

Teachers

Chris (NET) and Tin Zhe (science teacher)

Grade

3

Time

40 mins

Topic

Dissolve: volume and temperature

Previous knowledge/skills

- Science
 - measurement, temperature, estimated amounts
- English
 - much/many
- Mathematics
 - numbers

Aims

- Demonstrate that many solids dissolved in liquid water, the solubility increases with volume and temperature.

Teaching objectives

- Enquire about whether students are able to make tea and sugar with hot water.
- Enquire whether students can make 'cold tea' and sugar with cold water.
- Express to students that they will test sugars solubility both in cold and hot water.
- Express to students that they will test sugars solubility in different volumes of water.

Learning outcomes**Ss will be able to:**

- compare how well sugar dissolves in cold and hot water.
- observe that sugar dissolves much better in hot water.

Language of learning

- **Vocabulary:**
- Science
 - water (solvent), sugar (solute), dissolve, cold, lukewarm, hot,
Note: diluted, concentrated, saturated
- English
 - How many...?

- How much...?
- more, less
- Mathematics
- numbers, size

Phrases: How many spoons of ...?; How much water?;
How does it feel? It feels cold/warm/hot.
(What's the temperature?)

Task phrases: **Add more water; Measure the water; Measure the spoons of...;**
Show your class; Help your classmate; Write each measurement
in table; Challenge your classmate; This is hot/cold;

Material/Resources:

- hot water
- cold water
- lukewarm water
- 6 beakers per table
- stirrers
- Small-volume measures like 1/4 cup and 1 teaspoon
- rulers
- pencils
- worksheets
- (How much sugar? Vs How does it feel?[temperature])

Lesson procedure

- Note:
 - solubility:** The amount of a substance that will dissolve in a given amount of a solvent to give a saturated solution under specified conditions. 3 mins
- **Warm-up (pre-assessment)**
- Elicit students' knowledge of solids (sugar) and liquids (water), and what they expect to happen when these two materials are mixed together. 6 mins
(How?; What?)
- **Main (demonstration and experiment)**
- NET and science teacher explains the steps that students need to follow when preparing their tables for the experiments.
 - Number of cups needed**
 - Amount of water in each cup**
 - Amount of sugar in each cup**
 - Method and amount of time stirring**
- Invite all students to the front of the class. Introduce and demonstrate how students should use a graph to record their observations.

- (How much sugar? Vs How does it feel?[temperature])
Teacher demonstrates to students how to **prepare, conduct, observe and record** their experiments, and finally writing their findings on their handout. 5 mins
- Place 1/4 cup of cold, lukewarm water and hot water in each of 3 cups. At the same time, add 1 teaspoon of sugar to each cup. 10 mins
- Stir each for 10 seconds and observe.
- Stir for another 10 seconds and observe again.
- Repeat with a different volume of water.
- Provide each table with the necessary materials to dissolve and record their findings. While the NET and science teacher facilitate and assist students during their experiments. 10 mins
- **Wrap-up (assessment)**
- Ask students questions:
 - Does sugar dissolve faster in hot or cold water?
 - Could you make "cold tea" by stirring sugar into cold water?
 - What might you do instead if you wanted "cold tea"? 3 mins
- Clean-up and collect worksheets

3 mins

Assessment

- **Ask students:**
What did you find out about dissolving from this activity? Students should realize that the temperature of a liquid affects dissolving, and that substances seem to dissolve better when a liquid is warmer.