

Classroom Sequence

Step 3: Challenge - The Liquid Tower

Discovering mixtures (3/4)

Chemistry - Mixtures and solutions
4th - 6th grade

Introduction

Topics covered	Chemistry, mixture, solution, mass, volume, matter, separation techniques.
Summary and objectives	In this step, students consolidate the knowledge acquired during the sequence by taking on the challenge of the liquid tower.
Discipline engaged	Science and Technology
Duration	30 min approx.

This sequence compiles older resources, produced by the teachers of the *La main à la pâte* networks, on the subject of mixtures of liquids and solids.

The four steps of the sequence on mixtures can be carried out independently. We encourage teachers to create their own progression, adapted to their students and the time available. To help teachers choose from the proposals, here is the order in which the activities have been designed:

- Step 1: Mixtures of solids and simple liquids
- Step 2: The concept of density
- Step 3: Challenge - The Liquid Tower
- Step 4: Complex mixtures in everyday life

Getting started

Do not hesitate to watch the videos [Billes de Sciences #7](#) : Tania Louis - *Mélanges de liquides* (Mixtures of liquids), and [Billes de Sciences #3](#) : Tamar Saison - *La dissolution* (Dissolution).

Disclaimer: These videos are in French. But we encourage you to activate the English subtitles. Just be aware that is an automatic translation.

Activity: Challenge – The Liquid Tower

General objective: Consolidate the knowledge acquired throughout the sequence.

Summary	
Discipline	Science and Technology
Procedure and methods	Students must apply what they have learned in this sequence by taking on a challenge.
Duration	30 minutes
Material	<p>For the class:</p> <ul style="list-style-type: none">• Water, oil, household alcohol, cordial, washing-up liquid, food colouring, scales. <p>For each group of students:</p> <ul style="list-style-type: none">• A large glass to make the liquid column. <p>For each student:</p> <ul style="list-style-type: none">• Worksheet 1 and Worksheet 2 (optional).

Suggested procedure

The choice of the level is left to the teacher's discretion. In the same class, it is possible to change the activity by proposing a different level suited to each group of students.

Teaching note:

- Making the tower can be a little tricky for students. They will need to be very careful and pour the liquids very gently. A spoon can be used to pour the liquids by pouring them over the back of the spoon. It is important not to add food colouring to the oil, as they are mostly water.

Advanced level

The teacher distributes Worksheet 1 to the students and gives them time to read it. If they have any difficulty understanding, they can ask the teacher. Then they perform the challenge independently.

Intermediate level

The teacher distributes Worksheet 1 to the students and gives them time to read it. Then, after a few minutes of reflection, the children take the floor to explain which experiments they could carry out. The teacher mediates the debate and encourages the students to help each other in order to build a complete protocol. He/she stresses the fact that two parameters must be taken into account: the mass of the liquid for the same volume and the miscibility of the liquids. The teacher lets them carry out the experiment independently, once the students have reached agreement on the following protocol: *"We must weigh the same volume for each liquid in order to classify them by increasing mass, then check their miscibility."*

Beginner level

The teacher distributes Worksheet 1 to the students and gives them time to read it. The teacher then asks them to set up experiments to classify the liquids from lightest to heaviest. The students refer to the notes taken in their experiment notebook during Step 2. They carry out the weighing. They complete Worksheet 2 by placing the liquids on the axis. The teacher then asks, "If we arrange the liquids from lightest to heaviest, will we have a nice tower?" He encourages the students to look at the previous conclusions before answering. The children then complete the rest of Worksheet 2 to find the order of pouring that will create a tower of liquids. They carry out the experiment.



Liquid Tower:
(from top to bottom) household alcohol + red colouring,
oil, water + blue colouring,
washing-up liquid,
raspberry cordial.

Scientific Note:

- In the liquid tower, the soap (or washing-up liquid) and the water are one on top of the other and do not mix, although they are miscible with each other. The same is true for the cordial and soap (or washing-up liquid). But they can still be layered. To do this, you have to pour them gently. Moreover, soap (or washing-up liquid) is more viscous than water and this prevents the two liquids from mixing too quickly.

Conclusion (5 min)

The teacher reviews the challenge and the difficulties encountered by the pupils, if any. The diagram serves as a written trace for this session.

Worksheet 1: Liquid Tower Challenge - version 1

First name :

Equipment available:

- A scale
- A narrow, transparent container

Liquids to be used in the tower:

- Water
- Oil
- Alcohol
- Cordial
- Washing-up liquid

Challenge: Using the materials provided, place the five liquids to create a tower.

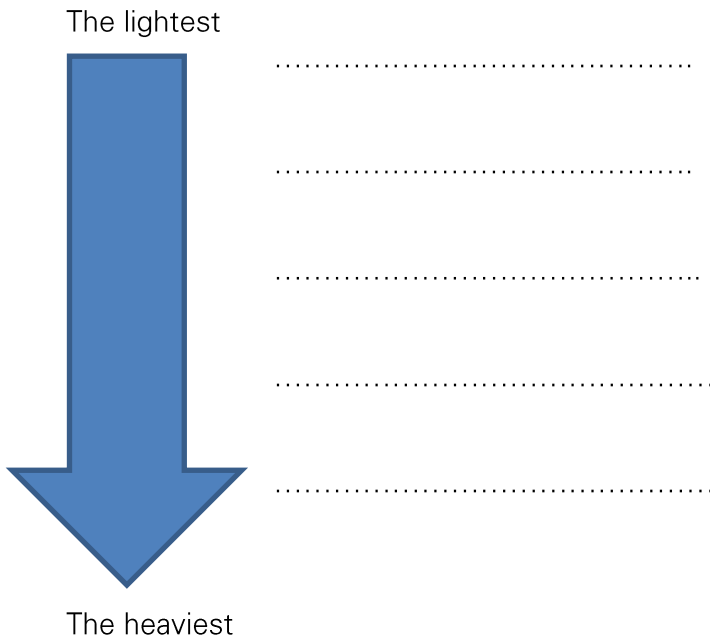
Time: 30 minutes

Labelled diagram of the tower:

Challenge validated by the teacher: YES NO

Worksheet 2: Liquid Tower Challenge - version 2

Instructions: Classify the liquids from lightest to heaviest.



Instructions: Using your experiment notebook, tell us whether or not the liquids in each pair are miscible.

Water and washing-up liquid:

Cordial and washing-up liquid:

Oil and alcohol:

Water and oil:

Instructions: Write the order in which the liquids will be poured to form the tower.

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