centre de développement pédagogique
pour la formation générale en science et technologie



MATERIALS PREPARATION GUIDE

(This document is intended for adults.)



Lemonade

Mixtures

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Image drawn from the RÉCIT national service for preschool education

ANNEX 1

Lemonade – Materials preparation guide



Activity 1 (The shape of the container influences the height of the water level)

Material:

- 1 - 1000mL graduated cylinder or a 1000 mL measuring cup
- 1 funnel (to use with the graduated cylinder)
- 5 large containers of different shapes but with similar capacities*
- 1 agitator or spoon
- Food colouring (not necessary but more stimulating for the senses)
- Tap water
- 1 permanent marker or liquid corrector or nail polish

Manipulation:

1. Identify the containers from 1 to 5 using the permanent marker.
2. Measure precisely 1000 mL of water.
3. Add food colouring and stir well.
4. Pour into container #1.
5. Repeat steps 1 through 5 for the four other containers.
6. Place the 5 containers on the desk.

*Pay particular attention to your choice of containers. It is preferable if:

- they are transparent so the students can observe them better;
- they are of varied heights;
- they are large, since this promotes observation.

It is not necessary to have 1000 mL containers. Smaller sizes will also allow for observation.

Examples of containers:

- 1L water bottle
- Pitcher
- High rectangular vase
- Erlenmeyer flask
- Beaker
- Florence flat bottom boiling flask, volumetric flask
- Graduated cylinder
- Rectangular dish (Pyrex or plastic storage container)



Activity 2 (Shape/quantity of liquid contained)
(Demonstration by the teacher)

Material:

- 1 standard glass (1 oz shot glass)
- 6 glasses of various shapes and volumes (identified A-B-C-D-E-F) (8 of each)
- 1 - 1000 mL measuring cup
- 1 permanent marker, or liquid corrector, or nail polish
- Tap water
- Food colouring
- Agitator or spoon

Manipulation:

- Identify the glasses using the permanent marker (A to F).
- Count the number of standard glasses contained in glass A
- Pour that number of standard glasses into the first glass, A.
- Draw a line* in permanent marker, at the top level of the water, then you can use this glass to mark all the other A glasses.
- Repeat steps 2 to 4 for the other sizes of glass (B to F) ensuring that they do not all contain the same number of standard glasses.

*The line on the glass ensures that the « unknown » glasses contain a whole number of standard glasses.

When taking the water with the standard glass, it is important to always use the same work technique so that your measurements are exact.

N.B. If you consider that your students are capable of working with half a standard glass, you can adjust the volume of water in consequence.



Activity 2 (Shape/quantity of liquid contained) (continued)
(Student manipulations)

Material required per team of 2 or 3:

- 1 - 1000 mL measuring cup or any other container easily transported by the student (bucket or pitcher, etc.)
- 1 « standard glass »
- 1 – 100 mL graduated cylinder or glass to be used for a cylinder or 500 mL water bottle whose end has been cut off.
- 1 funnel (not necessary in the case of a cut water bottle whose neck will be used as a funnel when turned upside down)
- 6 glasses of various sizes identified A to F
- Place masking tape the length of the container to be used as a graduated cylinder (this tape will be used to support data gathering for the water level).
- Scissors
- 1 marker
- 1 towel
- 1 dishwashing container

Class preparation:

1. Fill each measuring cup with water (or have the student fill them during the activity).
2. Add food colouring and stir well.
3. Place masking tape along the entire length of the container to be used as a graduated cylinder (the cylinder, the glass or the water bottle).
4. Prepare all the material in a dishwashing container for each team.

It is possible to carry out the activity with 4 glasses instead of 6. This decreases the cost and the manipulation time.



Activity 3 (Solubility)
(Demonstration by the teacher)

Material:

- 6 plastic graduated test tubes with cap or other containers. If other containers are used (pill bottles), you must put a line in permanent marker indicating 5 mL.
- Small test tube holder or other container to hold the test tubes
- 6 laboratory spatulas or 6 small spoons
- 1000 mL measuring cup
- Eye dropper
- Tap water
- Jars containing parsley, coffee, powdered detergent, baby powder, sugar crystals (candy sugar) (these substances may be replaced with others).

Manipulation:

1. Transfer 5mL water from the measuring cup to the test tube using the eye-dropper*.
2. Using the spatula or the handle of the spoon, take a small quantity of parsley.
3. Pour the parsley into the test tube containing the water.
4. Shake by inversion (tip the test tube upside down then back up again).
5. Observe this mixture.
6. Repeat steps 1 to 5 for the other substances.

* When using an eye-dropper, you must first depress the rubber end to remove the air. This pressure must be maintained as you plunge the aspiration tube into the liquid. Release the pressure and take the required quantity of liquid. Never depress the rubber once the eye-dropper is in the liquid, as this could cause splashes.



Activity 3 (Solubility) (continued)
(Student manipulations)

Material required per team of 2:

- 4 plastic graduated test tubes with caps
- Small test tube stand or container to hold the test tubes

Material required per work station (8X):

- 1000 mL measuring cup
- Standard glass
- Eye-dropper
- Spatula or adapted straw
- Substances in a wide mouthed plastic container
- Tap water
- Towel
- Identifying cardboard with station # (blue and red)

Class preparation:

1. Fill each measuring cup with water (or have the students fill them during the activity).
2. Place the material at each work station following the table for the substances:
    a. Identify the « BLUE » series of containers 1 to 4 using round blue stickers.
    b. Repeat the process for the « RED » series.

	1	2	3	4
Station Blue*	**Sugar**	**Table salt**	**Paprika**	**Sand**

Station Red*	**Brown sugar**	**Epsom salts**	**Pepper**	**Couscous**

- **It is not essential to have these same substances. You must ensure, however, to have soluble and non soluble substances that can be easily compared.**

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Organisation during the activity:

1. Distribute the teams to the work stations.
2. Have the students carry out the manipulations (the first station will determine how much time to allow for the following stations).
3. Change stations (students at blue stations do only these stations. The same holds true for those at red stations.) When changing stations the students transport only their holder containing the test tubes.

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Activity 4 (Integration)

Material:

- 3 – 1000 mL beakers or measuring cups
- 1 – 100 mL graduated cylinder or 250 mL measuring cup
- 3 large weighing containers or other containers for the powdered juice
- 1 tablespoon
- 3 agitators or spoons for stirring
- Powdered juice (flavour crystals)
- Tap water

Manipulation:

1. Measure one tablespoon of powdered juice and pour it into the first weighing container.
2. Measure three tablespoons of powdered juice and pour it into the second weighing container.
3. Measure twelve tablespoon of powdered juice and pour it into the third weighing container.
4. Measure 125 mL tap water and pour it into a beaker. Repeat this same water measurement in the two other beakers.
5. For the mixture, you may do it before the class, in front of the class or have the students do it themselves.



List of necessary materials Lemonade LES

Activity 1 (The shape of the container influences the height of the level of the water)

Laboratory materials		Everyday materials
• 1 funnel • 1 - 1000 mL Florence flat bottom boiling flask • 1 – 1000 mL volumetric flask • 1 - 1000 mL beaker • 2 - 1000 mL graduated cylinders • 1 - 1000 mL Erlenmeyer flask • 1 agitator	**OR**	• 1 - 1000mL measuring cup • 1 funnel • 5 various shapes of large containers • 1 spoon

- Food colouring
- Tap water
- 1 permanent marker or liquid corrector or nail polish

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Activity 2 (Shape/quantity of liquid contained)

Laboratory materials	OR	Everyday materials
• 8 - 100mL graduated cylinders • 8 funnels		• 8 glasses used as cylinders • 8 funnels

- 8 - 1000mL measuring cups
- 8 standard glasses (1 oz shot glasses)
- 8 X 6 glasses of various shapes
- Masking tape
- Scissors
- 8 markers
- 8 towels
- 8 dishwashing containers
- Tap water

Material for preparation before the manipulation	• Food colouring • Tap water • 1 permanent marker or liquid corrector or nail polish • Agitator or spoon

Activity 3 (Solubility – Demonstration by the teacher)

Laboratory materials	OR	Everyday materials
• 6 graduated test tubes with caps • Test tube stand • 2 spatulas		• 6 transparent containers with covers (pill bottles) • 2 spoons

- 1000 mL measuring cup
- Eye dropper
- Tap water
- Jars containing parsley, coffee, powdered detergent, baby powder, sugar crystal



Activity 3 (Solubility – Student manipulations)

Laboratory materials		Everyday materials
• 32 graduated test tubes with caps • 8 test tube stands	**OR**	• 32 transparent containers with caps

Material for the stations
• 8 - 1000 mL measuring cups • 8 standard glasses • 8 eye droppers • 8 spatulas or adapted straws • 8 towels • Tap water • 4 blue identification cardboards numbered #1 to #4 • 4 red identification cardboards numbered #1 to #4 • 8 plastic containers with an easily opened cover and a wide mouth

Preparation of substances:

	1	2	3	4
Station Blue	**Sugar**	**Table salt**	**Paprika**	**Sand**

Station Red	**Brown sugar**	**Epsom salts**	**Pepper**	**Couscous**



Activity 4 (Integration)

Laboratory materials		Everyday materials
• 3 - 1000 mL beakers • 1 100 mL graduated cylinder • 3 large weighing containers • 3 agitators	**OR**	• 3 - 1000 mL measuring cups or transparent containers • 1 – 250 mL measuring cup • 3 small containers for the powder • 3 spoons

- 1 tablespoon
- Powdered juice (flavour crystals)
- Tap water

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Purchase and cost estimate

Article	Unit price	Quantity required	Total Cost
1000 mL Measuring cups	1$	8	8$
Funnel*	1$	8	8$
Large containers of various shapes	1$	5	5$
Wooden spoons (pkg. of 3) (or agitator)	1$	1	2$
Shot glasses (1 oz) (pkg. of 40)	1$	28	1$
Glass to be used as a cylinder *	1$	8	8$
Glass A	Depending on the glass, the price of the packages varies	8	1 à 2$
Glass B		8	1 à 2$
Glass C		8	1 à 2$
Glass D		8	1 à 2$
Glass E		8	1 à 2$
Glass F		8	1 à 2$
Dishwashing container**	1$	8	8$
Test tubes ***	13$ for 50 43$ for 125	38	13$
Test tube stands***	5.50$ 6.85$	8	49$
Small spoons (pkg. of 25)	1$	1	1$
Spatulas****	20.50$ for 12	14	20,50
Eye-dropper	5$ for 12	8	12$
Set of measuring spoons	1$	1	1$
Food colouring	2$	1	2$
Permanent marker	1$	1	1$
Masking tape	1$	1	1$
Marker	1$	8	8$
Towel	1$	8	8$
Powdered juice	2$ à 5$	1	2$ à 5$
Sugar, sand, parsley, …*****			
250 mL measuring cup			
Total :			Between 72$ and 81$

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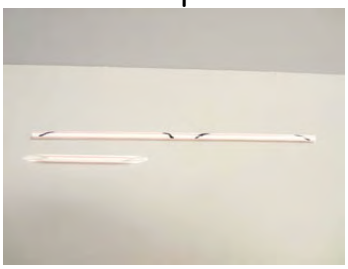
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*By using 500mL water bottles whose end has been cut off, you will not have to buy funnels and glasses to be used for cylinders.

**Any other container that you have in the classroom will do to transport the materials.

***To avoid buying test tubes and stands, you can use small pill bottles. By asking the students to bring some from home, you will quickly have enough.

****It is possible to replace the spatulas by plastic spoon handles and adapted straws. You need only to cut the straw in half then cut each end at an angle. A dab of hot glue is added to each end. See the photo below.



*****Only a few tablespoons of each of these substances are required. It is not necessary to purchase them.