

CHEMISTRY

GRADE 2

ASSESSMENT PACKET

Discover how to create different states of matter, grow crystal farms, experiment with phase shifts, cross-link polymers, shake up rainbow solutions, and stew up a chemical matrix of heat and ice reactions.



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This curriculum is aligned with the National State Standards and STEM for Science.

Educational Goals

To the Parent/Teacher: Kids will demonstrate how well they understand important key concepts from this section. Some kids at this level are not reading quite yet, so you'll need to work together with them and observe them carefully as you go in order to understand what they know as they may not be able to tell you directly.

Overview: The study of chemistry is particularly exciting because of all the nifty experiments we can see and do! What are those strange bubbles? A chemical reaction! Why did I get this glob of goo? I made a polymer!

Concepts that would be somewhat foreign in a textbook can come to life as an experiment or demonstration. Students will gain skills at following detailed directions for labs as well as building a strong foundation of important scientific vocabulary. They will be asked to reflect on what they have learned and experimented with, then challenged to take that learning to the next level.

Here are the scientific concepts:

- Structure of atoms and molecules
- Crystals are organized grouping of atoms or molecules that form specific patterns
- Physical verses chemical change
- Indicators of a chemical change
- Molecules join together to form polymers
- There are four states of matter we'll be dealing with: solids, liquids, gases, and plasma, and they exist depending on the temperature
- Sublimation is the process by which a solid goes directly to a gas
- Evaporation goes from a liquid to a gas.
- Condensation of molecules goes from a gas to a liquid
- Freezing goes from a liquid to a solid state
- Density is a measure of how tightly packed the molecules are
- Different factors affect density
- Matter can be described by its observable properties.
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.

By the end of the labs in this unit, students will be able to:

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.
- Different properties are suited to different purposes.
- A great variety of objects can be built up from a small set of pieces.
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not
- Know how to demonstrate the process by which a polymer is formed; how crystals are formed
- Understand how to determine if something is a chemical or physical reaction; what state of matter is observed; how to find density

- Design and build an experiment to describe and classify different kinds of materials by their observable properties.
- Analyze data from testing different materials to figure out which have properties best suited for an intended purpose.
- Construct an experiment that shows that some changes are caused by heating or cooling, and come of these processes are reversible and some are not.
- Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations
- Measure and estimate the weight, length and volume of objects
- Formulate and justify predictions based on cause-and-effect relationships
- Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results
- Follow a set of written instructions for a scientific investigation

Chemistry Grade 2 Explorations

Teacher's Outline with Answers

Teacher/Parent: This is not a quiz. This is a chance for you to explore the key concepts with your student to you can understand what they know and where they still need work. Read each question aloud and do the action and invite the students discuss their answers with you to help them answer the questions. Answers and/or experiment references given in parenthesis.

Materials:

- Red cabbage juice (make your own by mixing in a blender a red cabbage with enough water to cover. Strain out the solids and keep the liquids for use in this lab.)
- Cup of distilled white vinegar
- Cup of sprite soda
- Cup of water mixed with baking soda
- Spoon for stirring

Questions to Explore Together:

1. Describe four states of matter, and explain where you can find each one. (Solid (ice cube), liquid (orange juice), gas (air), and plasma (the sun).)
2. Give three examples each of a physical and a chemical change. (Physical: crumpling up paper, squishing clay, blowing bubbles. Chemical: lighting paper on fire, digesting food, combining baking soda and vinegar.)
3. Can we drink ocean water directly? If not, what needs to be done in order to make it drinkable, and how would you do it? (Refer to *Taking the Salt out of the Ocean* experiment.)
4. What is rust? Why do many metals rust? Is it a physical or chemical change? (Metals corrode, or rust when the metal reacts with the oxygen in water or air. Iron (steel) + Oxygen (water, air) = Rust. Chemical change.)
5. What is the difference between an acid and base? (Acids turn blue litmus paper red and red cabbage juice indicator pink. Bases turn red litmus paper blue and red cabbage juice indicator blue.)
6. Use the materials provided, show which liquid is an acid and which is a base. (Do not eat anything in this lab! Mix in red cabbage juice to each cup separately and watch for a color change. Pink is acid, blue is basic.)

Chemistry Grade 2 Evaluation

Student Worksheet

(Teacher: You'll need to go over the instructions with the kids and work with them on this part.)

Overview: You're going to show your teacher how much of this science stuff you already know. Choose one of the following activities:

- a. Make up a short story about the earth from the point of view of the water molecule and it's adventures through as it interacts with iron of a boat, soap in the shower, salt in the ocean, and more. You can act it out if you want to with costumes and everything.
- b. Draw a poster that teaches the four phases of matter and include examples of each. Label the freezing, melting, evaporating, and condensing points. When you're finished, you'll use it to teach your parent or teacher and demonstrate what you've learned.
- c. Using your knowledge from this section, put on a chemistry magic show based on color changes and/or invisible writing (if you did that part of the labs). Remember, don't eat or drink anything when doing this! When it's ready, present it to your teacher and family by explaining not only what you did Have fun!