

## The scenario

<b>Subject</b>	<b>Zinc reactions</b>
<b>Length</b>	5,06 min.
<b>Main objectives</b>	Learning the reactivity of zinc
<b>Detailed objectives</b>	<p>Observation of changes occurring during the reaction</p> <p>Learning the properties of zinc</p> <p>Learning equation notation of the reactions in ionic form</p> <p>Learning and understanding of the electron balance of oxidation-reduction reactions</p>
<b>Structure and description of experiments:</b>	
<b>Introduction</b>	<p>Description: Zinc is a brittle metal with a blue-white colour. Zinc is in the d block (group 12) in the zinc group. Zinc reacts with acids, e.g. HCl, dil. nitric (V) acid, dil. sulfuric (VI) acid, forming salts. Zinc reacts with concentrated solutions of strong bases in a neutral environment to form coordination compounds. Zinc reacts with oxygen at elevated temperatures. The reaction produces a white powder of zinc (II) oxide, which has amphoteric properties. Zinc does not react with water.</p>
<b>Main subject</b>	<p>Description: Learning the reaction of zinc with acids, bromine water, and salts.</p>
<b>Experiment</b>	<p><b>Equipment:</b> test tubes, Pasteur pipettes, a stand</p> <p><b>Reagents:</b> bromine water, aqueous copper(II) sulphate (VI) solution, 1 M sulfuric (VI) acid solution, zinc dust</p> <p><b>Precautions:</b> bromine water, sulfuric acid - toxic and corrosive - be especially careful - work under a fume hood.</p> <p><b>Description:</b> Pipette 3 ml of the following solutions into three test tubes: bromine water, 1 M sulfuric acid solution (VI), and 1 M copper (II) sulphate (VI) solution. To each of them, add a pinch of zinc dust using a spatula. Write down the observations. After completing the experiment, transfer the contents of the test tubes to the appropriate waste containers.</p> <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>1. Write down your observations of the changes taking place</li> <li>2. Write down the equations of reactions taking place in each test tube</li> <li>3. Write the equations of the reactions in the ionic form</li> <li>4. Write the equations of the corresponding half-reactions of reduction and oxidation.</li> </ol> <p><b>Conclusions:</b> Zinc reacts with bromine water, which is observed after the decolorization of the brown solution of bromine water and the formation of a gray-white zinc bromide precipitate.</p> $\text{Zn} + \text{Br}_{2\text{aq}} \rightarrow \text{ZnBr}_2$

	<p>Zinc reacts with dilute sulfuric acid (VI) displacing hydrogen (a colourless gas is released in the test tube) and forming gray-white zinc sulphate (VI).</p> $\text{Zn} + \text{H}_2\text{SO}_{4\text{ rozc.}} \rightarrow \text{H}_2 + \text{ZnSO}_4$ <p>Zinc reacts with copper(II) sulphate(VI). Zinc is a more active metal than copper (voltage series) so it displaces copper from its salts. After adding zinc to the blue solution of copper sulphate (VI), the solution becomes discoloured (a colourless solution of zinc sulphate (VI) is formed), and a rusty metallic copper precipitate is observed at the bottom of the test tube.</p> $\text{Zn} + \text{CuSO}_4 \rightarrow \text{Cu} + \text{ZnSO}_4$ <p><b>Level:</b> Primary school</p>
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