered water as it sits for two or three days? |
| Thurs. 5th  Books like The Magic School Bus at the Waterworks by Joanna Cole can be read for information on the treatment of drinking water.  As a home-school connection, students can look for evidence of evaporation and condensation at home. They can report their findings to the class. | Objectives:   |  |  | | --- | --- | | 3.02 | Observe changes in states of matter due to heating and cooling of common materials.  (See Resources for Objective explanation/description.) |   Changes in state occur when heat energy is introduced and when it is removed.  Water evaporates into the air as it changes from a liquid to a gas.   Condensation occurs when water changes from a gas to a liquid.  Vocabulary:   |  |  | | --- | --- | | condensation | the process by which water vapor cools and changes to a liquid | | evaporation | the process by which a liquid becomes a gas | | humid | a weather condition when the air is saturated with moisture | | water cycle | the process by which water moves through the ground, evaporates from earth into the air, forms clouds, and falls back to earth as rain or snow |   Focus Question: Where does water that has evaporated go?  Ask students to collect their Petri dishes and discuss with their partners the changes they observe. Invite students to share their observations with the class and compare their results with the predictions they made at the end of lesson 2. Ask students to brainstorm what happened to the water and discuss how the covered Petri dishes may be different. Let students know they will set up an investigation to explore how water changes from a liquid to a gas.   * Ask students to draw a line down the center of a page in their science notebooks and label one column “cool” and the other “warm.” * Select students to distribute the materials for the investigation. * Guide students to set up an investigation of cool and warm water in cups, and observe the process of condensation. * Circulate the classroom filling cups with warm water from the thermos. * Direct students to draw their observations in the appropriate columns in their science notebooks. * Lead a making meaning discussion. Guide students to think of situations when they have observed water droplets as they did in the lesson (e.g., a foggy bathroom mirror, a wet, cold soda can). * Record then new ideas that the students have about water as a solid, liquid, and gas on the “Properties” poster. * What observations can you make about these cups? * Has the inside of each cup changed? If so, how? * How did the water change when it was in the freezer? * How did the water change when it was removed from the freezer? * How did the water change when it was in the uncovered dish? Where did the water go? * How do you know from this investigation that the water went into the air? * Think about the cup of warm water. What happened when the water in the air touched the large cup? |
| Fri. 6th  As a home and school connection, students can look for filters which are used in the home – coffee filters, lint filters, and colanders – and share their findings with the class. | Objectives:   |  |  | | --- | --- | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) |   Mixtures can be made and they can be separated by a sieve, a filter, and/or by the process of evaporation.  Solutions are a kind of mixture.  A mixture can be made by combining two solids and separated by using a sieve.  Vocabulary:   |  |  | | --- | --- | | mixture | a blend of two or more substances |   Focus Question: What happens when two solids are mixed together and do the materials change?  Gather students and ask them what they know about mixing things. Record their responses on the “What We Know about Mixing” poster. Place a check mark beside duplicate responses to acknowledge all student contributions. Let students know they will mix two solids – salt and gravel.   * Distribute the Students Instructions and materials to each pair of students. * Discuss each step of the instructions and direct students to complete them step by step. * Circulate the classroom and provide assistance to students when necessary and pose questions to focus their observation. * Conduct a making meaning discussion so students can discuss the changes they observed. * Record new ideas or questions students may have about mixing and separating substances. * What two solids did you mix? * How did the solids change when you mixed them? Did they change size? Color? * How might the pieces of your mixture change when they are separated? * What happened when you mixed the salt and gravel? Describe the mixture. * How did using the sieve change the mixture? * In what ways is the gravel the same as before you mixed it with the salt? * Did the gravel change as a result of the mixing? |
| Mon. 9th  Students keep a record of the solids and liquids they consume and graph the results.  Check with the art teacher about incorporating a project involving the use of plaster of Paris or making papier-mâché objects. | Objectives:   |  |  | | --- | --- | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) |   Mixtures can be made and they can be separated by a sieve, a filter, and/or by the process of evaporation.   Solutions are a kind of mixture.  A mixture can be made by combining a solid and a liquid.  In a solution, one substance dissolves in another.  Vocabulary:   |  |  | | --- | --- | | dissolve | to make or become part of a liquid mixture | | solution | a mixture formed when a substance dissolves in a liquid and cannot be filtered out; the properties of a mixture are the same throughout the liquid |   Focus Question: How do different solids react when they are mixed with water?   * Distribute materials for the investigation to the class. * Guide students to place a small amount of each solid in the appropriate circle on the test mat, observe each solid with a hand lens, and glue a small sample of each solid to the appropriate circle. * Prompt students to share their observations of the solids with the class. Record their observations in the “Properties” column of the “Changes Observed” chart. * Guide student to add the gravel to water and record their observation in the “Before Stirring” column of the record sheet. * Invite students to stir the gravel and water mixture with a wooden stirrer for about a minute. * Prompt students to record their observation in the “After Stirring” column of the record sheet. * Invite students to repeat the process with the toilet tissue and again with kosher salt. * Circulate the classroom and guide students’ investigation of mixing, observing, stirring, and observing. * Lead a making meaning discussion so students can discuss the changes they observed before and after stirring the solids and water.  Record their observations and new ideas on the “Changes Observed” chart. * How does each solid look? What color is each solid? * How does each solid feel? What shape is it? * How does each solid smell? * Compare the gravel, salt, and tissue. How are they alike? Different? * What happened to each solid when you added it to water? * How did the water change? * What happened to the water and the solid when your stirred? * How well did the solid and water mix? * Did anything surprise you about the way each solid changed? If so, what? |
| Tues. 10th  Read The Magic School Bus at the Waterworks by Joanne Cole to demonstrate real world situations where filtration is useful.   Consider bringing a furnace filter to class to show students what a filter looks like. | Objectives:   |  |  | | --- | --- | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) |   Mixtures can be made and they can be separated by a sieve, a filter, and/or by the process of evaporation.  Solutions are a kind of mixture.  Some mixtures can be separated using a sieve or filter.  Vocabulary:   |  |  | | --- | --- | | filter | any substance through which a liquid or gas is passed to remove suspended solids |   Focus Question: What methods can be used to separate a solid and a liquid mixture?  Invite students to observe their mixtures from lesson 5. Encourage them to share their thoughts and observations with the class. Introduce the term “dissolve” to students. Then tell students they will try to separate the gravel, salt, and tissue from the water in their mixtures.   * Prompt students to brainstorm possible ways to separate the solid from the water in their mixtures. Record their ideas on the brainstorming list. * Show students a filter and a sieve. Guide students to notice how they are alike and different. * Demonstrate how to place the filter inside the funnel and how to hold the funnel over the cup. * Distribute materials for the investigation to students. * Guide students through the process of separating the gravel from the water. * Circulate the classroom and provide assistance as students try to separate the tissue mixture and the salt mixture with a partner. * Lead a making meaning discussion so students can share the changes they observed as they tried to separate each mixture.  Lead the students to discover how the salt passed through the filter. * Invite students to pour their salt-and-water solution into a labeled, uncovered Petri dish. * How have your mixtures changed overnight? * How are the mixtures the same? Different? * Where is the gravel in the gravel-and-water mixture? * Where is the tissue in the tissue-and-water mixture? * What happened to the salt that was mixed with the water? * What do you think it means to “dissolve” a solid? * Which solids dissolved? Which did not? * How do you know if something has dissolved? What solids outside of the classroom have you seen dissolve in liquid? * Did filtering change any of the mixtures? * Which solid changed the most after mixing with water? Which changed the least? * Where is the salt? |
| Wed. 11th  Students can repeat this investigation using a stopwatch to time how long it takes for the two forms of sugar to dissolve. They can compare the amount of time it took each form of sugar to dissolve. | Objectives:   |  |  | | --- | --- | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) |   Mixtures can be made and they can be separated by a sieve, a filter, and/or by the process of evaporation.  Solutions are a kind of mixture.  Sugar dissolves faster when it is in smaller pieces and when it is stirred.  Vocabulary:   |  |  | | --- | --- | | dissolvable | able to be dissolved in a liquid |   Focus Question: How do variables affect the time it takes a substance to dissolve**?**  Direct students’ attention to the two samples of sugar added to the “Changes Observed” chart. Tell students they will describe the two new solids and observe the changes that occur when they mix each one with water.   * Distribute record sheet 7-A and review it with students. Then distribute investigation materials. * Prompt students to place the sugar cube (without crushing it) and sugar granules on black paper and observe and compare two forms of sugar using a hand lens. * Invite students to share their observations and record them in the “Properties” column of the “Changes Observed” chart. * Challenge students to predict which form of sugar will dissolve faster in water and to record their prediction in their science notebooks. * Direct student pairs to put each form of sugar in a cup and stir.  One student will stir both cups of water at the same time while the other student holds the cups in place. * Direct students to record their observations on record sheet 7-A. * Conduct a making meaning discussion so students can discuss how and why each solid changed at different rates. Record student observations and new ideas in the “Changes with Water” column on the “Changes Observed” chart. * What does the solid look like? Describe its size and shape. * How does the solid smell? Feel? * Compare the sugar cube and the sugar grains. How are they alike? Different? * Which solid won the dissolving race? * Why do you think that solid won? * How is the sugar cube different from the sugar grains? * What happened to the sugar cube while you stirred? |
| Thurs. 12th  Students can repeat the dissolving investigation and use a stop watch to time how long it takes for sugar to dissolve in cold water, then in warm water. The dissolving investigation can be repeated using kosher salt. Students may be surprised that kosher salt produces different results.  Students can make rock candy by creating a sugar-and-water mixture and allowing the water to evaporate or students can grow crystals from alum (available at a drug store). | Objectives:   |  |  | | --- | --- | | 3.02 | Observe changes in states of matter due to heating and cooling of common materials.  (See Resources for Objective explanation/description.) | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) |   Mixtures can be made and they can be separated by a sieve, a filter, and/or by the process of evaporation.  Solutions are a kind of mixture.  Increasing the temperature of the liquid often increases how fast a solid dissolves.  Vocabulary:   |  |  | | --- | --- | | Use words from previous lessons. | . |   Focus Question: How does the temperature of water affect the time it takes for a substance to dissolve?  Begin lesson 8 by reviewing the investigations in lesson 7. Tell students they will explore another variable that affects how fast sugar dissolves in water: the temperature of the water. Ask students to share their experiences of dissolving solids in warm or cold liquids at home. Then tell students they will dissolve sugar grains in two different cups of water – one cold and one warm – and observe the results.   * Students work with a partner to repeat the previous lesson’s basic activity using granulated sugar and dissolving it in cold water and hot water. * Lead a making meaning discussion so students can discuss how and why each solid changed at different rates. Record students’ observations and new ideas on the “Dissolving Sugar” chart. * What happened when you put the solid in the liquid? How did the solid and the liquid change? * In which water temperature did the sugar grains dissolve faster? * Did anything surprise you about your results? If so, what? * How do your results compare with those of other student teams? If they are different, why do you think this happened? |
| Fri. 13th – EARLY RELEASE |  |
| Mon. 16th – NO SCHOOL |  |
| Tues. 17th  Students can make rock candy by creating a sugar-and-water mixture and allowing the water to evaporate or students can grow crystals from alum (available at a drug store). | Objectives:   |  |  | | --- | --- | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) |   Mixtures can be made and they can be separated by a sieve, a filter, and/or by the process of evaporation.  Solutions are a kind of mixture.  A salt-and-water solution can be separated by the process of evaporation.  Vocabulary:   |  |  | | --- | --- | | evaporation | the process by which a liquid becomes a gas | | water vapor | water that has changed to gas |   Focus Question: How does a substance change or remain the same after evaporation?  Begin lesson 9 by reviewing how gravel and tissue were separated from water and how the filter did not separate salt from water. Tell students they will use a method scientists use to separate solids that have dissolved in a mixture - evaporation.   * Direct students to collect their test mats and observe the salt which is left over from the evaporation process started in lesson 6. * Guide students to compare the salt crystals with salt that has not been recovered from evaporated water. * Distribute record sheet 9-A and tell students they will use the Venn diagram to record properties of kosher salt before it was mixed with water and after the water evaporated. * Lead a making meaning discussion and have students predict the changes that would happen if they added water to the salt crystals.  Allow students to explain the reasons for their predictions based on previous experiments and prior knowledge. Record predictions and new ideas. * Direct students to stir the recovered salt crystals back into room temperature water. * Were you able to separate the salt from the water? If so, how? * What happened to the water? * What happened to the salt? Does it look or feel the same? Is it still salt? * Did anything surprise you? If so, what? * How did the salt crystals in the Petri dish change when you added water this time? * Do you think this salt-and-water mixture is the same as the mixture in lesson 5? * What do you think would happen if you let the dish sit for a few days? Why do you think so? |
| Wed. 18th  Invite a criminologist or police officer to the classroom to explain how chromatography is used in solving crimes. | Objectives:   |  |  | | --- | --- | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) |   Mixtures can be made and they can be separated by a sieve, a filter, and/or by the process of evaporation.  Solutions are a kind of mixture.  Chromatography is a way to separate a mixture into its components.  Vocabulary:   |  |  | | --- | --- | | chromatography | a process in which a liquid or gas “carries” a mixture along a special paper and separates it into its components |   Focus Question: Can mixtures be separated even if the components cannot be seen?  Gather students and ask them about times when they mixed paints, blended colors, or mixed drops of food coloring. Prompt students to explain how each color changed. Record students’ ideas on the “What We Know...” poster. Let students know that they will separate ink into its hidden colors during this investigation.   * Distribute investigation materials. * Prompt students to practice releasing one drop of water at a time onto the cardboard tray. * Guide students through the process of separating colors with the black marker: make a dot in the center of the filter with the black marker and then separate the colors by adding one drop of water at a time to the dot. * Circulate the classroom and provide assistance as student pairs repeat the process for the green marker. * Lead a making meaning discussion so students can share the changes they observed and add any questions they may have about separating colors. * Students use water soluble markers, coffee filters and droppers of water to separate the colors in the markers. * They make a dot in the center of the filter with the black marker and then separate the colors by adding one drop of water at a time to the dot. * They repeat the activity with the green marker. * How did the black ink change? * How did the green ink change? * From what you observed, what colors were mixed to make black ink? What colors were mixed to make green ink? * Did anything surprise you? If so, what? * Were you able to answer any of your own questions recorded on the newsprint? |
| Thurs. 19th | Objectives:   |  |  | | --- | --- | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) |   Mixtures can be made and they can be separated by a sieve, a filter, and/or by the process of evaporation.  Solutions are a kind of mixture.  Methods learned in previous lessons are used to separate “mystery” mixtures into their components.  Vocabulary:   |  |  | | --- | --- | | Use words from previous lessons. | . |   Focus Question: Can students separate and identify the components of a “mystery mixture”?  Tell students they will become detectives, using what they have learned to identify and separate the components of a mystery mixture. Prompt students to recall the methods they have used so far to investigate mixtures and record their ideas on the “Ways We Have Tested…” poster.   * Distribute record sheet 11-A and explain that the record sheet will help guide the investigation. * Distribute investigation materials and prompt students to identify the two solids in the mixture. * Circulate the classroom to provide assistance and pose questions as student pairs work to separate the mixture. * Conduct a making meaning discussion so students share what processes work best for separating the mixture. * Have students predict what will happen to the liquid over the next few days. * What are the two solids in the mixture? * How could you separate the dissolved white solid from the liquid? * How could you dry the black solid? * What do you suppose will happen to the liquid over the next few days? |
| Fri. 20th  Any kind of baking activity is a good example of a chemical reaction.  Making pancakes is a great activity for this unit. Students can observe a piece of cake or pancake and provide an explanation for what caused the air holes. | Objectives:   |  |  | | --- | --- | | 3.06 | Observe that a new material is made by combining two or more materials with properties different from the original material.  (See Resources for Objective explanation/description.) |   Chemical reactions result in the formation of a new material.  Chemical reactions occur when some solids and liquids react when they are mixed, forming a new substance such as a gas.  Vocabulary:   |  |  | | --- | --- | | chemical reactions | the activity that occurs when a substances encounter each other and form new substances, such as a gas or rust | | indicators | clues | | react | the activity that occurs when a substance either combines with another substance or breaks apart to produce new substances |   Focus Question: What changes occur when solids and liquids react chemically?  Begin lesson 12 by telling students they will mix baking soda with water, and then with vinegar. They will observe and compare the changes that occur in each case.   * Distribute investigation materials to students. Circulate the classroom and use your spoon to place a sample of baking soda on students’ black construction paper. * Invite students to use hand lenses and other senses (except taste) to observe the baking soda and discuss its properties with their partner. * Distribute liquids and ask students to observe the liquids, reminding them of the proper technique for smelling an unknown substance in science. Direct students to describe each liquid. * Guide students to pour a cup of baking soda into the water and the other cup of baking soda into the vinegar at the same time. * Call for attention and prompt students to share their observations. Record their observations on the chart. * Direct students to stir the mixtures and share additional observations. * Lead a making meaning discussion so students discuss the changes they have observed. Explain that the new substance (gas) was formed as a result of a chemical reaction. * How are the water and vinegar alike? Different? * How did stirring the mixtures change them? * What changes did you observe when you added baking soda to water? To vinegar? * What happened that surprised you? * Did a new substance form in either cup? * How did the changes you observed compare with those you observed in earlier lessons? |
| Mon. 23rd – WORK DAY No school! |  |
| Tues. 24th  Any kind of baking activity is a good example of a chemical reaction.  Making pancakes is a great activity for this unit. Students can observe a piece of cake or pancake and provide an explanation for what caused the air holes.  Bring in some carbonated beverages. Pour some into cups and have students observe what happens when the cups are left uncovered. Have students explain why this happens. | Objectives:   |  |  | | --- | --- | | 3.06 | Observe that a new material is made by combining two or more materials with properties different from the original material.  (See Resources for Objective explanation/description.) |   Chemical reactions result in the formation of a new material.  Some changes produce new substances with new properties.  Vocabulary:   |  |  | | --- | --- | | chemical reaction | the activity that occurs when a substances encounter each other and form new substances, such as a gas or rust | | indicators | clues | | react | the activity that occurs when a substance either combines with another substance or breaks apart to produce new substances |   Focus Question: What properties of gas can we observe?  Begin the lesson by asking students to brainstorm some things that “fizz” or produce bubbles such as soda pop. Remind students about the vinegar and baking soda they mixed in lesson 12 and the effervescent tablet and water they observed in lesson1.   * Direct students to divide a page in their science notebook into two columns. The left column is labeled “Tablet in a Cup” and the other column “Tablet in a Bag. * Distribute materials for the investigation. * Guide students to remove the half tablet and observe it with the hand lens and other senses (not taste). * Direct students to drop the half tablet into the cup of water and observe any changes that occur. Invite students to record their observation in the “Tablet in a Cup” column of their science notebook page. * Call for attention and have students compare their observation of the effervescent tablet with the observation of baking soda and vinegar recorded on the “Comparing Changes” chart. * Guide students to place a small amount of water in the zip bag and gently squeeze it to remove air. * Direct students to leave a small opening for the whole tablet to be dropped in. * Tell students to quickly seal the bag, shake it, then gently squeeze the bag between their hands and describe what they feel. * Prompt students to record their observations in the “Tablet in a Bag” column on their science notebook page. * Lead a making meaning discussion for students to share their observations. Record their observations and discoveries on the “Comparing Changes” chart. Add additional properties of gases to the “Properties” chart from Lesson 3. * Gently squeeze the bag between your hands. What do you feel? * What happened to the tablet when you put it in the bag of water? * How did the tablet change? How did the water change? * What happened to the bag when you sealed it? Why? * What do you think made the bag change? * What was left in the bag? * Did anything happen that surprised you? If so, what? * Have you ever tasted soda pop? * What makes the bubbles? * Why does it fizz when you open it? |
| Wed. 25th  Students can investigate the effects of protective coatings (vegetable oil, petroleum jelly, and tape) applied to metals to protect it. Set up an investigation for students to coat three nails with different substances and leave one nail uncoated. Students can share their results with the class. | Objectives:   |  |  | | --- | --- | | 3.01 | Identify three states of matter: solid, liquid, and gas.  (See Resources for Objective explanation/description.) | | 3.02 | Observe changes in states of matter due to heating and cooling of common materials.  (See Resources for Objective explanation/description.) | | 3.03 | Explain how heat is produced and can move from one material or object to another.  (See Resources for Objective explanation/description.) | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) | | 3.06 | Observe that a new material is made by combining two or more materials with properties different from the original material.  (See Resources for Objective explanation/description.) |   Chemical reactions result in the formation of a new material.  The formation of a solid, a change in color, and/or a change in temperature are indicators of a change caused by a chemical reaction.  Vocabulary:  **Chemical reaction**  the activity that occurs when a substances encounter each other and form new substances, such as a gas or rust  **iron oxide**  rust; the result of a chemical reaction when irons combines with oxygen  Focus Question: What changes can be indicators of a chemical reaction?  Gather students and let them know they will investigate a solid they may have seen before –rust. Ask students to share what they know about rust, where they may have seen it, and what they want to learn about it. Show students a cup with the steel wool and survey them to determine who has seen steel wool before. Let students know they will rinse two steel wool samples with different liquids.   * Direct students  to title one page of their science notebook “Dry Steel Wool,” a second page “Steel Wool and Vinegar,” and a third page “Steel Wool and Water.” The left hand column should be dated with today’s date. (The right hand column will be used to record final observations in a day or so.) * Demonstrate the proper use of forceps when handling steel wool and distribute the materials needed for the investigation. * Prompt students to use a hand lens to observe a sample of steel wool through the side of the cup. Direct students to draw the steel wool and list words to describe it in their science notebooks. * Guide students to pour vinegar over the steel wool and use forceps to move it around in the vinegar. * Remind students that each partner needs a turn holding the cup. Prompt students to share their observations with one another. * Invite students to repeat the process using water. Circulate the classroom and provide assistance when necessary. * Lead a making meaning discussion so students can share the changes they observed. (One of the changes you want the children to observe is that the steel wool in the vinegar will get warm.  This is easier to observe if you make a class sample in a plastic bag which the students can pass around.) * What are some rusty things you have seen? What did they look like? * How did you know they were rusty? * Where was the rusty object located? * Where do you think rust comes from? * What questions do you have about rust? * What happened to the steel wool rinsed with water? With vinegar? * Did anything surprise you? If so, what? * Did any new substance appear in either cup? If so, what was it? * How are the three samples of steel wool alike? Different? |
| Thurs. 26th  Challenge students to write a recipe for their own bubble solution. Students can write the recipe, test it, and share the results with their classmates. | Objectives:   |  |  | | --- | --- | | 3.01 | Identify three states of matter: solid, liquid, and gas.  (See Resources for Objective explanation/description.) | | 3.02 | Observe changes in states of matter due to heating and cooling of common materials.  (See Resources for Objective explanation/description.) | | 3.03 | Explain how heat is produced and can move from one material or object to another.  (See Resources for Objective explanation/description.) | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) | | 3.06 | Observe that a new material is made by combining two or more materials with properties different from the original material.  (See Resources for Objective explanation/description.) |   Chemical reactions result in the formation of a new material.  Students gather clues and apply what they know about how solids and liquids can interact.  Vocabulary: All previous  Focus Question: What are the different ways that solids and liquids can interact?  Invite student pairs to retrieve their steel wool samples from Lesson 14 and observe them with a hand lens. Prompt students to date their science notebook pages and record their observations.   * Call for attention and ask students to share their observations. Record students’ ideas on the “Comparing Changes” chart. * Let students know they will use the information gained in Lessons 12 -14 to create their own recipes. Each recipe will combine a solid and a liquid and will cause a chemical reaction. * Guide students to work in pairs to write a “Recipe for Change,” using materials of their choice.  Depending on the skill level of your class, you may need to model this activity ahead of time. * Circulate the classroom and offer support. Guide students to test their recipes and make changes as needed. * Direct students to place their recipe in an envelope. * How have the steel wool samples changed since lesson 14? * How is the dry steel wool different from the steel wool rinsed with water or vinegar? * How is the steel wool rinsed with water different from the steel wool rinsed with vinegar? How are they the same? * Did anything surprise you? If so, what? |
| Fri. 27th | Objectives:   |  |  | | --- | --- | | 3.01 | Identify three states of matter: solid, liquid, and gas.  (See Resources for Objective explanation/description.) | | 3.02 | Observe changes in states of matter due to heating and cooling of common materials.  (See Resources for Objective explanation/description.) | | 3.03 | Explain how heat is produced and can move from one material or object to another.  (See Resources for Objective explanation/description.) | | 3.05 | Investigate and observe how mixtures can be made by combining solids, liquids or gases and how they can be separated again.  (See Resources for Objective explanation/description.) | | 3.06 | Observe that a new material is made by combining two or more materials with properties different from the original material.  (See Resources for Objective explanation/description.) |   Changes Unit Assessment! |

Experiments:

<http://unplugyourkids.com/2011/02/26/magic-expanding-hand-experiment/>

 Solid, Liquid, Gas model with froot loops/cheerios



Videos/Songs:

<http://teacher.scholastic.com/activities/studyjams/matter_states/>

<http://www.brainpop.com/science/matter/statesofmatter/preview.weml> (If you have a subscription)

<http://www.youtube.com/watch?v=iH3AlE_W6w8&feature=related> (Ice Ice Baby!)

<http://www.youtube.com/watch?v=oAqompxk7fY&feature=related> (Possibly recreate with your students and showcase on morning news!)

<http://www.youtube.com/watch?v=9xDNJSMikBo&feature=related> (alien video on discovering matter)

Online Games:

<http://www.harcourtschool.com/activity/states_of_matter/>

<http://fossweb.com/modulesK-2/SolidsandLiquids/activities/changeit.html>

<http://www.bbc.co.uk/schools/scienceclips/ages/8_9/solid_liquids_fs.shtml>

<http://www.bbc.co.uk/schools/scienceclips/ages/9_10/gases_fs.shtml>

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