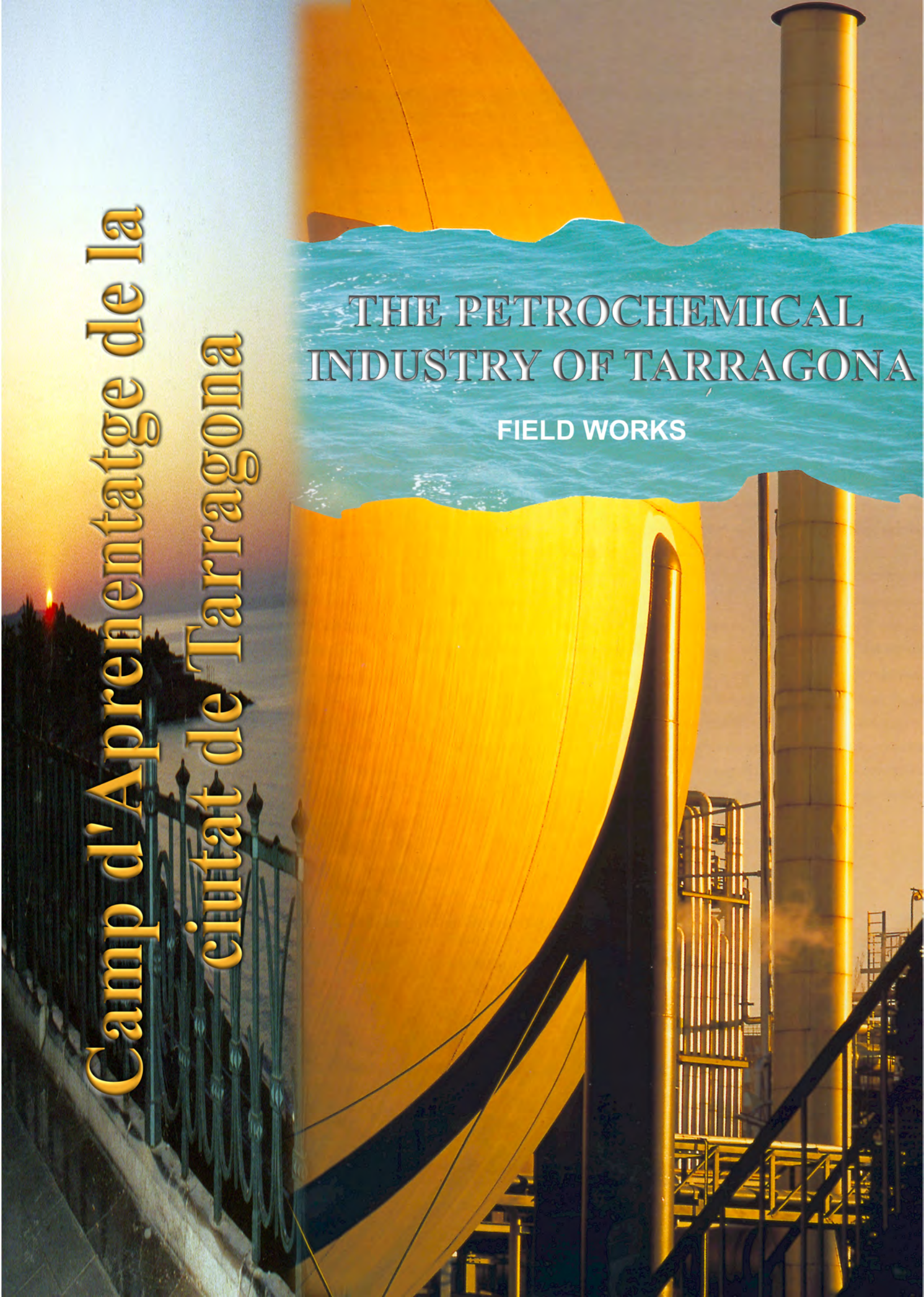


*Camp d'Aprenentatge de la
ciutat de Tarragona*

THE PETROCHEMICAL
INDUSTRY OF TARRAGONA

FIELD WORKS





Generalitat de Catalunya
**Departament
d'Ensenyament**

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CdA
CIUTAT DE TARRAGONA



Camp d'Aprenentatge de la ciutat de Tarragona
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Publisher: **CdA de la ciutat de Tarragona**

**THE PETROCHEMICAL
INDUSTRY
OF
TARRAGONA**

FIELD WORKS


STUDENT'S BOOKLET

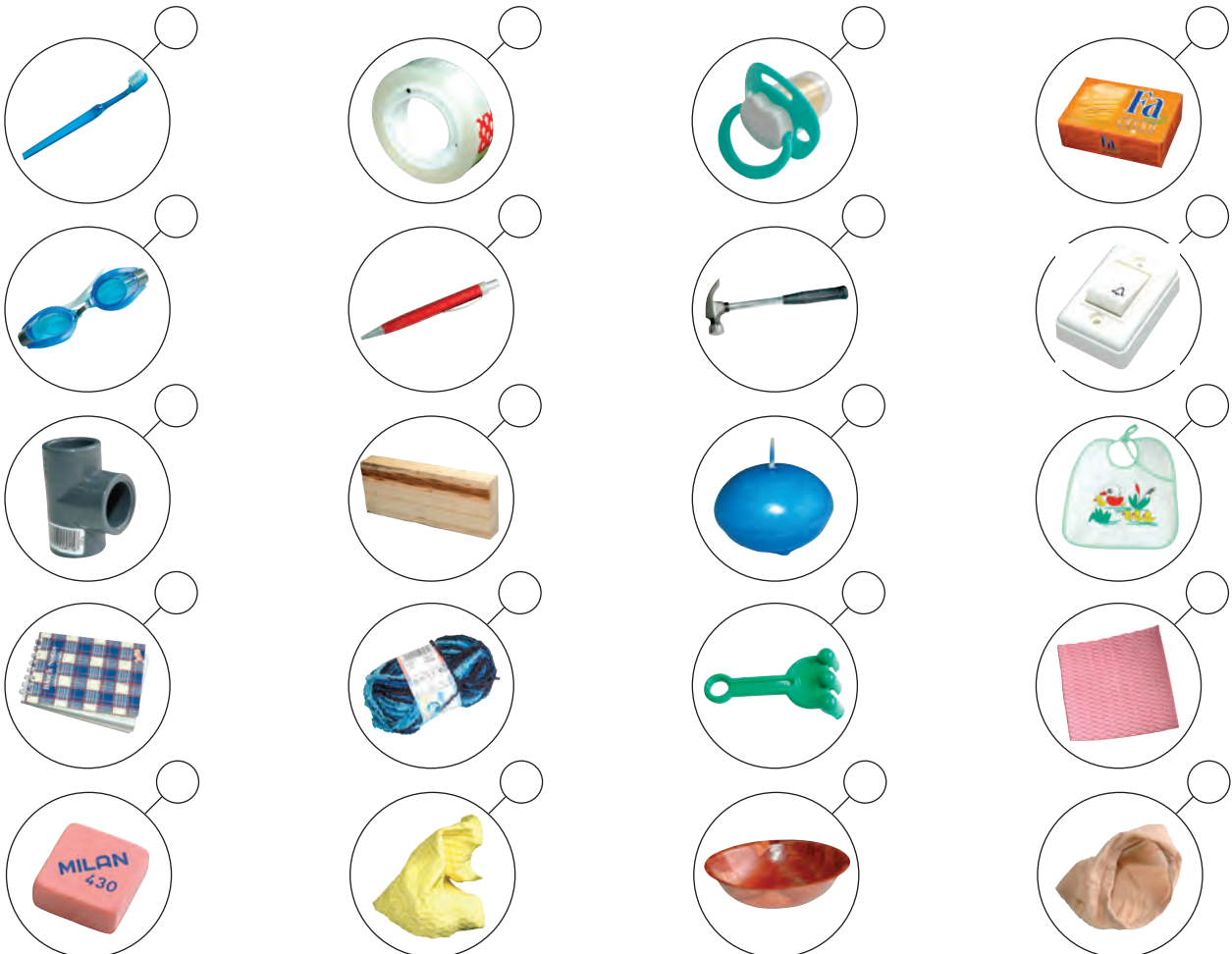
Name of the student

School Level

Let's start...

- 1 Students will be divided into **4 groups** that will be placed in the tables **1, 2, 3** or **4**, respectively.
- 2 A representative from each group will go to the "**Objects' Classification**" wardrobe and will grab the drawer "**PETROLEUM PRODUCTS**".
- 3 He or she will take the drawer to the table. Then, you will classify the everyday objects into two groups: petroleum products and non-petroleum products.

Mark  the objects that, in your opinion, are petroleum products:



4

Check your results on the answer key, "**PETROLEUM OR NON-PETROLEUM PRODUCTS**", and correct if necessary.

WRITE DOWN:

- How many petroleum objects have you guessed?
- How many non-petroleum objects have you guessed? ...
- Conclusion:

5

Again, the representative from each group will go to the "**Objects' Classification**" and will grab the drawer called "**TRAYS WITH OBJECTS TO CLASSIFY**".



6

Place the objects over the table and put the petroleum products in the correct container.

7

Check your results on the answer key, "**OBJECTS' CLASSIFICATION ACCORDING TO ITS FUNCTION**", and correct if necessary.

8

Now, match the groups of products with their functionality by using arrows.

HOME CARE

SYRINGE
DUMMY FEEDING BOTTLE
CAPSULES MASK
CAPSULES' DISPENSER
URINE COLLECTION CUP
ADHESIVE DRESSING

RETOREFLECTOR
GAS CAP
MERCEDES-BENZ BRAND LOGO

PAPER AND GRAPHIC ARTS

PLUG PROTECTOR
ROPE
PAINT ROLLER
AIR FRESHENER

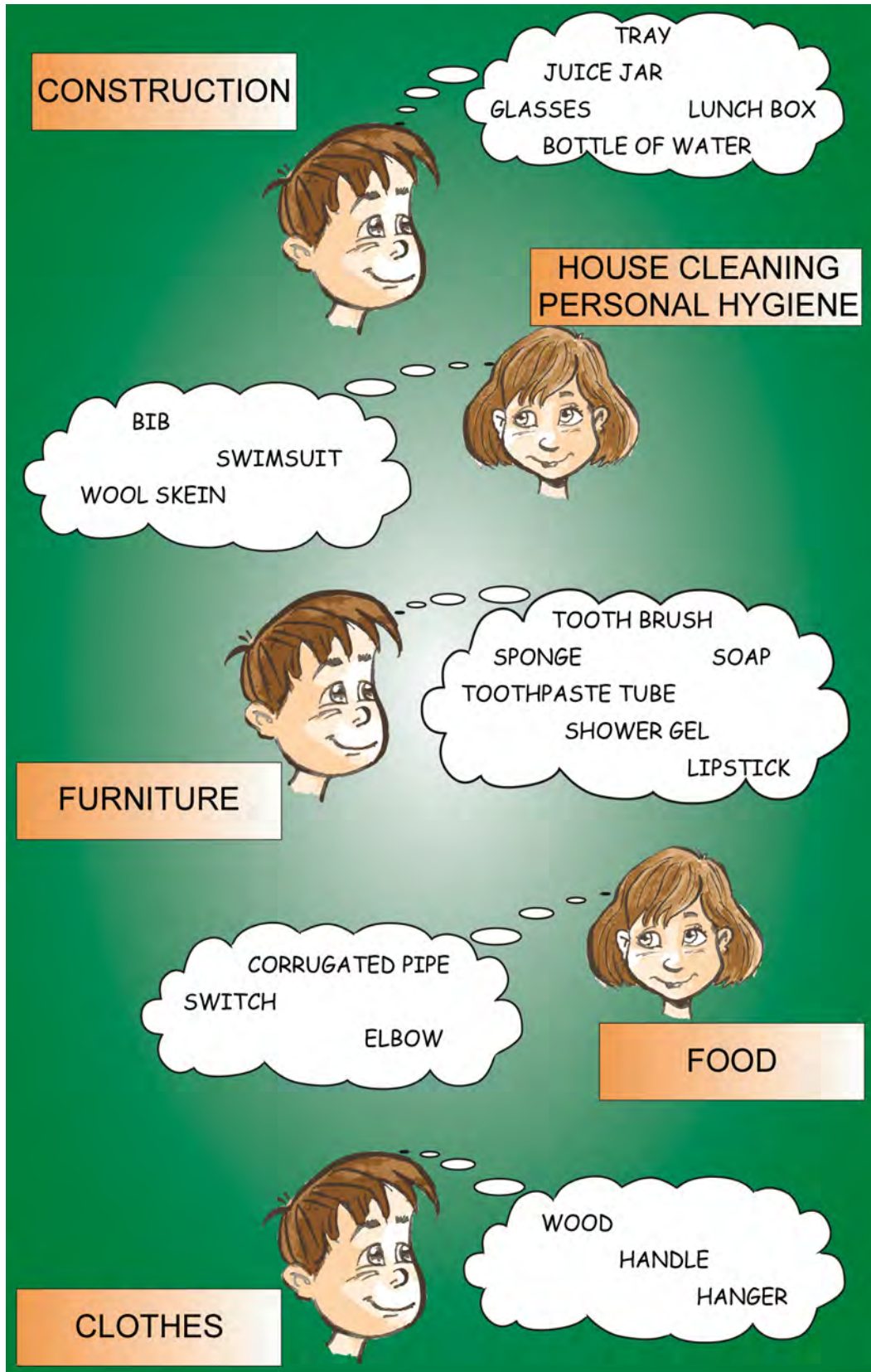
TRANSPORT

ERASER
TALE'S BOOK
MARKER BOOKMARK
ADHESIVE TAPE

ELECTRONICS AND LEISURE

TOY
CD RADIO
GOGGLES

HEALTH AND MEDICINE

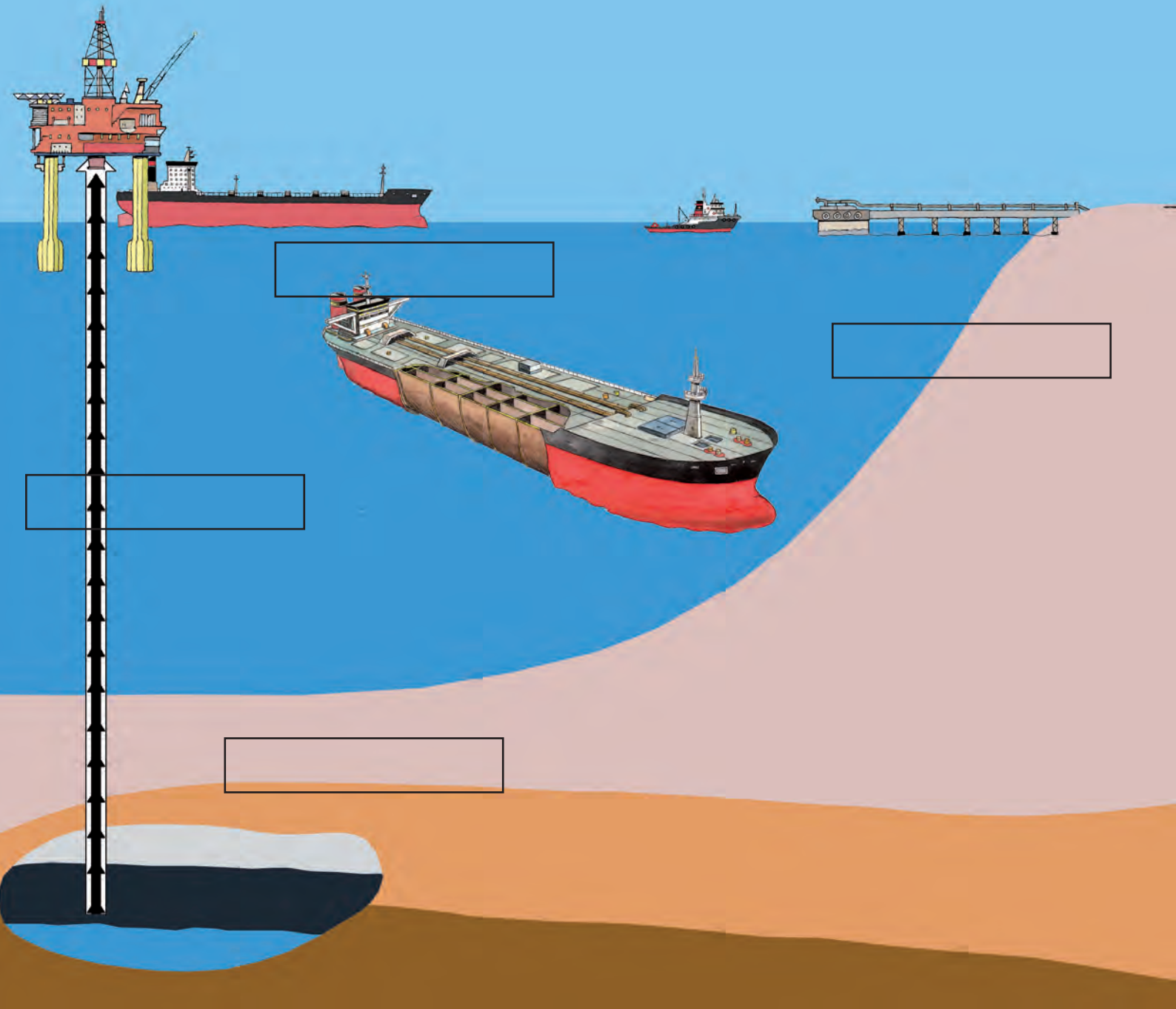


9

Tidy up the drawers.
Take one chair and sit in front of the felt board.

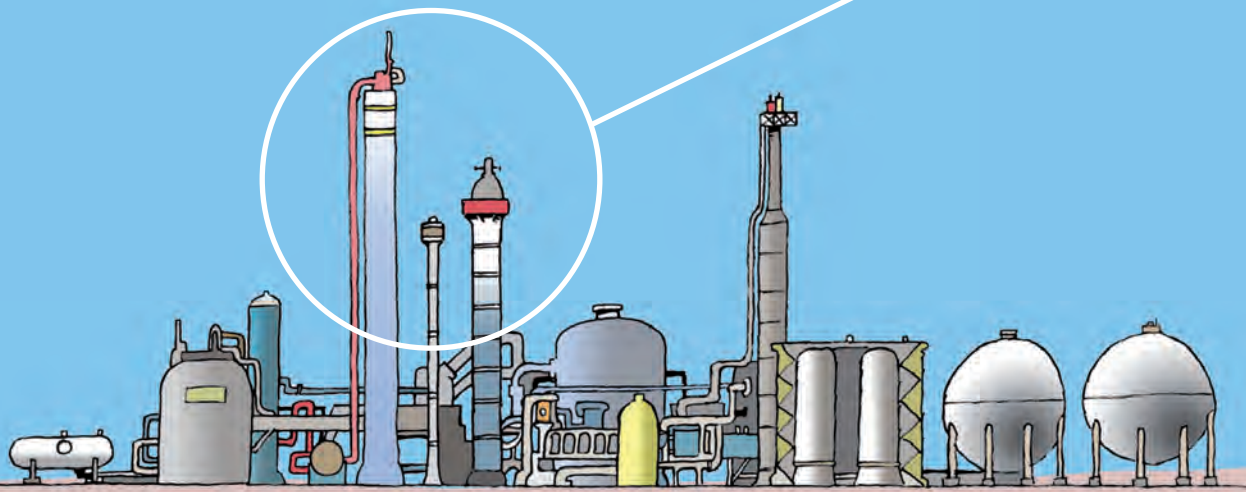
10

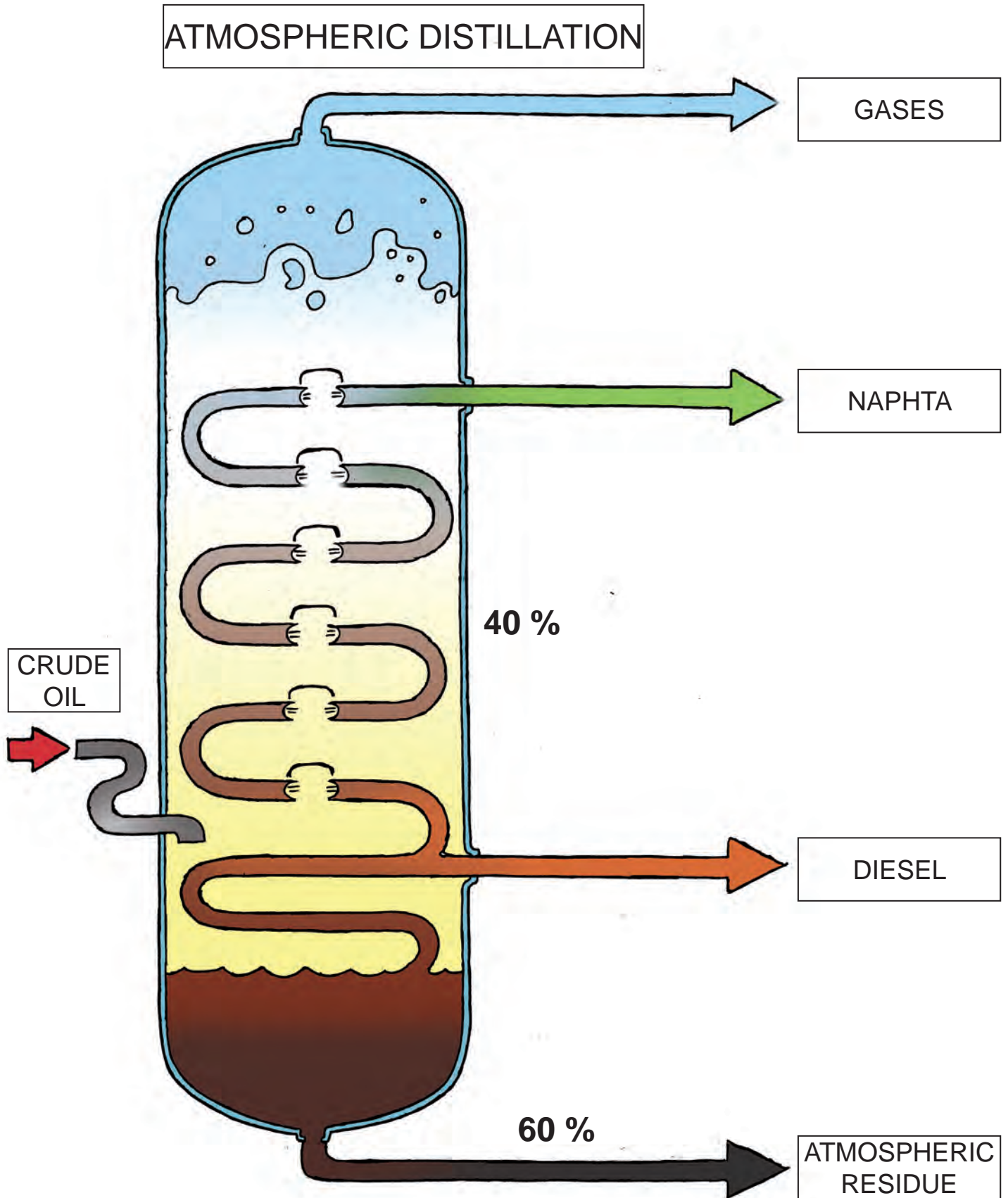
Observe the felt board and listen carefully to the explanation about the petroleum extraction. Complete the mural with the correct names.



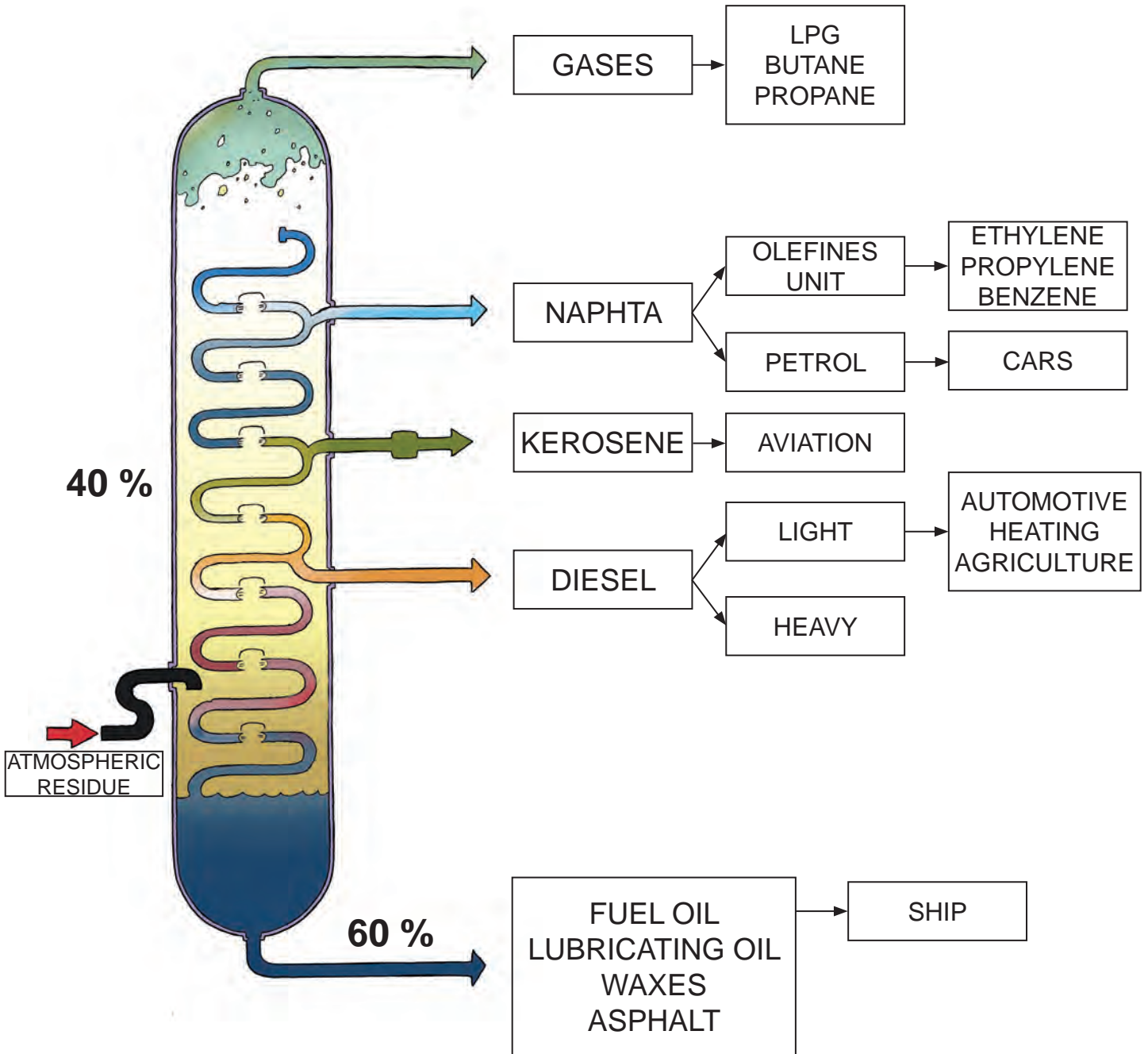
, transport and transformation processes.

CRUDE OIL
DISTILLATION

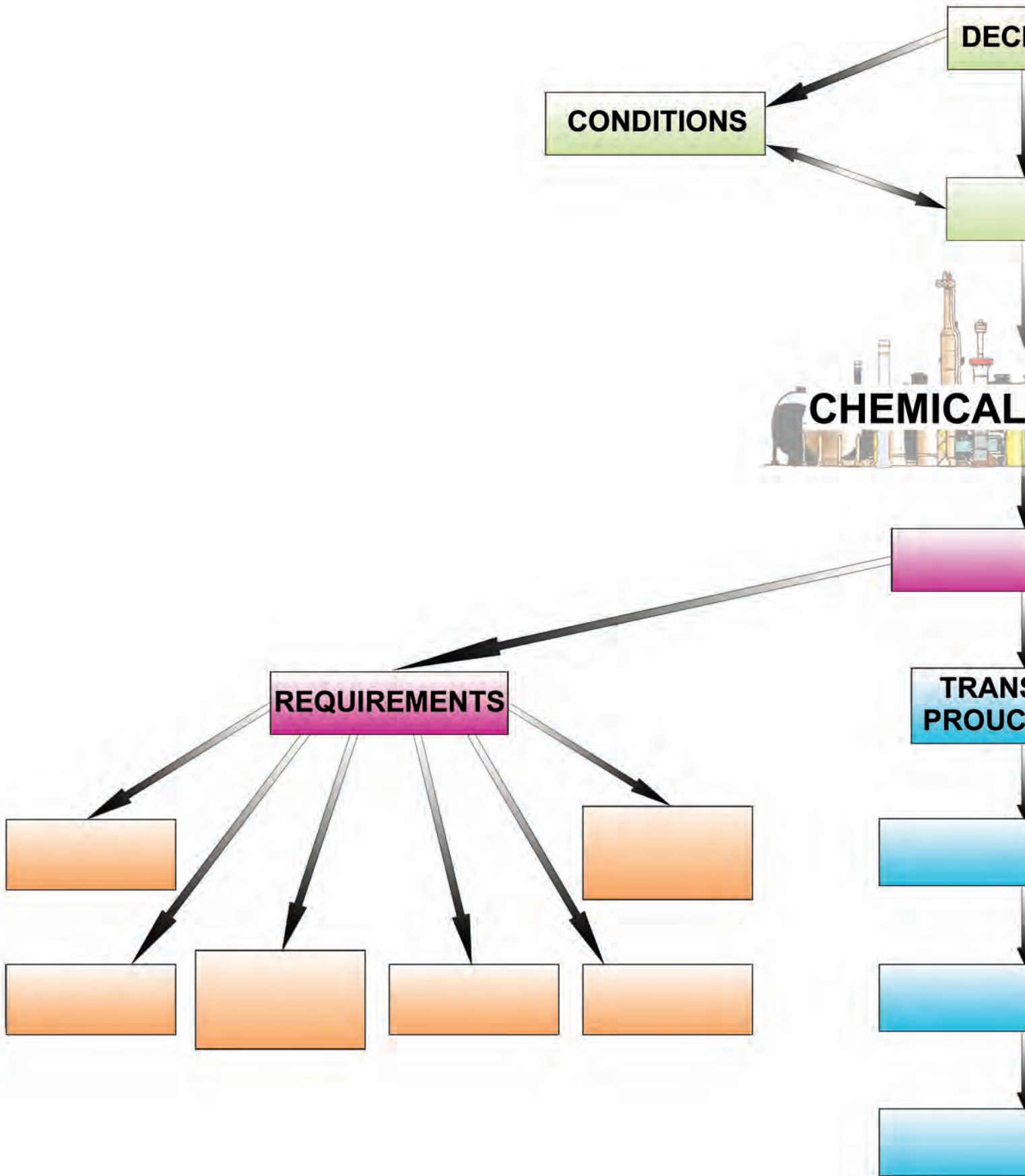




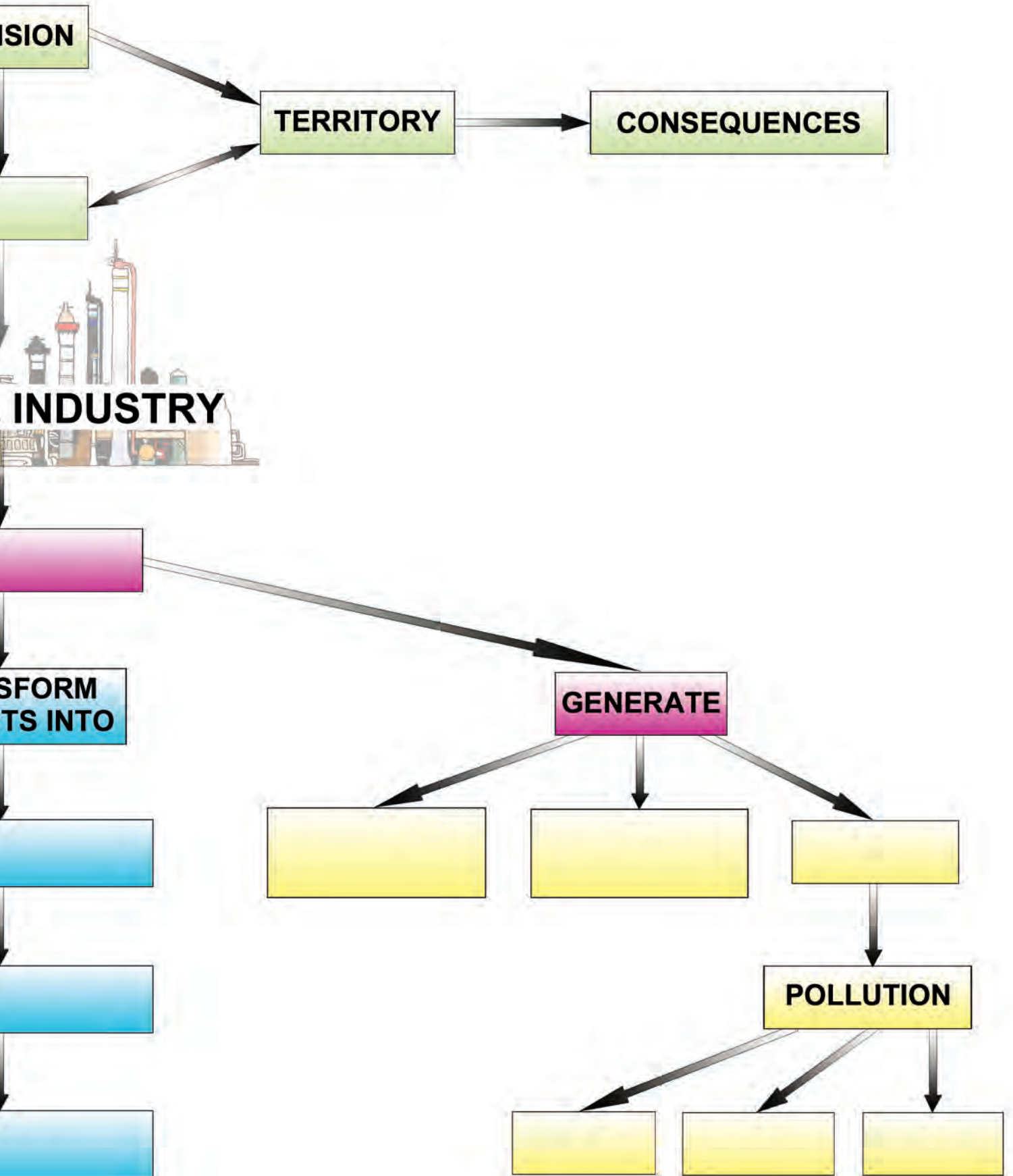
VACUUM UNIT

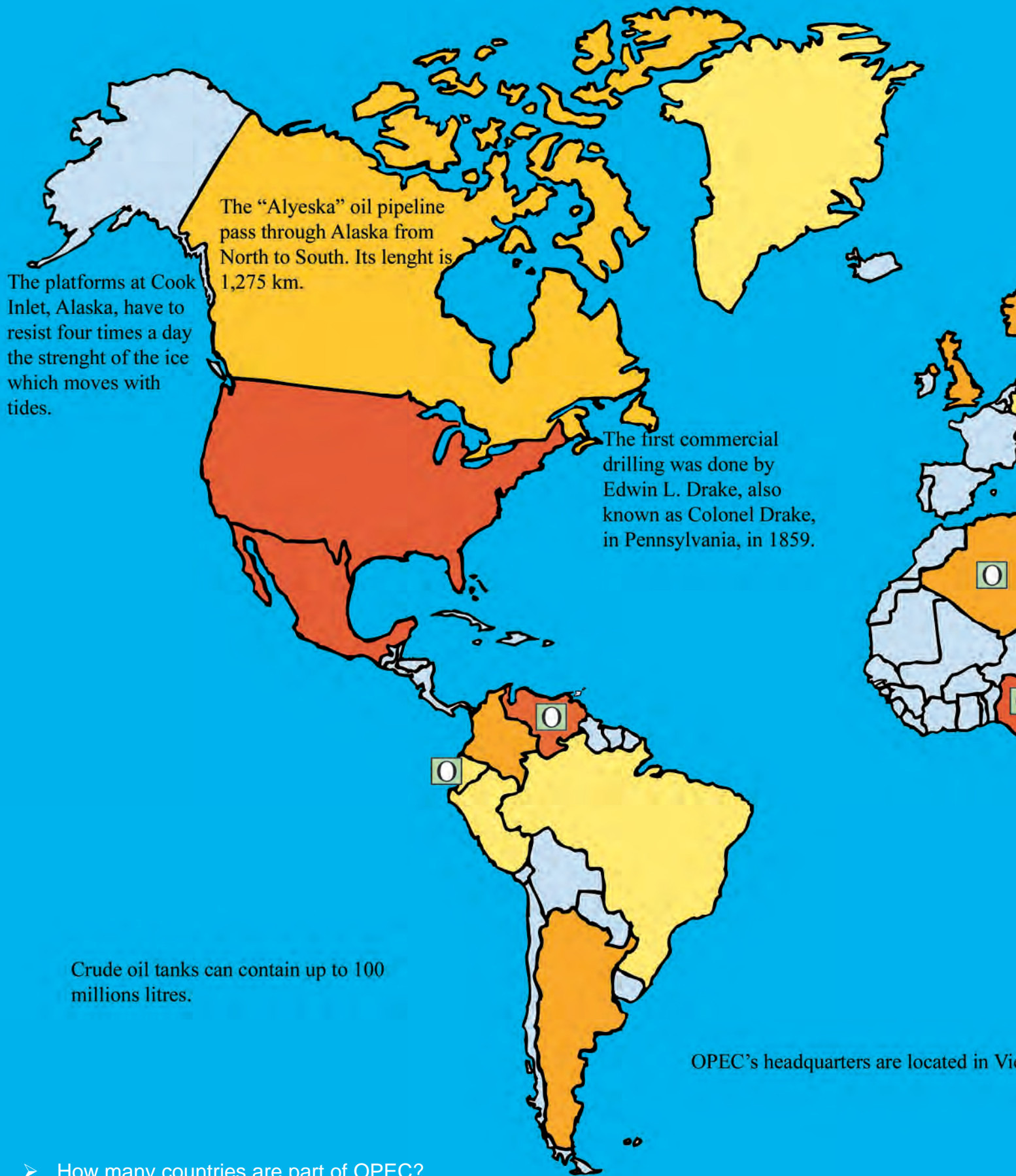


CHEMICAL INDUSTRY'S LOCAT



ION AND OPERATION DIAGRAM





The platforms at Cook Inlet, Alaska, have to resist four times a day the strength of the ice which moves with tides.

The "Alyeska" oil pipeline pass through Alaska from North to South. Its length is 1,275 km.

The first commercial drilling was done by Edwin L. Drake, also known as Colonel Drake, in Pennsylvania, in 1859.

Crude oil tanks can contain up to 100 millions litres.




OPEC's headquarters are located in Vienna.

- How many countries are part of OPEC?
- Which countries are the biggest producers of petroleum?

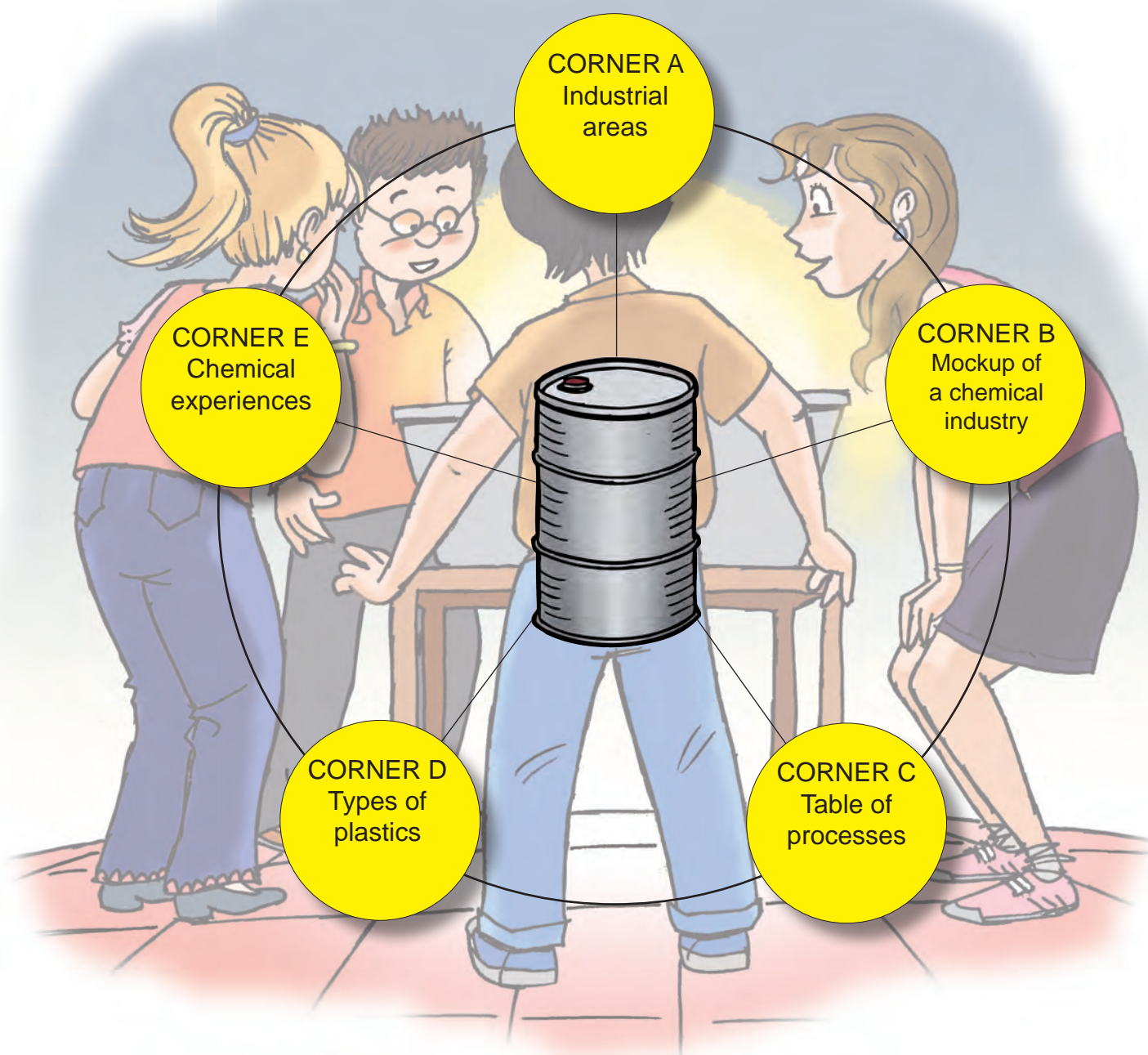
OIL DISTRIBUTION AND OIL RESERVES

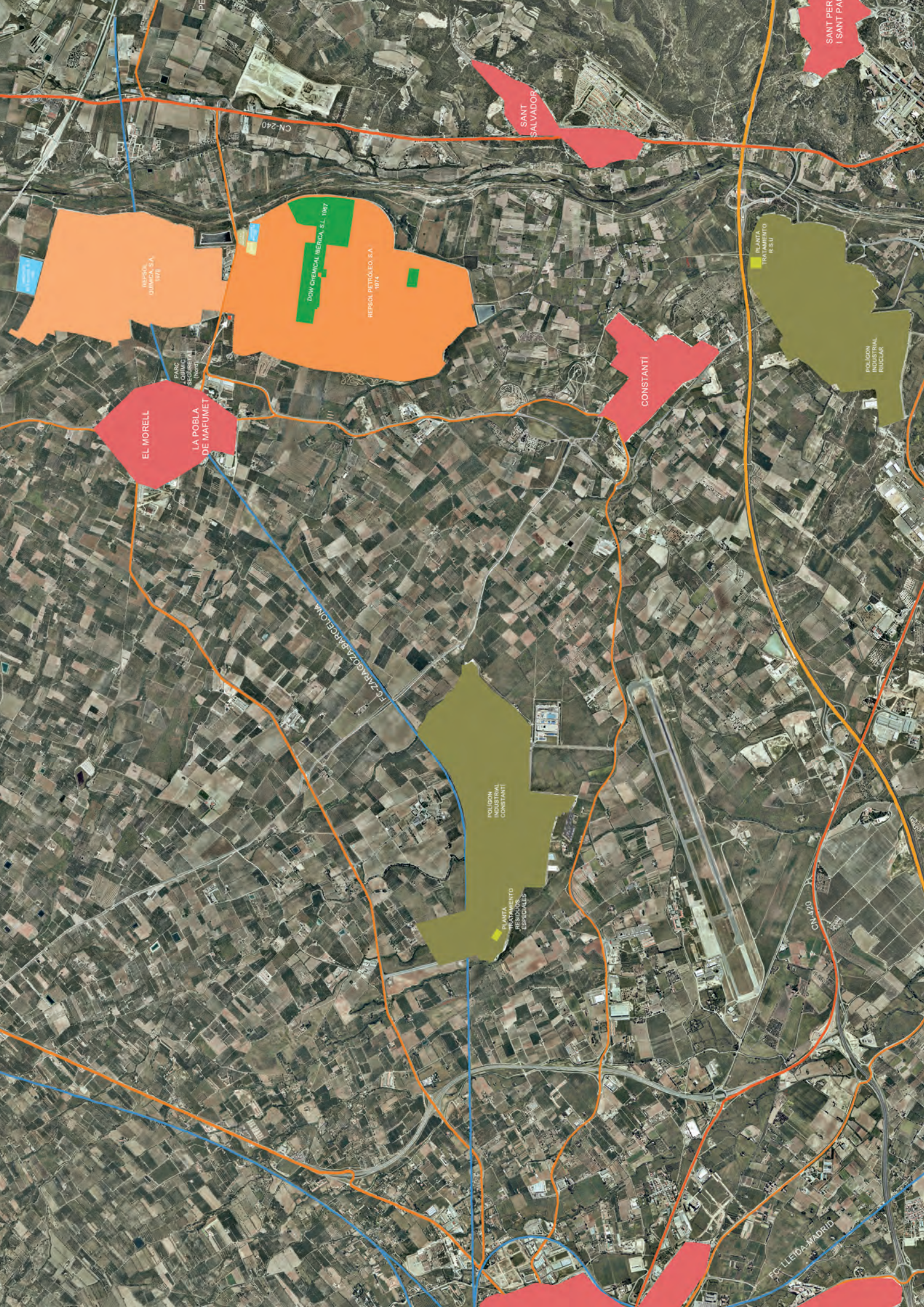


enna, Austria.

| | | |
|---|--------------------------------|---|
|  | from 55 to 300 million barrels | Saudi Arabia - 9,817 thousand barrels/day |
|  | from 10 to 54 millions barrels | Russia - 8,543 thousand barrels/day |
|  | from 2 to 9 million barrels | United States - 7,454 thousand barrels/day |
| | | Iran - 3,853 thousand barrels/day |
| | | China - 3,396 thousand barrels/day |
| | |  OPEC member countries |

✓ Now, we will divide the class into **5 groups** and, following the teacher's instructions, you will rotate throughout the different positions.





EL MORELL
LA POBLA DE MAFUMET

SANT SALVADOR

SANT PERI
I SANT PAU

INDUSOL QUÍMICA S.A. 1978
DOW QUÍMICA (MÉRICA) S.L. 1987
MÉRICA PETROLÍO S.A. 1974

CONSTANTÍ

POLÍGON INDUSTRIAL RUCIAR
PLANTA TRATAMIENTO R.S.U.

POLÍGON INDUSTRIAL CONSTANTÍ
PLANTA TRATAMIENTO ESPECIALES

PARK QUÍMIC SECURETAL (Nort)

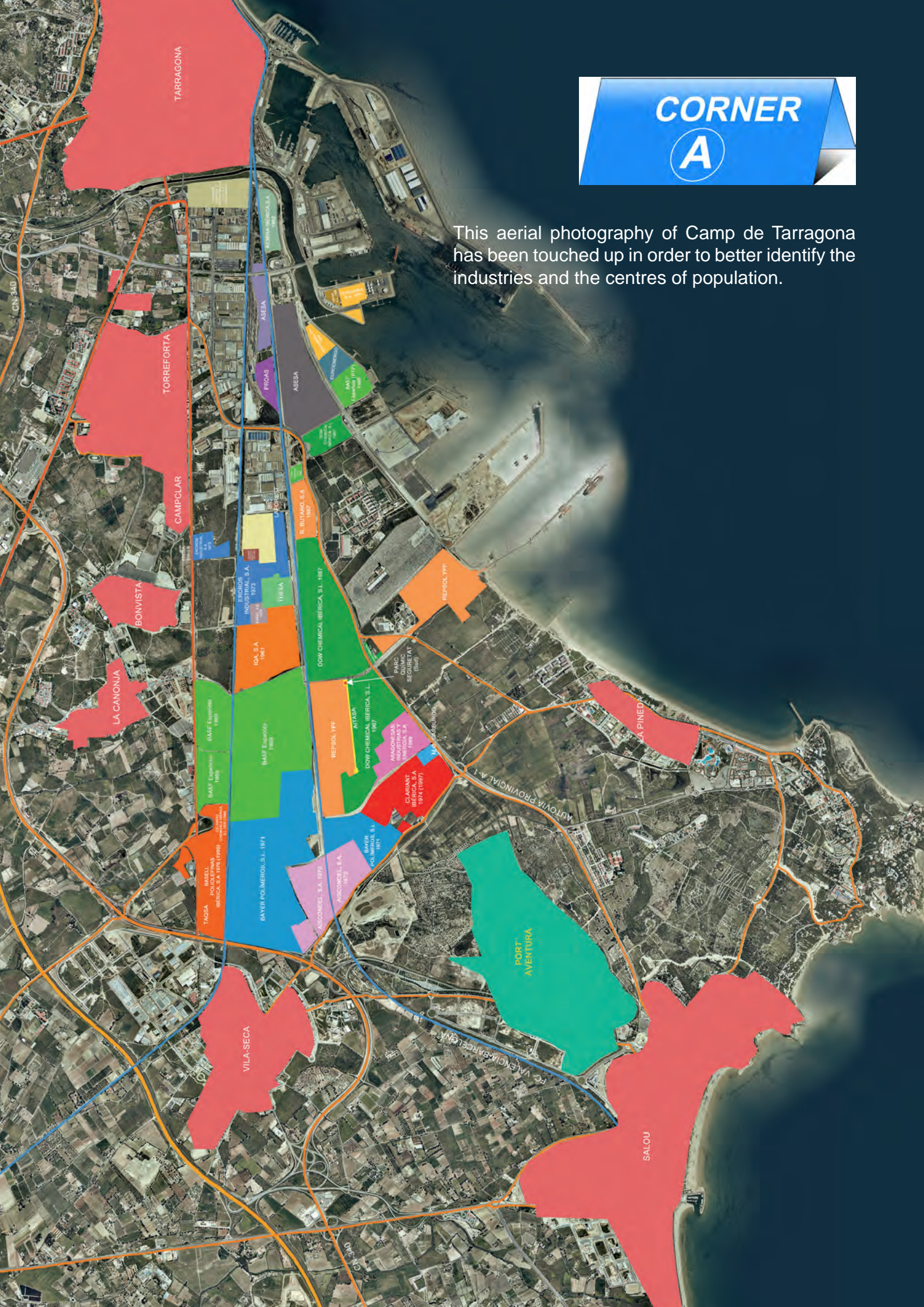
FC-ZARAGOZA-BURGOS

CIV-420

FC-LLEIDA-MADRID

CORNER A

This aerial photography of Camp de Tarragona has been touched up in order to better identify the industries and the centres of population.



The petrochemical industry of Tarragona

1

Inside the "**Puzzle's pieces**" drawer, you will find the elements of the industrial areas and the settlements. The elements inform you about the name and year of establishment of each industry.

Place each element on its corresponding place over the aerial photography.

2

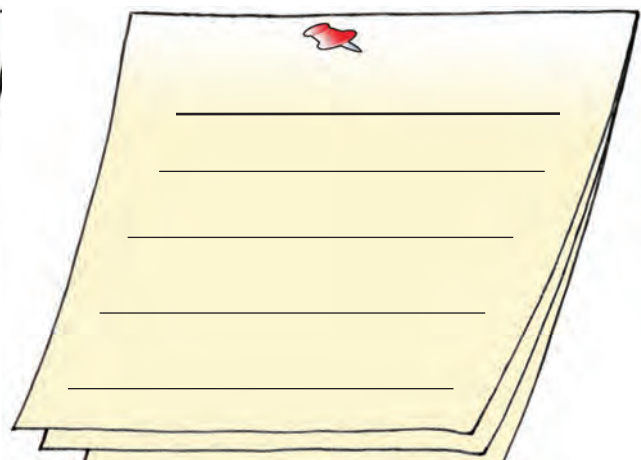
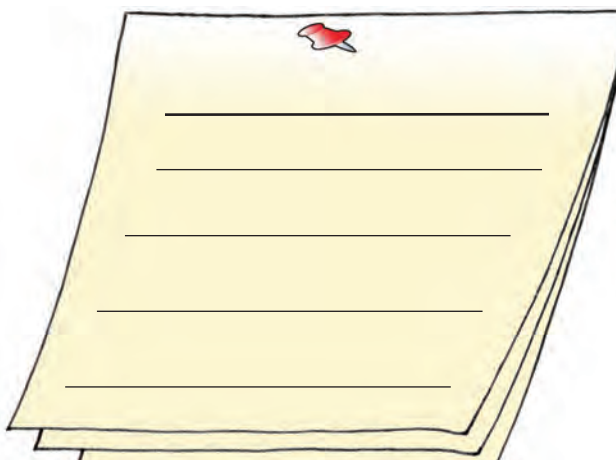
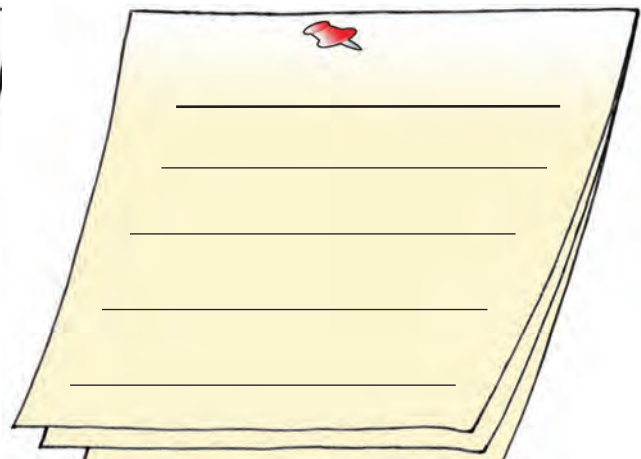
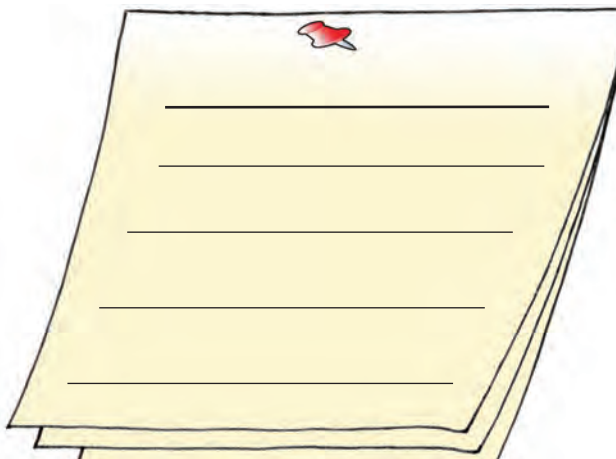
Inside the "**Chemical products**" drawer, you will find some jars with samples of intermediate products. Place them according to the company which makes them.

3

Place on each industry the application of its production that you will find in the "**Applications**" drawer.

4

Select 4 industries and write down their names and their products names. You should try to not repeat them.



5

Locate and mark the following elements on the orthophotomap:



Natural elements

- Francolí river
- Mediterranean Sea
- Coastline



Infrastructures

- A-7 Mediterranean Motorway
- N-340
- N-240
- Airport
- Port
- Railway
- Asesa's Dock
- Repsol's Dock



Industrials areas

- South
- Riu Clar
- North
- Constantí



Tourism business

- Port Aventura



Centres of population

TOWNS

- La Pobla de Mafumet
- El Morell
- Constantí
- Vila-seca
- La Canonja

NEIGHBORHOODS

- Sant Salvador
- Sant Pere i St Pau
- Torreforta
- La Granja
- Camp Clar
- Bonavista



Answer the following questions:

- Which was the first industry of this industrial area? _____
- Which chemical industry has the largest area? _____
- Which one is closer to the centres of population? _____
- Which of the two petrochemical areas has the largest area? _____



Write down the applications of the production from the companies that you have chosen in section 4, using the information from the cards.

| |
|---------------------|
| Applications |
|---------------------|

Company: _____

Company: _____

Company: _____

Company: _____



Once in front of the mockup, pay attention to the drawing that you have below: it is the plan of a petrochemical company. Make up the mockup with the different buildings and signs.

1

Share out the informatives cards (1-9) that you will find inside the 0 drawer, called "INFORMATIVE CARDS".

2

Open the drawer that responds to your card.

3

Follow the instructions in the card:
a. Place the pieces in the correct place.
b. Find out tis function.
c. Put the cards in the correct place.
d. Mark your working area in the diagram.

4

Once the mockup is made up, you have to explain the whole process to the rest of the group.

5

Everyone has to put all the material (the cards, the pieces and the informative cards) into the correspoding drawer.

6

Read the text on the next page and place the numbers on the corresponding white gaps of the mockup.

1. Initial process

The **oil tanker** (1) docks in the **jetty** (2) and unloads the oil, which is led throughout a **rack** (3) to a big **deposit** (4) surrounded by a **tray** (5).

2. Distillation plant

The crude oil arrives to the first **distillation column** (6) where it is divided into: atmospheric residues, diesel, naphta and gases. The atmospheric residue enters the **vacuum unit** (7) where fuel, diesel, kerosene, naphta and gases are obtained. The **final products** like petrol are stored in **tanks** (8) and the **intermediate products** like naphta are stored in another **tank** (9). This process is watched from the **control room** (10).

3. Transformation plant: From naphta to gases

The naphta goes into the **furnaces** (11), where it is broken, and obtains: ethane, propylene, and benzene. Fumes from combustion are expelled by the **chimney** (12).

4. Petroleum gases' distillation plant

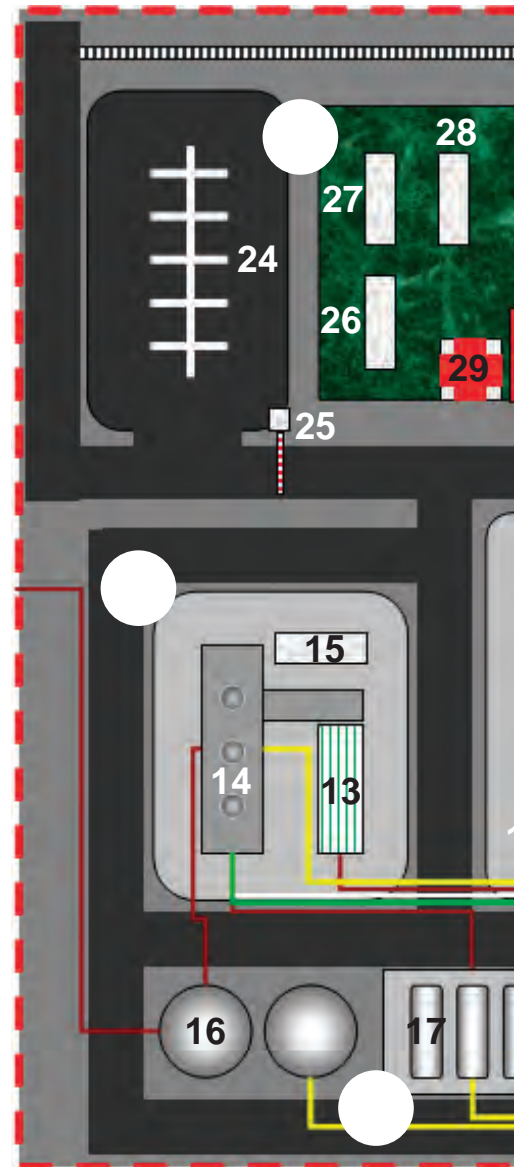
The hot gases from the furnace enter to the **refrigeration unit** (13) and then to the **distillation columns** (14), obtaining ethylene, propane, butane and other gases. Everything is controlled from the **control room** (15).

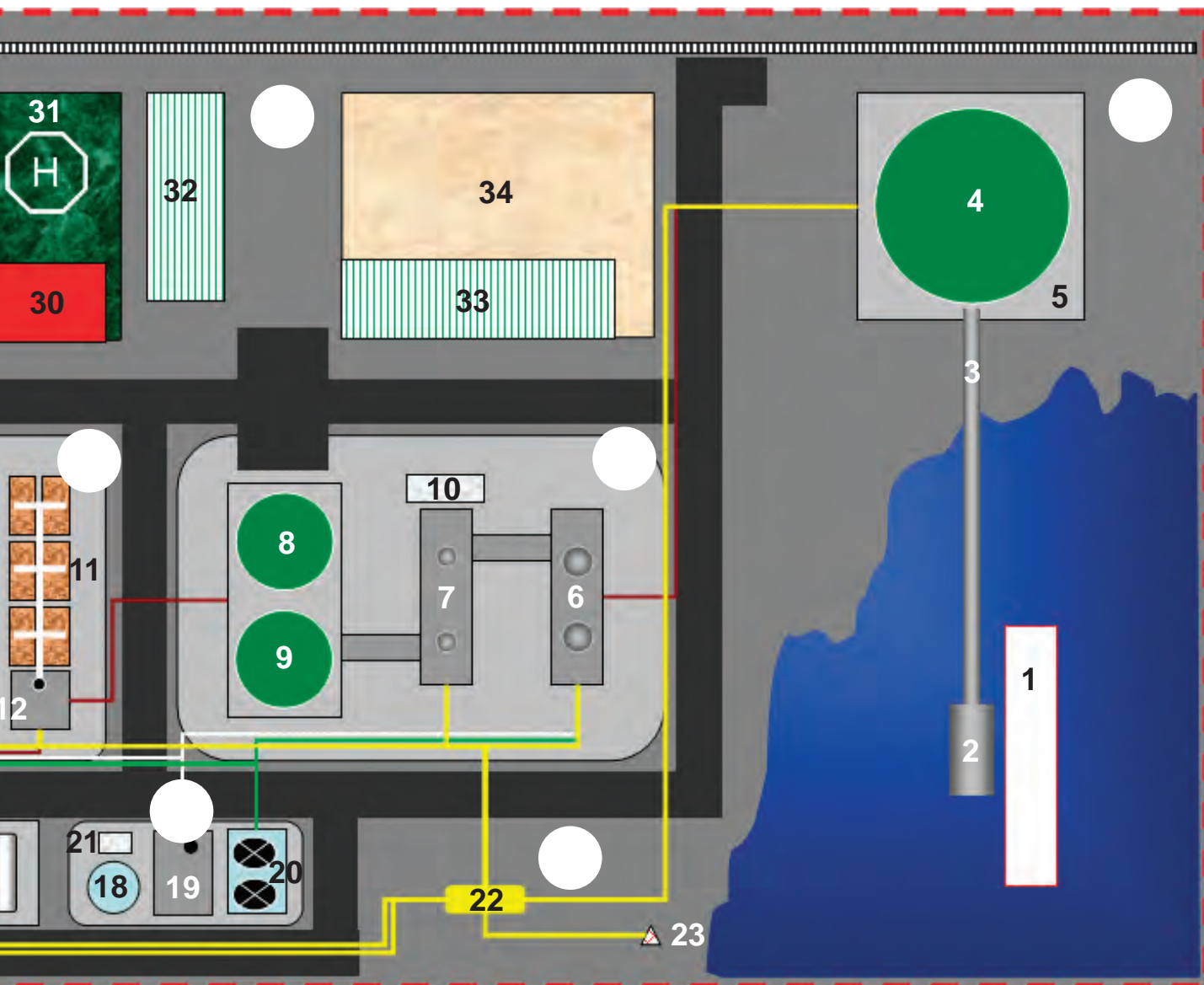
5. Storage unit

Petroleum gases, such as methane and natural gas, are stored in **sphere tanks** (16). Liquefied gases, such as propane or butane, are stored in **LGP tanks** (17).

6. Water unit

The **water tank** (18) provides water to **steam boilers** (19) and to the **cooling tower** (20). There is also a **control room** (21).





7. Safety area

The products that have not been processed for any reason are collected through yellow pipelines and carried to a **tank** (22). Then these products are sent to the **torch** (23) to be burned and, therefore, flammable gases are not released directly to the atmosphere.

8. Service area


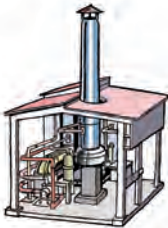
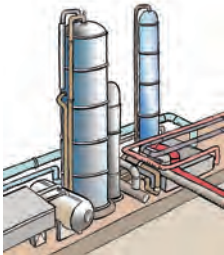


There is a **car park** (24), an **access control** (25), a **cafeteria** (26), a **formative classroom** (27), a **management building** (28), a **nurse's office** (29), a **fire station** (30) and an **heliport** (31).


9. Warehouse and workshop area

Here we find a **covered workshop** (32), an **outdoor warehouse** (34), and a **covered warehouse** where raw material, additives and other materials are stored (33).

4

Identify these images, locate them in the correct zone and explain briefly their function.

| Image | Zone | Function |
|---|--|-------------------|
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |

| Image | Zone | Function |
|---|--|-------------------|
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |
|  | <p>SERVICES <input type="radio"/></p> <p>STORAGE <input type="radio"/></p> <p>PRODUCTION <input type="radio"/></p> | <hr/> <hr/> <hr/> |



1

Look at the table with spheres and match the products with its corresponding color.

The diagram features a large orange circle containing several smaller white circles with text. Four colored spheres are also present, each with text written on it. The white circles contain the following text: Oil, Polyethylene pellet, Naphta, Polystyrene pellet, Styrene, Tar, Sodium, Ethylene, Sea salt, Chlorine, Sodium hydroxide, Naphta, Oil, Polypropylene pellet, Propylene, and Tooth-paste tube. The colored spheres contain the following text: Packaging (red), Tooth-paste tube (yellow), Syringe (blue), and Bleach (green).

2

Now you can write down the four routes that we have followed:

Routes



| | | | | |
|-----------------------|--|--|--|--|
| Raw materials | | | | |
| Intermediate products | | | | |
| Final product | | | | |

3

Classify the following products:

| | | | | | |
|----------|-------|----------|---------|----------|--------|
| G | Gases | L | Liquids | S | Solids |
|----------|-------|----------|---------|----------|--------|

| | | | | | |
|--|----------|--|--------------|--|------------------|
| | Sea salt | | Polyethylene | | Sodium hydroxide |
| | Sodium | | Polystyrene | | Propylene |
| | Chlorine | | Ethylene | | Tar |
| | Naphta | | Styrene | | Polypropylene |

4

Match the product with its chemical formula:

- | | | | |
|---------------------|--------------------------|--------------------------|-----------------|
| Chlorine | <input type="checkbox"/> | <input type="checkbox"/> | $(H_2C=CH_2)_n$ |
| Sodium | <input type="checkbox"/> | <input type="checkbox"/> | Cl_2 |
| Styrene | <input type="checkbox"/> | <input type="checkbox"/> | $C_6H_5CH=CH_2$ |
| Ethylene | <input type="checkbox"/> | <input type="checkbox"/> | Na |
| Polypropylene | <input type="checkbox"/> | <input type="checkbox"/> | $H_2C=CH_2$ |
| Polyethylene | <input type="checkbox"/> | <input type="checkbox"/> | $(C_3H_5)_n$ |
| Methane | <input type="checkbox"/> | <input type="checkbox"/> | C_2H_6 |
| Ethane | <input type="checkbox"/> | <input type="checkbox"/> | CH_4 |
| Bezene | <input type="checkbox"/> | <input type="checkbox"/> | C_6H_6 |

5

Look at the 3 buckets of pellet and touch carefully the material inside them. Pick up some pellet from each bucket and put it into a bag. You can keep it.

6

Now look at the showcases with plastics inside. Write down 8 objects that you identify.

| | |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |



1

Look at the cylinders representing the seven different types of plastic. Write down the characteristics of each one.









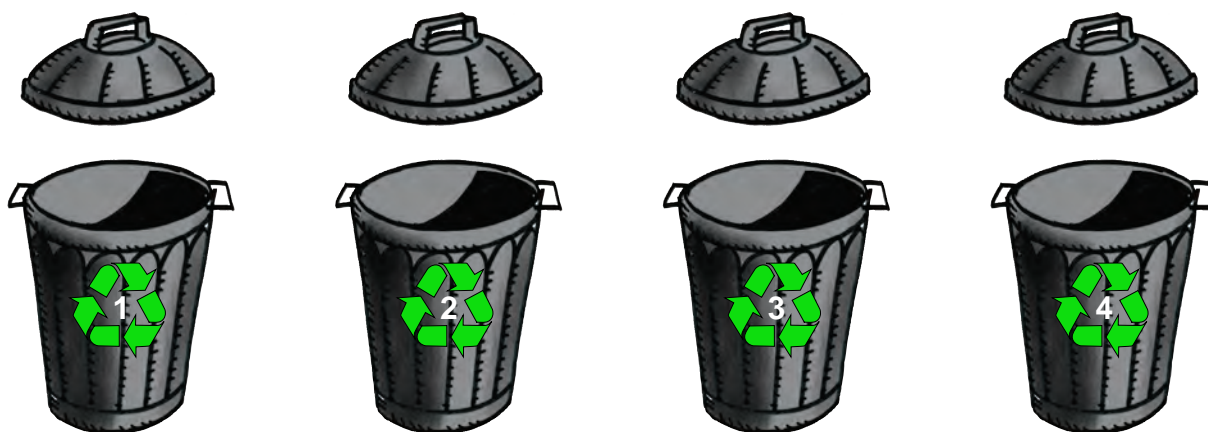


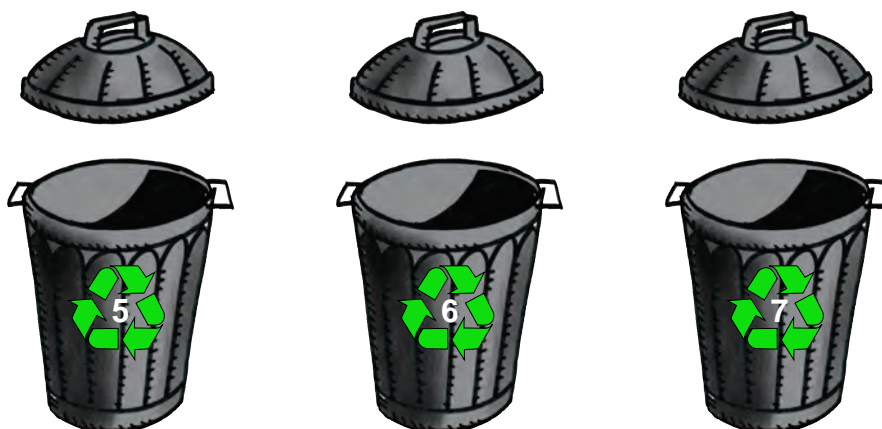




2

- Read the diptych.
- Write down below the bin:
 - the chemical name
 - the type of plastic
 - the abbreviation



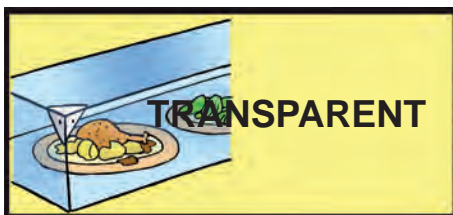


3

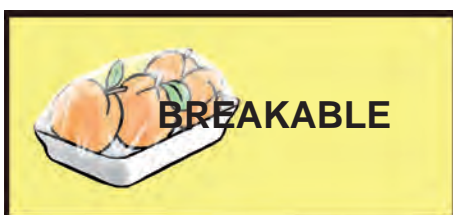
Classify the products that you have touched depending on what they are:













Come to an agreement with your groupmates and choose one of these experiences:

Experiment 1. What do astronauts and babies have in common?




Experiment 2. Surprise!



Experiment 3. Let's make a plastic!



 Follow the instructions, and good luck! 



ACTIVITY

"What do astronauts and babies have in common?"

OVERVIEW

We observe the reaction of absorption of Sodium Polyacrylate with water. Then we examine the properties of reagents and products.

ORGANIZATION

This activity should be performed around a table in groups of 3 or 4 students.

OBJECTIVES

- To introduce the application of a polymer.
- To carry out the process of absorption of liquids.
- To compare the physical properties of reagents and products.

DURATION

8 minutes approx.

REQUIRED MATERIAL

INDIVIDUAL

Student's booklet

SHARED

- 1 container to collect solid residues.
- 1 container to collect dirty material.
- 1 paper roll.

FOR THE GROUP

- 1 worktray
- 1 bottle of 50 ml with **blue sticker** (Sodium Polyacrylate)
- 1 water dispenser bottle of 500 ml
- 1 plastic, large spoon
- 1 plastic glass of 250 ml
- 1 piece of paper

WARNING

The manipulation of these products does not have known toxic effects. However, do not taste them or put them in contact with your eyes or skin. Wash your hands with water and soap once the activity has finished.

PROCEDURE

1. Add 2 tops of solid material from the bottle with the **blue sticker** to the large, plastic glass. Observe the properties of this reagent and write them down on the data table.
2. Fill immediately the 3/4 part of the glass. Stir the mixture until you observe no change. Observe carefully. Describe everything you see.

3. Observe the properties of the new product and write down on the data table.
4. Which uses and applications do you think the *Sodium Polyacrylate* may have?

5. Dump the waste materials to the container that you have on the table.
6. Clean the measured containers, the glasses, the spoons and the mold, and then put them inside the box on the table.
7. Once you have finished the activities, wash your hands.

DATA TABLE

| Reagent's properties | Product's properties |
|----------------------|----------------------|
| <hr/> | <hr/> |
| <hr/> | <hr/> |
| <hr/> | <hr/> |
| <hr/> | <hr/> |
| <hr/> | <hr/> |



ACTIVITY

"Surprise"

OVERVIEW

You will obtain a synthetic foam from simultaneous cross-linked polymerisation reaction and foaming process. We will examine the reagents' and the products properties.

ORGANIZATION

This activity should be performed around a table in groups of 3 or 4 people.

OBJECTIVES

- To introduce a polymers' transformation technique.
- To carry out a foaming process.
- To compare the characteristics of reagents and products.

DURATION

8 minutes approx.

REQUIRED MATERIAL

INDIVIDUAL

Student's booklet

SHARED

- 1 container to pick up solid residues
- 1 container to pick up dirty material
- 1 paper roll

FOR THE GROUP

- 1 worktray
- 1 dispenser bottle of 250 ml of **Reagent B** (*Sodium Borate* solution)
- 1 dispenser bottle of 250 ml of **Reagent C** (*Polyvinyl Alcohol* solution)
- 1 bottle of 50 ml with a **red sticker** (*Sodium Bicarbonate*)
- 1 bottle of 50 ml with a **yellow sticker** (*aluminium*)
- 1 dispenser bottle of 500 ml with water
- 2 calibration containers
- 2 small, plastic spoons
- 1 metallic mold
- 2 plastic glasses of 100 ml
- 1 piece of paper

PROCEDURE

1. Measure 10 ml of **Reagent C** with a calibration container and pour it into glass 1. Measure 10 ml of water with the calibration container, pour into glass 1, and stir it with the spoon.
2. Add 2 tops from the solid of the **red sticker's** bottle to glass 1, and stir it with the same spoon. Observe the properties of the mixture and write them down on the data table. Pour the content of glass 1 into the metallic mold.
3. Measure 10 ml of **Reagent B** with another calibration container and pour it into the glass.
4. Add 1 top from the solid of the **yellow sticker's** bottle to glass 2, and stir it with the spoon. Observe the properties of the mixture and write them down on the data table. Pour the content from glass 2 into the metallic mold and observe carefully. Describe everything you observe.

5. Which uses and applications do you think the foam may have?

6. Dump the residues to the container on the table.
7. Wash the calibration containers, the spoon and the metallic mold, and put everything in the container on the table.
8. Once you have finished the activities, wash your hands.

DATA TABLE

| Reagent's properties | | Product's properties |
|----------------------|-------------------|----------------------|
| Glass 1's mixture | Glass 2's mixture | Foamed polymer |
| <hr/> | <hr/> | <hr/> |
| <hr/> | <hr/> | <hr/> |
| <hr/> | <hr/> | <hr/> |
| <hr/> | <hr/> | <hr/> |
| <hr/> | <hr/> | <hr/> |



ACTIVITY

"Let's make a plastic"

OVERVIEW

We will obtain a cross-linked polymer from polyvinyl acetate and we will examine the reagents' and the products' properties.

ORGANIZATION

This activity should be performed around a tables in groups of 3 or 4 people.

OBJECTIVES

- To introduce the concept "polymerisation".
- To carry out a process to obtain polymers.
- To compare the physical properties of the reagents and the products.

DURATION

8 minutes approx.

REQUIRED MATERIAL

INDIVIDUAL

Student's booklet

SHARED

- 1 container to collect solid residues
- 1 container to collect dirty material
- 1 paper roll

FOR THE GROUP

- 1 worktray
- 250 ml dispenser bottle **Reagent A** (glue solution -*polyvinyl acetate*-)
- 250 ml dispenser bottle of **Reagent B** (*Sodium borate* solution)
- 2 calibration containers
- 1 small, plastic spoon
- 3-4 little "minigrip" bags
- 1 piece of paper

WARNING

The manipulation of these products does not have known toxic effects. However, do not taste them or put them in contact with your eyes or skin. Wash your hands with water and soap once the activity has finished.

PROCEDURE

1. Shake the **Reagent A's** (glue) bottle about 20 seconds. Then, pour 10 ml of **Reagent A** (glue) in a calibration container.
2. Pour 5 ml of **Reagent B** (*Sodium borate*) in another calibration container. Observe the properties of the two reagents and write them down on the data table.
3. Add the **Reagent B** (*borate*) to **Reagent A** and stir it with the spoon until you see no change. Observe carefully. Can you see any temperature changes? Describe everything you observe.

4. Take the plastic out from the container and observe its properties. Then write them down into the data table.
5. Which uses and applications may have the plastic that you have made?

6. Dump the residues to the container on the table.
7. Wash the calibration containers and the spoon, and put them into the container on the table.
8. Once you have finished the activities, wash your hands.

DATA TABLE

| Reagents' properties | | Product's properties |
|----------------------|---------------|----------------------|
| Glue | Sodium borate | New polymer |
| <hr/> | <hr/> | <hr/> |
| <hr/> | <hr/> | <hr/> |
| <hr/> | <hr/> | <hr/> |
| <hr/> | <hr/> | <hr/> |
| <hr/> | <hr/> | <hr/> |

Now we are going to start the second part of our field work:

- Tidy up everything and leave it as you found it.
- Take your booklet.
- Prepare your notebook and your writing material.
- Be ready to take the bus.
- Durant the trip: **OBSERVE, LISTEN, TAKE NOTES...**

NOTES FROM THE ROUTE

Mark in every point the elements that you think that can be important for the location of the industry that we are going to visit:

✓ Infrastructures

| | | | | | |
|---------------|--|------------|--|-----------|--|
| Motorway | | Local road | | Airport | |
| Highway | | Railway | | Pipe rack | |
| National road | | Port | | Bridges | |

✓ Uses of the land

| | | | | | |
|------------|--|-----------|--|--------------------|--|
| Farming | | Wasteland | | Natural vegetation | |
| Industrial | | Urban | | Forests | |

✓ Traffic density and more abundants vehicles

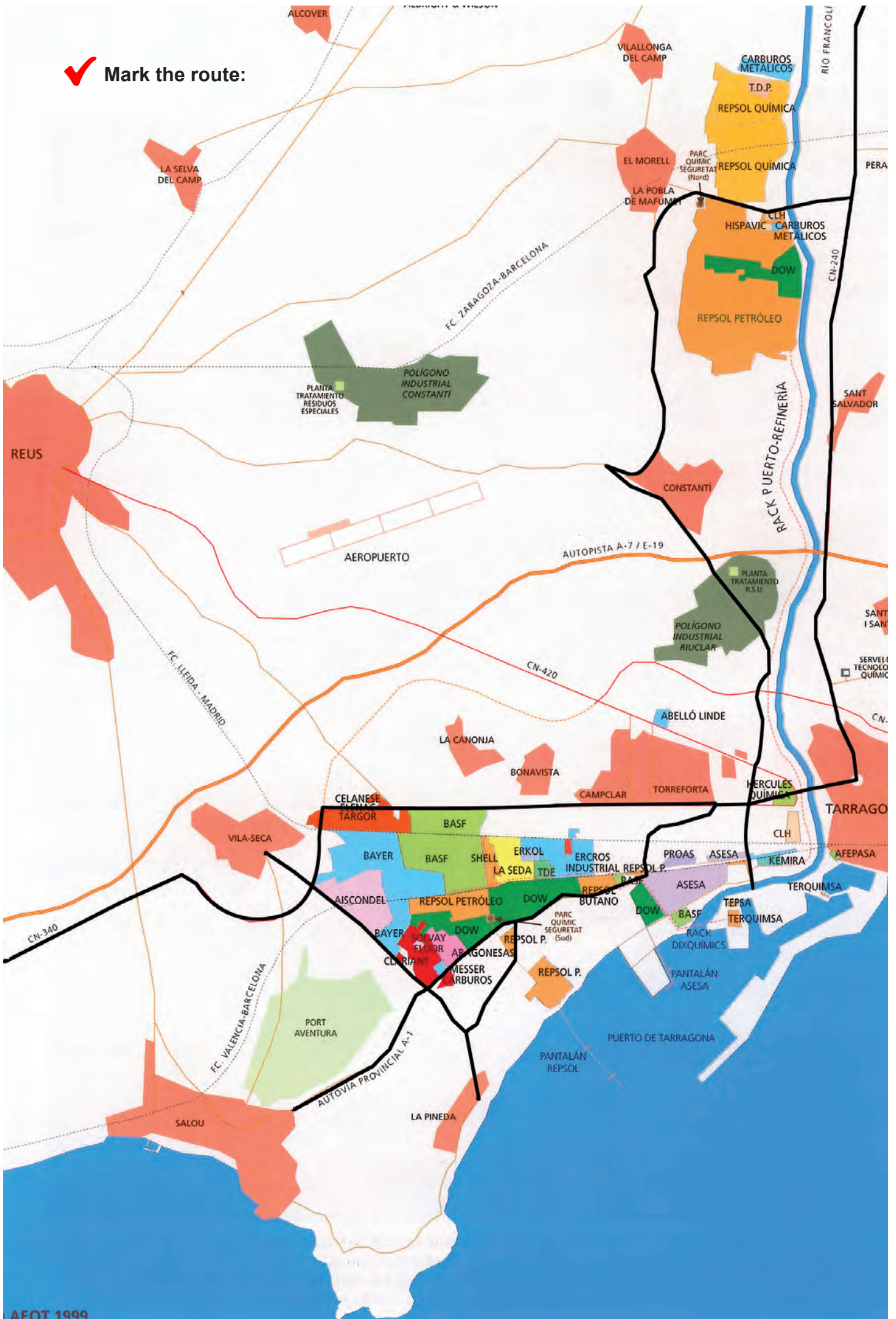
| | | | | | |
|------------|--|--------------|--|----------|--|
| Impossible | | Low | | Trucks | |
| Very high | | Very low | | Trailers | |
| High | | Sporadic | | Buses | |
| Medium | | Non-existent | | Cars | |

✓ Centres of population

| | | | | | |
|------|--|----------------|--|-------------------|--|
| City | | Neighbourhood | | Residential areas | |
| Town | | Block of flats | | Detached houses | |

✓ Petrochemical industries that you have located

✓ Mark the route:



OBSERVATIONS OF THE LANDSCAPE FROM THE GAS STATION

You are looking at a landscape that has changed a lot. Try to identify the main elements.

✓ Mark everything you recognize:

✓ Natural elements

| | | | | | | | |
|-----------|--|-------|--|-------|--|---------|--|
| Mountains | | River | | Plain | | Forests | |
|-----------|--|-------|--|-------|--|---------|--|

✓ Anthropic elements

Irrigation farming:

| | | | | | | | |
|-------------|--|------------|--|-------------|--|----------------|--|
| Olive trees | | Vegetables | | Fruit trees | | Hazelnut trees | |
|-------------|--|------------|--|-------------|--|----------------|--|

Dryland farming:

| | | | | | | | |
|-------------|--|---------|--|--------------|--|----------|--|
| Olive trees | | Cereals | | Almond trees | | Vineyard | |
|-------------|--|---------|--|--------------|--|----------|--|

Population:

| | | | | | | | |
|-------|--|---------------|--|----------------|--|-----------------|--|
| Towns | | Neighborhoods | | Country houses | | Detached houses | |
|-------|--|---------------|--|----------------|--|-----------------|--|

Petrochemical industry:

| | | | | | | | |
|-------|--|------------|--|--------------------|--|---------|--|
| Tanks | | Chimney | | Distillation tower | | Torches | |
| Pipes | | Water tank | | Cooling tower | | Furnace | |

✓ Make a list with all the elements of this landscape that you consider have not changed and which can be a good evidence of how this place was before the establishment of the industry:

✓ Mark the elements that you recognize:



OBSERVATIONS OF THE LANDSCAPE FROM LA PINEDA'S BREAKWATER

We are in the beach of La Pineda, in Salou. This place has always been devoted to leisure and fun. Currently, it is an important tourist area.

Once we have reached our point of observation, turn your back to the sea and observe the landscape on your right. After a few minutes, try to explain it from your sensations:

| | | | |
|-------|-----------|------------|----------|
| Quiet | Calm | Heavy | Happy |
| Sad | Beautiful | Disturbing | Insecure |

Do the same with the left side of the breakwater:

| | | | |
|-------|-----------|------------|----------|
| Quiet | Calm | Heavy | Happy |
| Sad | Beautiful | Disturbing | Insecure |

Which changes do you think will take place in the future?

What can we do to improve this landscape?

PREPARING THE VISIT TO THE INDUSTRY

Today you have learned about the petrochemical industries around you. Surely, this activity has raised some questions, for instance: how many people work there, which is the work schedule, how do they treat environmental issues, which final products do they offer, with security systems do they have, etc.



Set out your questions to the person in charge of the industry that we are going to visit.

FUTHER WORKS

The petrochemical industry of Tarragona

As a final assessment, one of the following exercises is proposed. Following your teacher's instructions, you can either do the whole exercise or just some parts.

A) Elaborate a research report about petroleum and our lives.

You may want to follow this outline:

1. Origin of the petroleum.
2. Extraction and transformation processes.
3. Distribution of the main oilfields over the world. Distillation: Oil transformation into products.
4. Petroleum products.
5. Determinants when installing an oil refinery.
6. Basic procedure of an oil refinery.
7. Area of the petrochemical industry of Tarragona
8. Location of the petrochemical areas in Tarragona.
9. Members of AEQT.
10. List of products made by petrochemical industries and their function.
11. Direct, indirect and induced works that petrochemical industries generate.
12. Financial investments.
13. Sales on the State market and exports.

You can do your presentation on paper, PowerPoint, video, etc. Your teacher will assess the content, but also your creativity and clarity.

B) Five questions to develop:

1. Influence of the petrochemical industries on the number of new jobs: direct, indirect and induced.
2. Order, from least to most, the industries according to their productive capacity.
3. Investigate the main products that each industry produces and their functions.
4. Risk and safety measures that the petrochemical industries involve for the surrounding population.
5. Value the positive and negative aspects that the installation of the petrochemical area in Tarragona has entailed.

C) Collect and analyse news about the petrochemical industries of Tarragona from *Diari de Tarragona* newspaper during the last three years.

You can look up in the Local Newspaper Library.

D) A detailed analysis of the personal and domestic objects. Observe which ones are petroleum products and which one are not. What would you do without them?

You can choose one of these options:

1. Analysis in the classroom of the things we take with us and everything around us.
2. Analysis of your room and wardrobe.
3. Analysis of your house.



In collaboration with:

