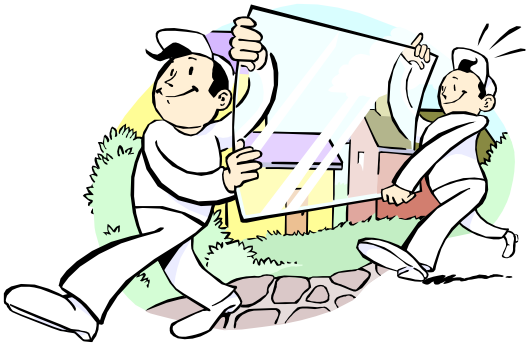
centre de développement pédagogique
pour la formation générale en science et technologie

Get cleaning!



TEACHER'S GUIDE

2010-2011



Description of the learning situation

	MATERIEL	DURATION
Preparation		
Activity 1 When the students come into class, they discover four bottles on the teacher's desk. The teacher submits a few questions to the students. (S)he makes the most of it to deal with properties, states of matter and liquid mixtures (miscible or not). (S)he presents a safety capsule *("How to safely smell a substance")*.	Four bottles containing cleaning products Shot glasses Safety capsule : *"How to safely smell a substance"* Demonstration materials	60 minutes
Activity 2 The teacher presents and explains the significance of symbols affixed on hazardous household products. (S)he present the "Hidden Pictures" activity of the *Stay Safe* program to the students.	Government of Canada website "Stay Safe" guide Appendix A-5 of this guide "Make your own puzzle" Appendix A-6 of this guide "Hidden Pictures, grades 1 or 2)"	45 minutes
For homework…		
The teacher assigns math homework: at home, make an inventory of household products with a hazard symbol on them. **Back in class** Once the homework is complete, the students make pictogram diagram or bar graph.		

Description of the learning situation - continued

Realisation		
Activity 3 (Experimenting) The teacher proposes an experiment to the students, with the purpose of discovering the most effective product for removing wax crayon marks from glass. (S)he presents a technical capsule on the graduated cylinder.	"Graduated cylinder technique" capsule Laboratory materials, see list.	60 minutes
Activity 4 The teacher proposes an initiation to diagramming activity.	Small bottles used in activity 3	45 min.
Integration		
Activity 5 The teacher animates a discussion regarding the knowledge the students have acquired so far, dealing specifically with the hazard symbols (pictograms). (S)he suggests three different activities that will allow the students to communicate their new knowledge.	Depends on the activity chosen	60 minutes

PREPARATION

Activity 1

Aim : ***Activate previous knowledge***
Incite the students to question
***Initiation to the "How to safely smell a substance"* technique**

Materials:

- **1 spray bottle of all purpose commercial cleaner**
- **1 spray bottle of a mixture of water and lemon juice***
- **1 spray bottle of a mixture of water and vinegar***
- **1 spray bottle of a mixture of water and dish soap***
- **Two empty bottles**
- **A small glass of milk**
- **A small glass of water**
- **A small glass of oil**
- **Shot glasses**
- **Student booklet, pages 1 and 2**
- **Theoretical capsule, pages 2 to 4**
- ***"How to safely smell a substance"* technical capsule**

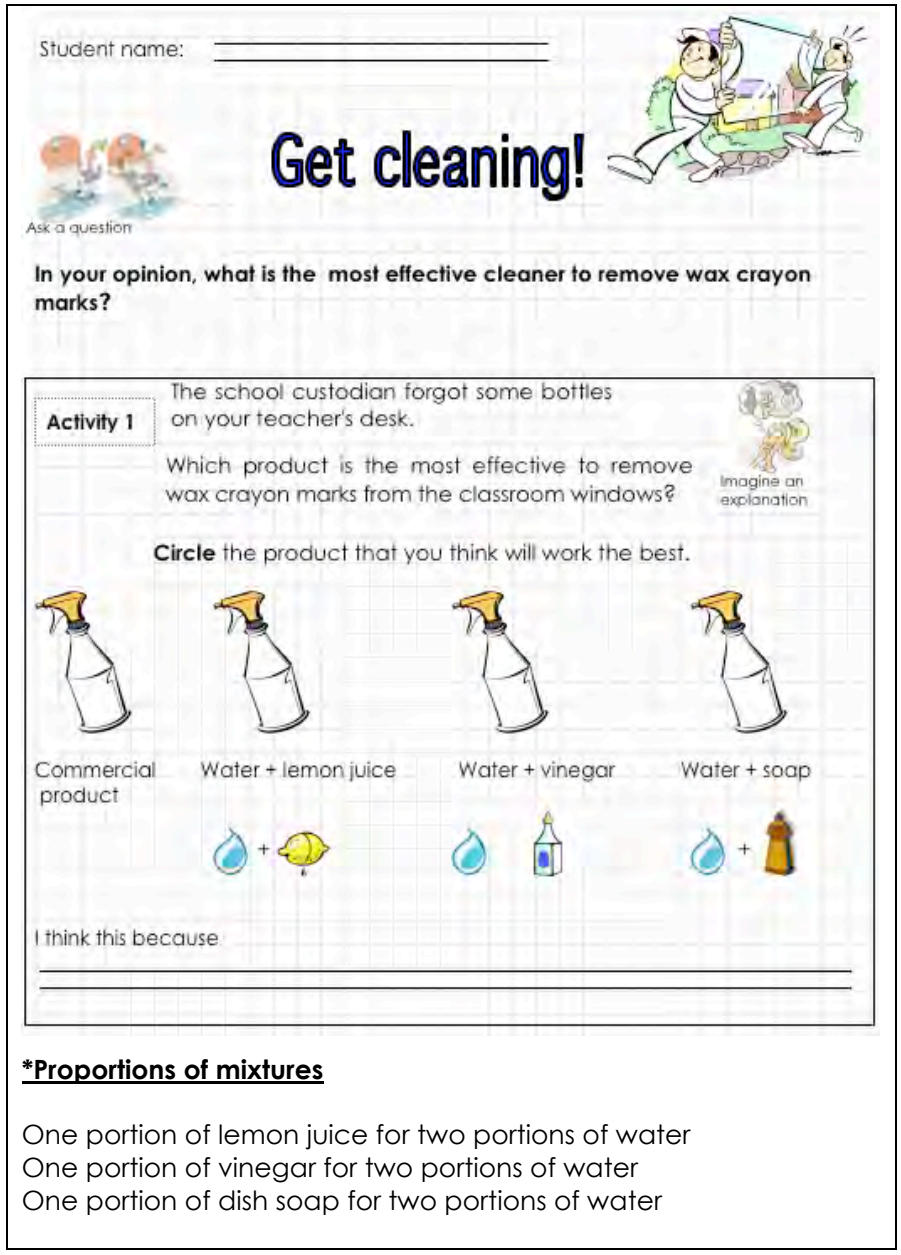
Duration: 30 to 60 minutes depending on the points broached

When the students come into class, four bottles of cleaning products are on the teacher's desk.

(S)he tells the students that the custodian had warned her that he was going to clean the wax crayon marks off the glass of the classroom door when (s)he was called away for an emergency. If the window is clean, tell the students that the custodian forgot to pick up the bottles.

The teacher questions the students as to which product would clean best. Which product did the custodian use or was (s)he planning to use? Some other context could also be used.

The students then complete the top half of page 1 in the student booklet (the student's hypothesis).


Student name: _____

Get cleaning!

Ask a question

In your opinion, what is the most effective cleaner to remove wax crayon marks?

Activity 1

The school custodian forgot some bottles on your teacher's desk.

Which product is the most effective to remove wax crayon marks from the classroom windows?

Imagine an explanation

Circle the product that you think will work the best.

Commercial product | Water + lemon juice | Water + vinegar | Water + soap

I think this because _____

***Proportions of mixtures**

One portion of lemon juice for two portions of water
One portion of vinegar for two portions of water
One portion of dish soap for two portions of water

To distinguish miscible from immiscible liquids

The students are invited to carry out the following manipulations themselves. The teacher may, however, perform a demonstration.

- Miscible liquids

In an empty bottle, vigorously mix the water and milk. Observe the result.

- Immiscible liquids

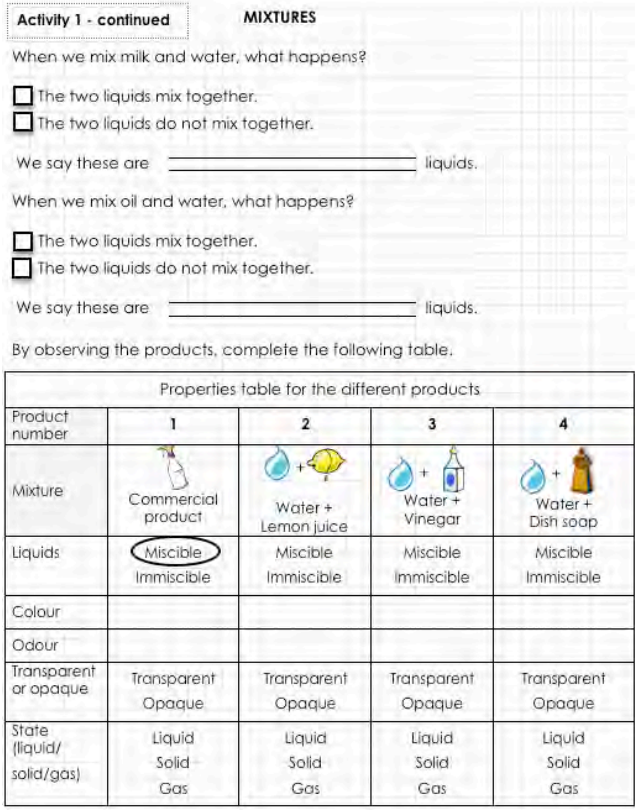
In a empty bottle, vigorously mix the water and oil. Observe the result.

Properties

The teacher takes advantage of the opportunity to deal with the properties (colour, odour, transparency or opacity) of the various products. (S)he may also deal with different states of matter, by comparing, for instance, soap in liquid or solid form...

When the property of "odour" is broached, it is important to address the safety issue. The teacher presents the *"How to safely smell a substance"* technical capsule.

The students then complete the properties table using a small container (shot glass) of each of the products. Working in a large group may help to build a word bank to describe the odours (for example, lemony, sweet, good, bad...). It is possible that this type of table (double entry) not be known by the students, so the teacher must ensure that the students understand how it works.



Activity 1 - continued **MIXTURES**

When we mix milk and water, what happens?

☐ The two liquids mix together.
☐ The two liquids do not mix together.

We say these are _____ liquids.

When we mix oil and water, what happens?

☐ The two liquids mix together.
☐ The two liquids do not mix together.

We say these are _____ liquids.

By observing the products, complete the following table.

Properties table for the different products

Product number	1	2	3	4
Mixture	Commercial product	Water + Lemon juice	Water + Vinegar	Water + Dish soap
Liquids	(Miscible) Immiscible	Miscible Immiscible	Miscible Immiscible	Miscible Immiscible
Colour				
Odour				
Transparent or opaque	Transparent Opaque	Transparent Opaque	Transparent Opaque	Transparent Opaque
State (liquid/ solid/gas)	Liquid Solid Gas	Liquid Solid Gas	Liquid Solid Gas	Liquid Solid Gas

List of materials necessary for the demonstration or for each team

Materials - miscible liquids

- An empty bottle
- A small glass of milk
- A small glass of water

Materials - Immiscible liquids

- An empty bottle
- A small glass of water
- A small glass of oil

PREPARATION

Activity 2

Aim: ***Present the hazard symbols to the students***

Materials:

- **Student booklet page 3 (1st), page 2 (2nd)**
- **Theoretical capsule, page 5**
- **Appendices A-5 and A-6 of the "Stay Safe" guide, drawn from the Government of Canada's "Stay Safe" website**

Duration: 45 minutes

The teacher presents and explains the significance of the symbols affixed to hazardous household products.

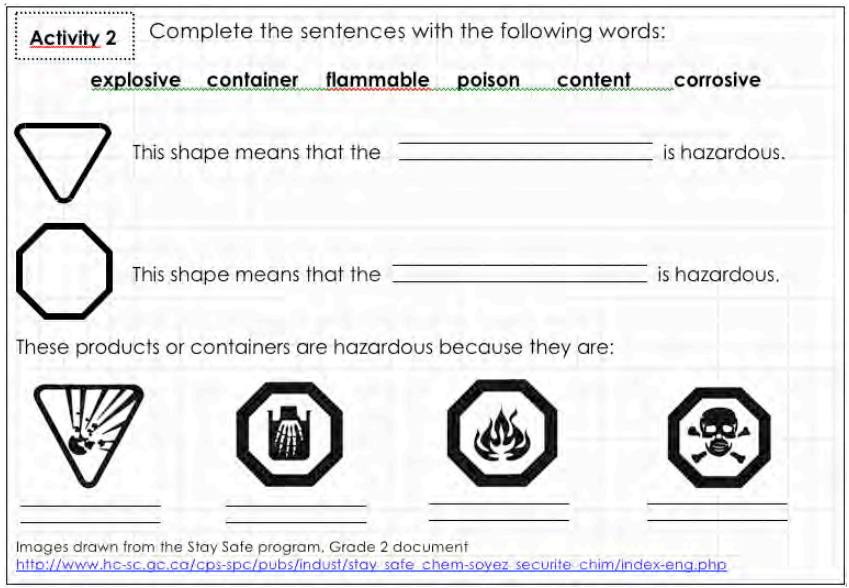
Two types of frames allow for the distinction between a hazardous container and hazardous content. Then the symbol specifies the type of hazard.

Appendix A-5 (Make your own puzzle) represents the four pictograms and may be printed and used to animate this activity.

During the presentation, the students complete page 2 or 3 of the student booklet, depending on their level.

The activity in Appendix A-6, "Hidden pictures, Grade 1 or 2" may be done in class. By attributing a colour to each shape of pictogram (container or contents) the correction of this activity is made easier.

Link to the program and to appendices A-5 and A-6 "Stay safe" - Domestic usage products
http://www.hc-sc.gc.ca/cps-spc/pubs/indust/stay_safe_chem-soyez_securite_chim/index-eng.php





For homework…

Aims: ***Make an inventory of hazardous domestic products at home***
Illustrate this inventory using graphs

Materials:

- **Student booklet, page 4 (1st) and page 3 (2nd)**

Duration: 30 minutes or more, depending on the work done in math.

The teacher invites the students to inventory the products that carry a hazard symbol at home.

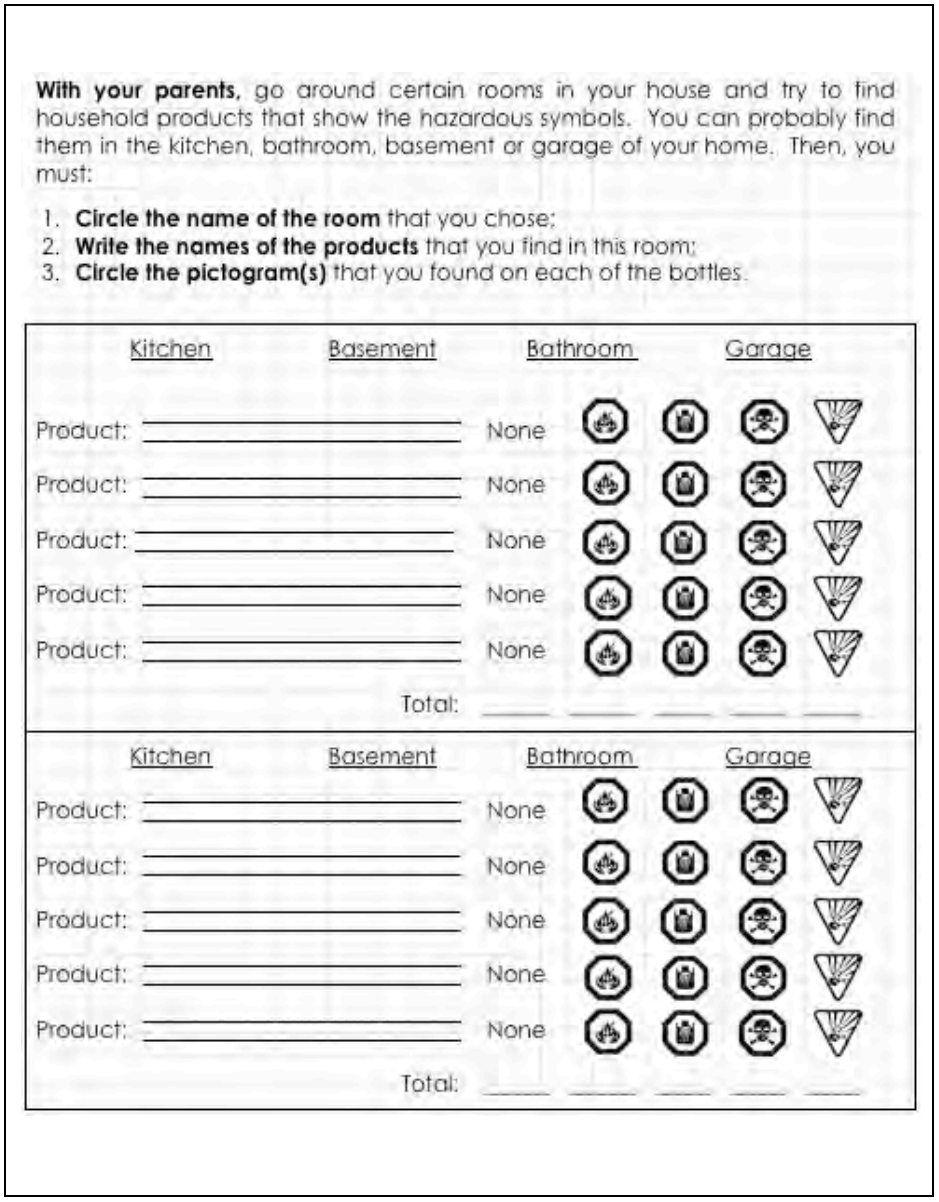
As homework, the students complete the "Hazard symbols at home" fact sheet under parental supervision.

The next day, the teacher guides the students in the creation of diagrams (group or individual) to represent the results of the inventory, according to the pedagogical intention in math.

To our great surprise, many hazardous household products carry no security pictograms.

According to the Government of Canada, household use products are not regulated by the same laws as commercial usage products, which must be identified. (The products used by the school custodian probably have pictograms).

Here is an ideal opportunity to discuss with the students of the dangers that some domestic cleaning products may represent despite the absence of security pictograms.



With your parents, go around certain rooms in your house and try to find household products that show the hazardous symbols. You can probably find them in the kitchen, bathroom, basement or garage of your home. Then, you must:

1. **Circle the name of the room** that you chose;
2. **Write the names of the products** that you find in this room;
3. **Circle the pictogram(s)** that you found on each of the bottles.

Kitchen	Basement	Bathroom	Garage
Product: _____		None	
Product: _____		None	
Product: _____		None	
Product: _____		None	
Product: _____		None	
Total:			

Kitchen	Basement	Bathroom	Garage
Product: _____		None	
Product: _____		None	
Product: _____		None	
Product: _____		None	
Product: _____		None	
Total:			

REALISATION

Activity 3

Aims: ***Test the various products from Activity 1***
Initiation to the use of a graduated cylinder
Initiation to following of a protocol

Materials:

- **Student booklet, , pages 5 to 6 (1st), pages 4 to 5 (2nd)**
- **Theoretical capsule, page 6**
- **"Reading a graduated cylinder" technique capsule, 1st cycle version**
- **Illustrated laboratory materials list, annex 1**
- **Commercial products labels, annex 2**
- **Safety glasses for each student**
- **Per team:**
  - **a place mat, annex 3**
  - **a small bottle containing the commercial product**
  - **a small empty bottle**
  - **a graduated cylinder**
  - **a funnel**
  - **a small container of home made product to test**
  - **Two watch faces**
  - **a popular brand, dark coloured, wax crayon**
  - **a rag or paper towels**

Duration: 60 minutes

With the pretext of helping the custodian determine which product is the most efficient to clean the wax crayon marks from the window, the teacher invites the students to perform an experiment.

This activity is the perfect opportunity to initiate the student to the use of a graduated cylinder. Without going into too much detail, an analogy may be made comparing the cylinder to a ruler. the ruler measures length in cm, while the cylinder measures liquids in millilitres (mL). The use of the graduated cylinder is not necessary



to the task, but rather an enrichment.

To be rigorous from a scientific point of view, the students should test all four products in order to determine which is most effective. If each team tests only two of the products, it is important to have a large group review in order to compare the results of all four products. In that case, at least one team must test each of the home made products.

In the 1st cycle, however, testing all four products would require a great deal of time and materials. We have therefore limited the various steps of the experiment to two products: the commercial product, identical for all, and a second, homemade product.

In order to limit the manipulations, the teacher may pour the commercial product into the small bottles before the experiment. It is recommended that you affix a label from annex 2 to it.

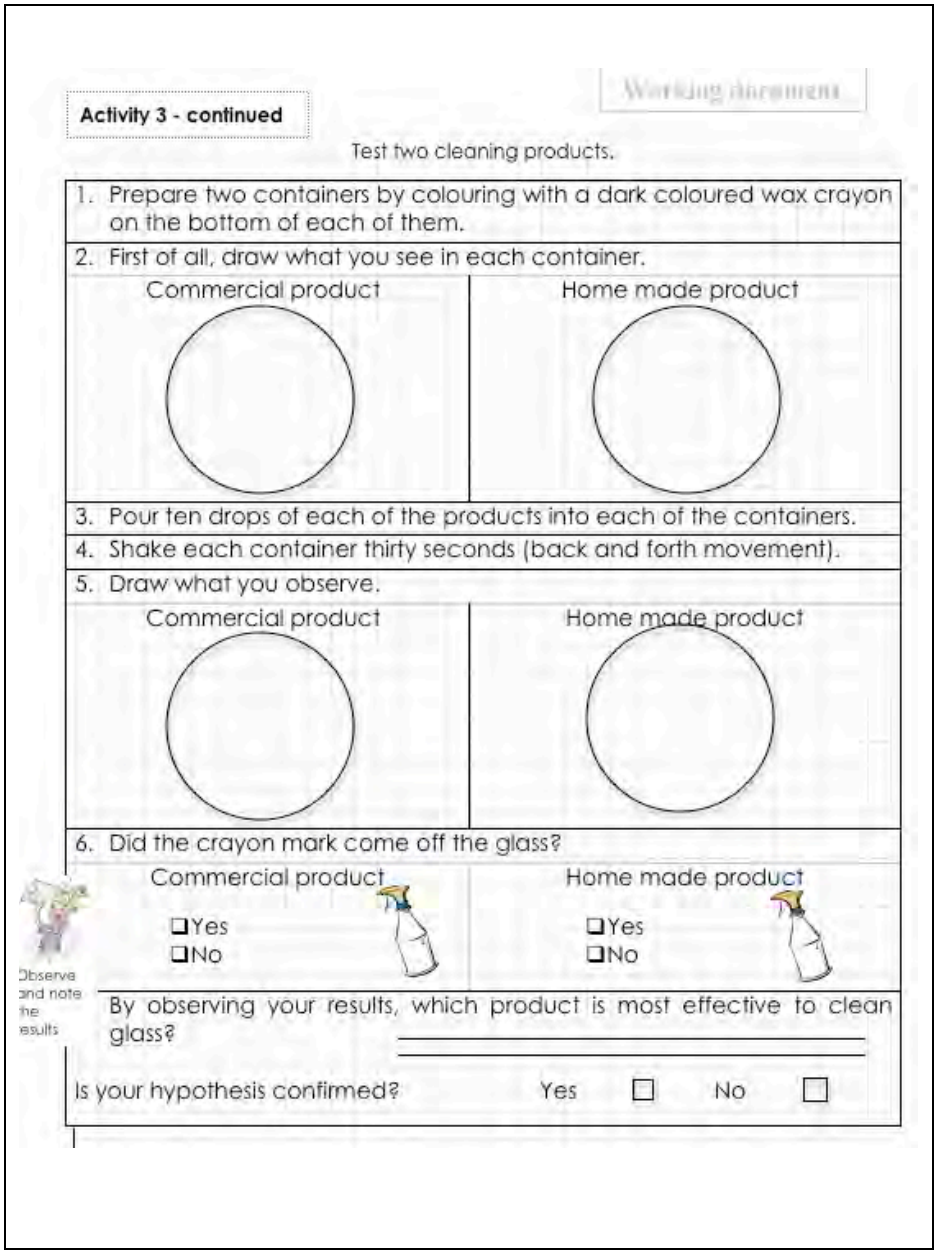
The teacher reminds the students of the importance of carefully identifying the contents of their containers. The students must therefore identify their bottle with masking tape before pouring the homemade product into the bottle.

*The number of mL to be measured will be determined by the graduated cylinder you use, since the experiment only requires 10 drops.

The teacher reads the protocol with the students. (S)he reminds them that they must note their results at each step.

Again in keeping with scientific rigour, it is important to mention to the students that as much as possible, the crayon marks on each of the watch faces should be identical.

It is important to remind the student of the safety rules regarding the use of hazardous materials. The "Stay Safe" program says not to touch and to call an adult when symbols are present. In the case of the product used for the experiment, the important part is



Activity 3 - continued

Test two cleaning products.

1. Prepare two containers by colouring with a dark coloured wax crayon on the bottom of each of them.
2. First of all, draw what you see in each container.

Commercial product	Home made product

3. Pour ten drops of each of the products into each of the containers.
4. Shake each container thirty seconds (back and forth movement).
5. Draw what you observe.

Commercial product	Home made product

6. Did the crayon mark come off the glass?

Commercial product	Home made product
❑Yes ❑No	❑Yes ❑No

Observe and note the results

By observing your results, which product is most effective to clean glass?

Is your hypothesis confirmed? Yes ☐ No ☐

to sensitise the student to safe usage, under adult supervision.

The teacher must ensure that the students have understood that the use of the products related to the activity entail very little danger as long as they are not ingested. Thus, what must be remembered is that **these products must always be used with care and in the presence of an adult.**

The experiment may be experienced out as a guided experiment or independently.

The students complete the student booklet after each of the steps of the protocol.

A place mat, to be plasticized, is available to give the students efficient work habits. They will thus be able to distinguish each of the products.

A quick way of cleaning all the materials would be to bring them home and use the dishwasher.

Safety glasses

The use of Pyrex watch faces is preferable to other glass containers since while glass may break into many pieces, Pyrex only breaks into a few.

REALISATION

Activity 4

Aim: ***Initiation to diagramming (construction diagram***

Materials:

- **Student booklet page 7 (1st), page 6 (2nd)**
- **Theoretical capsule, page 6 to 10**
- **Bottles used in activity 3**

Duration: 45 minutes

The theoretical information contained in pages 6 to 10 presents the basics of technical drawing. For the students, the only objective for this activity is the construction diagram.

The teacher reproduces the diagram of the bottle, appearing on page 6 (2nd) or 7 (1st) of the student booklet, on the board.

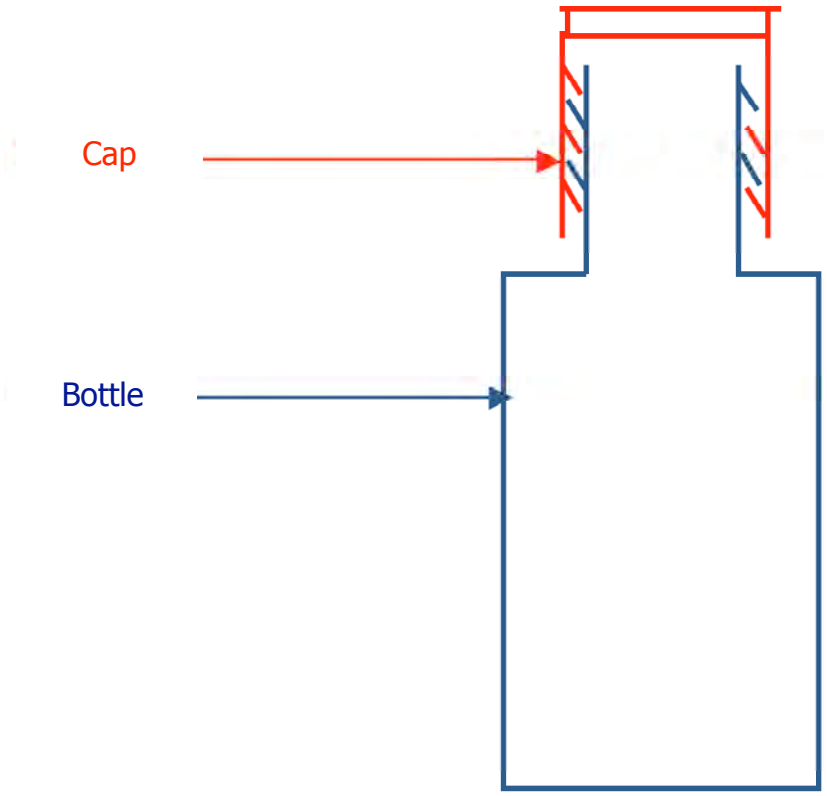
The teacher explains the basic rules of the construction diagram to the students:

- A title;
- Simple lines;
- Different colours for each part;
- The identification of each part.

The diagram on the board is then completed as a group.

In turn, and individually, the students then complete the diagram in the booklet using a ruler to draw the arrows (for 2nd grade students).

Construction diagram of the bottle



The image of the bottle should be modified if the bottle used is different from the one presented.

INTEGRATION

Activity 5

Aim: ***Share their knowledge of hazardous household products symbols***

Materials:

- **Student booklet, page 8 (1st), page 7 (2nd)**
- **Signs, computers or labels, depending on the activity chosen.**

Duration: 45 minutes or more, depending on the activity chosen

First, the teacher animates a discussion in order to highlight the acquired knowledge. Next, the students complete the student booklet.

Then, (s)he suggest one of the following activities to the students.

- Create a poster presenting and explaining one of the hazard symbols (art and languages arts or CIT and language arts)

- Create a poster that presents how to react faced with a potentially harmful product that shows no hazard symbols

- Create labels to be affixed to household containers that present warnings only, but no symbols.

A section of the last page of the student booklet may be used for the rough draft of these activities.

In addition, the teacher may present a video showing a real life situation where a domestic product was transferred into a milk container. (S)he animates a discussion related to the video regarding the behaviours to adopt in such a situation.

Link for the video (In French only) :

http://www.stopauxaccidentsquotidiens.fr/La-prevention-en-images/Securite-des-enfants-Produits-menagers