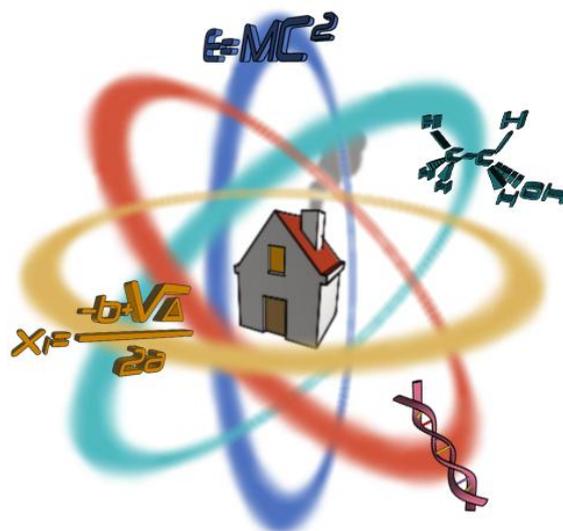


Faculté Des Sciences De Gabès



# English for Science



**Diploma: Fundamental License in Chemistry**



**Level: 3<sup>rd</sup> Year Student**



**Course designer: Mrs. Sonia ASLJ**



**Academic Year 2013 – 2014**

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⊗ **Reading comprehension**

⊗ **Translation**

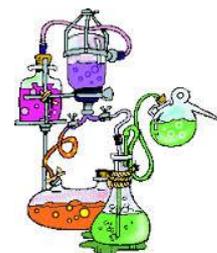
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*Skills:*

⊗ **Reading comprehension**

⊗ **Writing: MAKING PRESENTATION**

# Chapter 1: LABORATORY



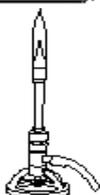
*Do you know the names of any items you can see below and which can be found in a common chemical laboratory? Fill in the blanks with the words from the list below*

1.



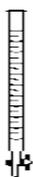
\_\_\_\_\_ are useful as a reaction container or to hold liquid or solid samples. They are also used to catch liquids from titrations and filtrates from filtering operations.

2.



\_\_\_\_\_ are sources of heat.

3.



\_\_\_\_\_ are for addition of a precise volume of liquid. The volume of liquid added can be determined to the nearest 0.01 mL with practice.

4.



\_\_\_\_\_ are placed on a ring attached to a ring stand as a support for a funnel, crucible, or evaporating dish.

5.



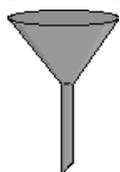
\_\_\_\_\_ are for addition of liquids drop by drop

6.



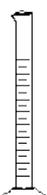
\_\_\_\_\_ are useful to contain reactions or to hold liquid samples. They are also useful to catch filtrates.

7.



\_\_\_\_\_ are for funneling liquids from one container to another or for filtering when equipped with filter paper.

8.



\_\_\_\_\_ are for measurement of an amount of liquid. The volume of liquid can be estimated to the nearest 0.1 mL with practice.

9.



\_\_\_\_\_ are used to dispense small quantities of liquids.

10.



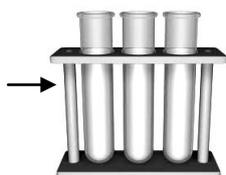
\_\_\_\_\_ with rings or clamps are for holding pieces of glassware in place.

11.



\_\_\_\_\_ are for holding small samples or for containing small-scale reactions.

12.



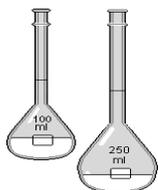
\_\_\_\_\_ are for holding test tubes when tubes should not be touched

13.



\_\_\_\_\_ are similar in function to forceps but are useful for larger items.

14.



\_\_\_\_\_ are used to measure precise volumes of liquid or to make precise dilutions.

15.



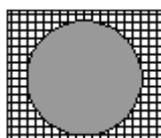
\_\_\_\_\_ are used for dispensing small quantities of distilled water.

16.



\_\_\_\_\_ are for holding small samples or for covering beakers or evaporating dishes.

17.



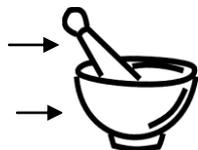
\_\_\_\_\_ on a ring supports beakers to be heated by Bunsen burners

18.



When you're doing experiments that involve using harmful chemicals or fire, you need \_\_\_\_\_ to protect your eyes.

19.



\_\_\_\_\_ and \_\_\_\_\_ is predominantly used to crush and blend substances together.

Wire Gauze - Burettes - Droppers - Glass Funnels - Graduated Cylinders - Pipettes - Ring Stand - Mortar and Pestle - Erlenmeyer Flasks - Test Tube Holders - Tongs - Bunsen Burners - Eye Goggles - Watch Glasses - Volumetric Flasks - Beakers - Wash Bottles - Clay Triangles - Test Tubes

*Match the following verbs in column A with the nouns in column B.*

| A               | B                            | C         |
|-----------------|------------------------------|-----------|
| 1. To evaporate | a. Your eyes                 | 1. + ...  |
| 2. To pour      | b. A glass vessel            | 2. + ...  |
| 3. To measure   | c. Electricity               | 3. + ...  |
| 4. To separate  | d. Some water                | 4. + ...  |
| 5. To protect   | e. A liquid into a container | 5. + ...  |
| 6. To collect   | f. Gases inside              | 6. + ...  |
| 7. To conduct   | g. Chemicals                 | 7. + ...  |
| 8. To support   | h. The mass of an object     | 8. + ...  |
| 9. To scratch   | i. A mixture                 | 9. + ...  |
| 10. To transfer | j. The test tubes            | 10. + ... |

*Sort this laboratory equipment into the columns:*

- |                     |                  |              |          |            |
|---------------------|------------------|--------------|----------|------------|
| goggles             | lab tongs        | pestle       | cylinder | spot plate |
| Petri dish          | thermometer      | balance      | funnel   | flask      |
| polarography        | evaporating dish | test tube    | beaker   | dissector  |
| furnace             | stirring rod     | watch glass  | pipette  | centrifuge |
| crucible            | hydrometer       | ring clamp   | wire     | gauze      |
| burner              | flint lighter    | wash bottle  | hood     | spatula    |
| conductivity tester | weighing paper   | filter paper |          |            |

| Glassware | Porcelain | Tools and Utilities | Apparatuses |
|-----------|-----------|---------------------|-------------|
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |
| .....     | .....     | .....               | .....       |

## TRANSLATION:

---

*Translate into French the following items*

| English                 | French                |
|-------------------------|-----------------------|
| 1. Lab tongs            | pincés de laboratoire |
| 2. Pestle               | .....                 |
| 3. Cylinder             | .....                 |
| 4. Spot plate           | .....                 |
| 5. Petri dish           | .....                 |
| 6. Thermometer          | .....                 |
| 7. Goggles              | .....                 |
| 8. Balance              | .....                 |
| 9. Funnel               | .....                 |
| 10. Flask               | .....                 |
| 11. Evaporating dish    | .....                 |
| 12. Polarography        | .....                 |
| 13. Beaker              | .....                 |
| 14. Dissector           | .....                 |
| 15. Furnace             | .....                 |
| 16. Stirring rod        | .....                 |
| 17. Test tube           | .....                 |
| 18. Watch glass         | .....                 |
| 19. Pipette             | .....                 |
| 20. Centrifuge          | .....                 |
| 21. Crucible            | .....                 |
| 22. Hydrometer          | .....                 |
| 23. Ring clamp          | .....                 |
| 24. Wire                | .....                 |
| 25. Gauze               | .....                 |
| 26. Burner              | .....                 |
| 27. Flint lighter       | .....                 |
| 28. Wash bottle         | .....                 |
| 29. Hood                | .....                 |
| 30. Spatula             | .....                 |
| 31. Conductivity tester | .....                 |
| 32. Weighing paper      | .....                 |
| 33. Filter paper        | .....                 |

# LANGUAGE: Prepositions

## Prepositions – Time

| English           | Usage  | Example   |
|-------------------|--|---|
| on                | days of the week   | on Monday   |
| in                | months / seasons<br>time of day<br>year<br>after a certain period of time ( <i>when?</i> ) | in August / in winter<br>in the morning<br>in 2006<br>in an hour      |
| at                | for <i>night</i><br>for <i>weekend</i><br>a certain point of time ( <i>when?</i> )         | at night<br>at the weekend<br>at half past nine                       |
| since             | from a certain point of time (past till now)   | since 1980  |
| for               | over a certain period of time (past till now)  | for 2 years   |
| ago               | a certain time in the past   | 2 years ago   |
| before            | earlier than a certain point of time   | before 2004   |
| to                | telling the time   | ten to six (5:50)   |
| past              | telling the time   | ten past six (6:10)   |
| to / till / until | marking the beginning and end of a period of time  | from Monday to/till Friday  |
| till / until      | in the sense of <i>how long something is going to last</i>                                 | He is on holiday until Friday.  |
| by                | in the sense of <i>at the latest</i><br>up to a certain time                               | I will be back by 6 o'clock.<br>By 11 o'clock, I had read five pages. |

## Prepositions – Place (Position and Direction)

| English | Usage  | Example   |
|---------|--|---|
| in      | room, building, street, town, country<br>book, paper etc.<br>car, taxi<br>picture, world   | in the kitchen, in London<br>in the book<br>in the car, in a taxi<br>in the picture, in the world   |
| at      | meaning <i>next to, by an object</i><br>for <i>table</i><br>for events<br>place where you are to do something typical (watch a film, study, work)                                | at the door, at the station<br>at the table<br>at a concert, at the party<br>at the cinema, at school, at work  |
| on      | attached<br>for a place with a river<br>being on a surface<br>for a certain side (left, right)<br>for a floor in a house<br>for public transport<br>for <i>television, radio</i> | the picture on the wall<br>London lies on the Thames.<br>on the table<br>on the left<br>on the first floor<br>on the bus, on a plane<br>on TV, on the radio |

|                     |  |   |
|---------------------|--|---|
| by, next to, beside | left or right of somebody or something   | Jane is standing by / next to / beside the car.   |
| under               | on the ground, lower than (or covered by) something else   | the bag is under the table  |
| below               | lower than something else but above ground   | the fish are below the surface  |
| over                | covered by something else<br>meaning <i>more than</i><br>getting to the other side (also <i>across</i> )<br>overcoming an obstacle | put a jacket over your shirt<br>over 16 years of age<br>walk over the bridge<br>climb over the wall |
| above               | higher than something else, but not directly over it   | a path above the lake   |
| across              | getting to the other side (also <i>over</i> )<br>getting to the other side   | walk across the bridge<br>swim across the lake  |
| through             | something with limits on top, bottom and the sides   | drive through the tunnel  |
| to                  | movement to person or building<br>movement to a place or country<br>for <i>bed</i>   | go to the cinema<br>go to London / Ireland<br>go to bed   |
| into                | enter a room / a building  | go into the kitchen / the house   |
| towards             | movement in the direction of something (but not directly to it)  | go 5 steps towards the house  |
| onto                | movement to the top of something   | jump onto the table   |
| from                | in the sense of <i>where from</i>  | a flower from the garden  |

### Other important Prepositions

| English | Usage   | Example   |
|---------|---|---|
| from    | who gave it   | a present from Jane                               |
| of      | who/what does it belong to<br>what does it show                       | a page of the book<br>the picture of a palace     |
| by      | who made it   | a book by Mark Twain                              |
| on      | walking or riding on horseback<br>entering a public transport vehicle | on foot, on horseback<br>get on the bus           |
| in      | entering a car / Taxi   | get in the car                                    |
| off     | leaving a public transport vehicle                                    | get off the train                                 |
| out of  | leaving a car / Taxi  | get out of the taxi                               |
| by      | rise or fall of something travelling                                  | prices have risen by 10 percent<br>by car, by bus |
| at      | for <i>age</i>  | she learned Russian at 45                         |
| about   | for topics, meaning <i>what about</i>                                 | we were talking about you                         |

# Activities

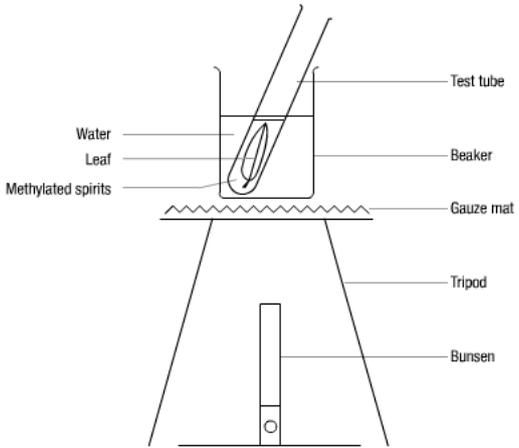
# above from beside Prepositions before near beyond



Chemistry experiments usually require a large number of chemicals and numerous pieces of equipment. It is important when writing a method that all the steps and equipment are included for safety and time management reasons.

"about," "above," "across," "after," "against," "along," "among," "around," "at," "before," "behind," "below," "beneath," "beside," "between," "beyond," "but," "by," "despite," "down," "during," "except," "for," "from," "in," "inside," "into," "like," "near," "of," "off," "on," "onto," "out," "outside," "over," "past," "since," "through," "throughout," "till," "to," "toward," "under," "underneath," "until," "up," "upon," "with," "within," and "without."

Using any of the prepositions in the word bank above write at least 4 sentences describing the placement of each piece of equipment in the diagram. For example "The Bunsen is **under** the tripod" "the tripod sits **under** the beaker, but **above** the Bunsen".




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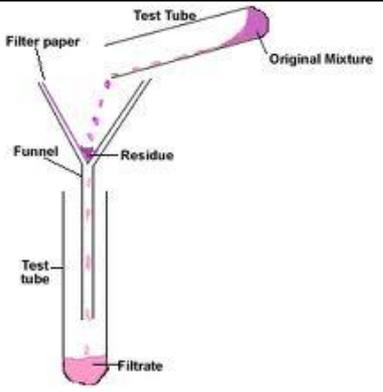
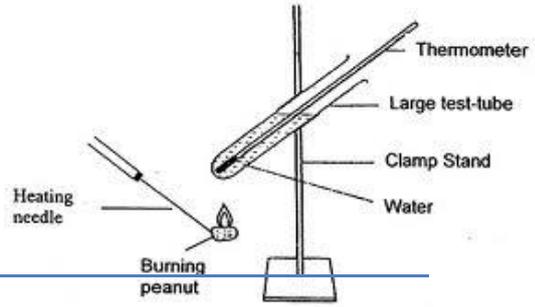
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# WRITING

## Writing an informal letter

Look at the organization of this letter. We begin all letters with *Dear...*, your address, and the date; but not your name.

The diagram illustrates the structure of an informal letter. On the left, there are boxes with labels, and on the right, there is a sample letter. Lines connect the labels to the corresponding parts of the letter.

**Labels on the left:**

- Introduction
- Where you live
- Who you live with
- What your family does
- What you do
- What you like
- Your hobbies and interests
- What you're doing at the moment
- Ending
- You can end a letter to a friend with *Best wishes* or *Regards*, or *Love*, if you know them well.
- Your signature

**Sample letter on the right:**

38 Clifton Gardens  
London NW6 4GT

27 September

Dear Maria

I'm very pleased that we're going to be penfriends. I'll tell you a little about myself, and you can do the same when you write to me.

I live in an area of London called Maida Vale. It's quite near the centre, but there are parks nearby where I take my dog, Mickey, for a walk. I live with my parents and my younger brother, Paul. My father works for the post office and my mother has a part-time job as a nurse.

I go to the local comprehensive school, where I have a lot of friends. I like most subjects, but not all of them! In the evenings I sometimes visit friends or stay at home and listen to music, and at the weekends I like going swimming or horse-riding.

At the moment I'm working very hard because I have exams soon, so I'm spending a lot of time in the library!

I'm looking forward to hearing from you!

Write soon!

Best wishes

Francis Jones

### Practice:

Write a similar letter to a pen friend in England. Your pen friend can be male or female.

Write about these things:

- ⊗ You
- ⊗ Where you live
- ⊗ What you do
- ⊗ What hobbies
- ⊗ Your family

# Lab Safety

Decide whether the following safety rules and recommendations are a **GOOD/ BAD** or even **DANGEROUS** piece of advice.

1. If you want to dilute sulphuric acid, pour water slowly into the acid.
2. For work with unpleasant or dangerous vapours plug your nose with cotton properly.
3. If any chemicals get in your eyes, flush them with running water and inform the teacher or colleague what happened.
4. In case of fire try to find some good shelter (e.g. under the sink) and wait.
5. If you want to warm some meal in the lab, don't put it in the furnace together with any chemicals.

| <b>Lab Safety Rules</b>   |  |
|---|--|
| <p><b>GENERAL GUIDELINES</b></p>   | <ol style="list-style-type: none"> <li>1. Conduct yourself in a responsible manner at all times in the laboratory.</li> <li>2. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, <b>ASK YOUR TEACHER BEFORE PROCEEDING WITH THE ACTIVITY.</b></li> <li>3. Never work alone in the laboratory. No student may work in the science classroom without the presence of the teacher.</li> <li>4. When first entering a science room, do not touch any equipment, chemicals, or other materials in the laboratory area until you are instructed to do so.</li> <li>5. Perform only those experiments authorized by your teacher. Carefully follow all instructions, both written and oral. Unauthorized experiments are not allowed.</li> <li>6. Do not eat food, drink beverages, or chew gum in the laboratory. Do not use laboratory glassware as containers for food or beverages.</li> </ol> |
|    | <ol style="list-style-type: none"> <li>7. Be prepared for your work in the laboratory. Read all procedures thoroughly before entering the laboratory. Never fool around in the laboratory. Horseplay, practical jokes, and pranks are dangerous and prohibited.</li> <li>8. Always work in a well-ventilated area.</li> <li>9. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times.</li> </ol>  |



10. Be alert and proceed with caution at all times in the laboratory. Notify the teacher immediately of any unsafe conditions you observe.

11. Dispose of all chemical waste properly. Never mix chemicals in sink drains. Sinks are to be used only for water. Check with your teacher for disposal of chemicals and solutions.

12. Labels and equipment instructions must be read carefully before use. Set up and use the equipment as directed by your teacher.

13. Keep hands away from face, eyes, mouth, and body while using chemicals or lab equipment. Wash your hands with soap and water after performing all experiments.

## CLOTHING



Protective gear has to be comfortable.



14. Experiments must be personally monitored at all times. Do not wander around the room, distract other students, startle other students or interfere with the laboratory experiments of others.

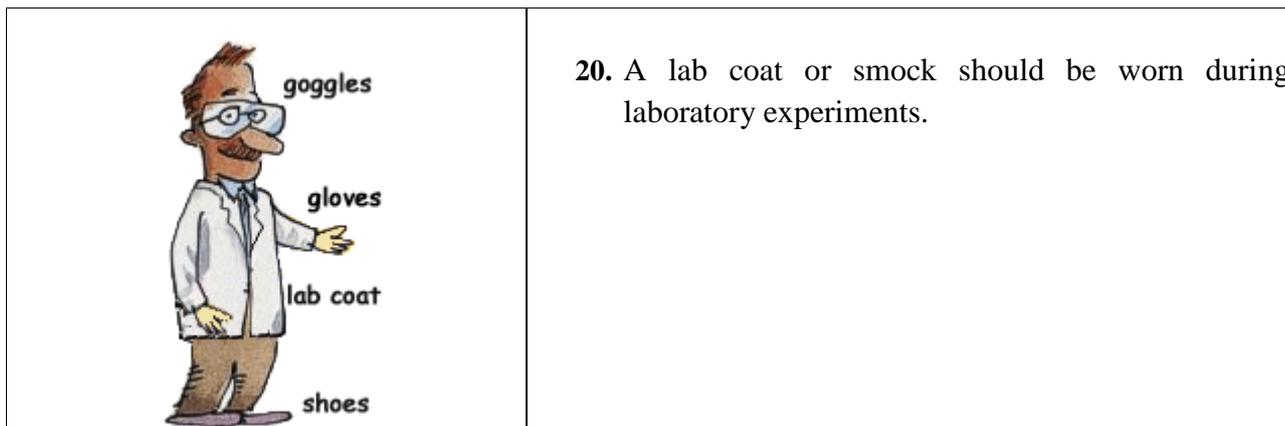
15. Know the locations and operating procedures of all safety equipment including: first aid kit(s), and fire extinguisher. Know where the fire alarm and the exits are located.

16. Know what to do if there is a fire drill during a laboratory period; containers must be closed, and any electrical equipment turned off.

17. Any time chemicals, heat, or glassware are used, students will wear safety goggles. **NO EXCEPTIONS TO THIS RULE!**

18. Contact lenses may be not be worn in the laboratory.

19. Dress properly during a laboratory activity. Long hair, dangling jewelry, and loose or baggy clothing are a hazard in the laboratory. Long hair must be tied back, and dangling jewelry and baggy clothing must be secured. Shoes must completely cover the foot. No sandals allowed on lab days.



20. A lab coat or smock should be worn during laboratory experiments.

**ACCIDENTS AND INJURIES**

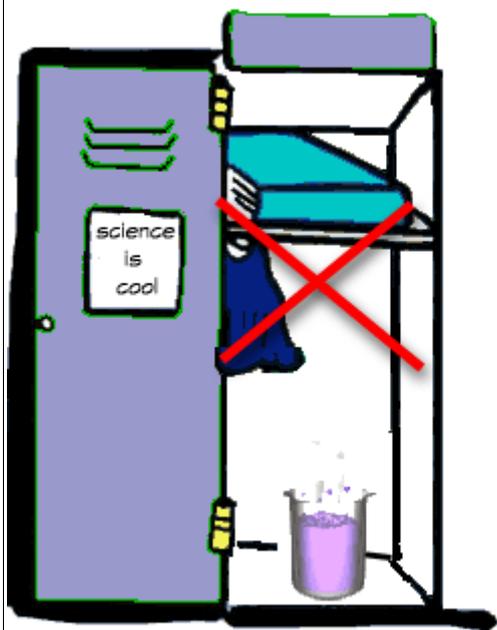


21. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the teacher immediately, no matter how trivial it seems. Do not panic.

22. If you or your lab partner is hurt, immediately (and loudly) yell out the teacher's name to get the teacher's attention. Do not panic.

23. If a chemical should splash in your eye(s) or on your skin, immediately flush with running water for at least 20 minutes. Immediately (and loudly) yell out the teacher's name to get the teacher's attention.

**HANDLING CHEMICALS**



24. All chemicals in the laboratory are to be considered dangerous. Avoid handling chemicals with fingers. Always use a tweezer. When making an observation, keep at least 1 foot away from the specimen. Do not taste, or smell any chemicals.

25. Check the label on all chemical bottles twice before removing any of the contents. Take only as much chemical as you need.

26. Never return unused chemicals to their original container.

27. Never remove chemicals or other materials from the laboratory area.

## READING QUESTIONS

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1. Study the text Lab Safety Rules and underline the expressions you are not familiar with. Can you guess their meaning from the context?
2. Did any of the rules surprise you?
3. Work in pairs or small groups and decide which of the rules are of the most importance. Make a TOP TEN list. Explain why. Then report to the rest of the class.

## LANGUAGE

## Quantifiers

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**Quantifiers are words which show how many things or how much of something we are talking about. They are much, many, (a) little, (a) few, a lot (of), some, any, no, none, both, all, either, neither, each, every.**

### I. Basic uses of “some” and “any”

*Some*

1. Affirmatives: *There are some people waiting outside.*
2. Questions + “yes”: *Would you like some orange juice?*
3. Requests: *May I have some tea?*
4. (=certain): *Some people believe everything*
5. Some=several: *I haven’t phoned my uncle for some years.*

*Any*

1. Negatives: *I don’t want any sugar.*
2. Uncertain questions: *Do you have any money on you?*
3. With “hardly”, etc.: *There’s hardly any rain.*
4. With “at all”: *I haven’t any idea at all.*
5. After “if”: *Buy some apples if you see any.*
6. Any=it doesn’t matter who or which: *Any fool knows the right answer.*

*General statements*

We always use zero in general statements: *Beans are good for you.*

*Not...any, no, none*

1. We can use “no” when we mean “not any”. We use an affirmative verb with no. *There aren’t any buses after midnight. = There are no buses after midnight.*
2. We can also use “no” in place of “not a/an”: *I’m not an expert. = I’m no expert.*
3. None stands on its own as a pronoun: *We have no bananas. We have none.*

We do not use “no of”. Instead we use “none of” or “none” on its own: *None of the films that are shown in town look very interesting*

### II. Basic uses of “much” and “many”

We use “much” with singular uncountable nouns: *much money.*

We use “many” with plural countable nouns: *many trees.*

1. In negative statements: *There isn’t much space in this flat.*  
*There aren’t many pandas in China.*
2. In questions: *Is there much demand for silk stoking?*

*Will there be many guests at the party?*

3. In formal statements: *Much money is spent for shopping.*  
*Many teachers retire early.*
4. In time references: *I've lived here for many years.*
5. With "as...as" *Take as much as you like.*

### **Basic uses of "a lot of" (lots of)**

We use a "lot of" with plural countable or singular uncountable nouns: *a lot of books.*

1. in the affirmative sentences: *There were such a lot of people in the shops.*
  2. In negative statements for emphasis: *I haven't got a lot of time for people like him.*
- If we use a quantifier on its own (not in front of a noun or pronoun) we do not use of:  
*Did you buy any fruit? – Yes, I bought a lot/lots. (Not a lot of)*

### **Basic uses of "little/a little" and "few/a few"**

We use "few" and "a few" with plural countable nouns: *a few friends, few friends.*

We use "little" and "a little" with uncountable nouns: *a little time, little time.*

1. A little means "some but not much", "a small quantity": *He knows a little French.*
2. A few – "a small number" *We are going away for a few days.*

Compare: *I've got a little money* (=some, but not much) Vs. *I've got little money* (=nearly no)

*I've got a few friends* (=some, but not many) Vs. *I've got few friends* (=nearly no)

We sometimes use only with a few and a little: *I've got only a little time.*

### **III. Basic uses of "both" and "all"**

1. We use "both" and "both the" in exactly the same way to refer to two particular people or things (plural countable nouns): *Both children /both the children are in bed.*
2. We use "all + noun" to refer to things in general (=the whole number or amount):  
*All children like to play (plural countable).*  
*All advice is useless (uncountable nouns).*
3. "All the" refers to particular people or things: *All the children in our street like to play (=all the+ plural countable nouns)*  
*All the advice you gave me was useless (=all the+ uncountable noun)*

Three basic positions of "both" and "all" in affirmative sentences

1. After be when it is the only verb in a sentence: *The girls are both ready (=Both girls/Both the girls are ready)*  
*The girls are all ready (=All the girls are ready)*
2. After auxiliaries or the first auxiliary when there is more than one:  
*The boys can both speak French (=Both boys/Both the boys can speak French)*  
*The committee should all have resigned (=All the committee should have resigned)*
3. Before the main verb when there is only one verb: *The girls both left early (=Both girls/Both the girls left early)*  
*The girls all left early (=All the girls left early)*

4. In negative sentences:

Both → neither: *Both the girls left early = Neither of the girls left early*

All → none: *All the girls left early = None of the girls left early*

### All compared with everyone/everybody and everything

1. We rarely use "all" on its own to mean 'everyone/everybody': *Everyone/Everybody wanted Marilyn's autograph. (Not \*All wanted\*)*.
2. All means 'everyone/everybody' when we use other words with it: *All of us/We all agreed to sign the contract. All those who were present were in favor. (= Everyone/Everybody agreed to sign. Everyone/Everybody present was in favor.*
3. We often use all and everything with other words to refer to things: *All/Everything I have belongs to you. He taught me all/everything I know.*  
But note: *He gave me everything*

### IV. Basic uses of "each" and "every"

1. We often use "each" and "every" to refer to two people or things. When referring to more than two we can use both "each" and "every". "Each" suggests 'one by one', 'separately'. "Every" suggests 'all together': *My wife and I each ordered avocado to start with.*  
*Each child at the party had a piece of cake (Every is possible)*  
*Every child in the world loves ice-cream*
2. We must use "every" after *nearly* and after *not*: *Nearly every shop is shut today.*
3. We cannot use "of" after "every" and we cannot use "every" at the end of a sentence: *Each of the child received a present. They received a present each.*

## Activities

### Circle the right variant.

- |   |                                |
|---|--------------------------------|
| 1. Give me ___ milk, please.  | <i>1 any 2 some 3 no 4 –</i>   |
| 2. We have ___ rivers but have ___ lakes.                             | <i>1 some 2 any 3 no 4 –</i>   |
| 3. There is ___ taxi when you need ___                                | <i>1 any 2 – 3 one 4 no</i>    |
| 4. You can find ___ time between six and nine.                        | <i>1 some 2 any 3 no 4 –</i>   |
| 5. When I needed help, he didn't ask ___ questions.                   | <i>1 no 2 some 3- 4 any</i>    |
| 6. You may have ___ tea without milk because there isn't ___ at home. | <i>1 any 2 no 3 one 4 some</i> |
| 7. Ann is much younger than ___ other girls in her class.             | <i>1 some 2 any 3 no 4 –</i>   |
| 8. Shall I help you to ___ fruit?                                     | <i>1 any 2 – 3 some 4 no</i>   |

### In the following sentences, fill in the gaps with one of the following quantifiers:

**MUCH, MANY, A LOT OF, SOME, A LITTLE, LITTLE, A FEW, FEW**

1. It seems to me that we haven't had \_\_\_\_\_ assignments in English this term.
2. How \_\_\_\_\_ material can we be expected to read in one week?
3. I've unfortunately had \_\_\_\_\_ headaches already because of stress.
4. Our yard looks awful this summer. There are too \_\_\_\_\_ weeds.
5. I didn't use \_\_\_\_\_ fertilizer last spring, and that has made a difference.
6. Also, I've paid very \_\_\_\_\_ attention to how \_\_\_\_\_ rain we've had.
7. I'm afraid it's rained \_\_\_\_\_ times this summer, and that is why the grass is turning brown and dying. Farmers are very upset.
8. How \_\_\_\_\_ good would it do if we watered the plants ourselves?
9. \_\_\_\_\_ of the advice I have ever received from so-called "experts" has been useless.
10. They said that just \_\_\_\_\_ help could make a big difference.
11. \_\_\_\_\_ people know as much about computers as Tomas does.

**Choose between every, both, all and each.**

1. \_\_\_\_\_ day he comes here, and \_\_\_\_\_ time he asks me the same question.
2. There was a huge building on \_\_\_\_\_ side of the square, \_\_\_\_\_ having a massive arched gate.
3. \_\_\_\_\_ windows in the house are open.
4. He shook hands and had a few minutes' talk with \_\_\_\_\_ of us.
5. I see him \_\_\_\_\_ day.
6. \_\_\_\_\_ his legs were broken in the accident.
7. You've been given \_\_\_\_\_ opportunity to do well in this company.
8. I've phoned him twice, but he's been out on \_\_\_\_\_ occasion.
9. \_\_\_\_\_ people are mortal.
10. By that time \_\_\_\_\_ his sisters had got married.
11. She had brown shining hair which hung down on \_\_\_\_\_ sides of her face.

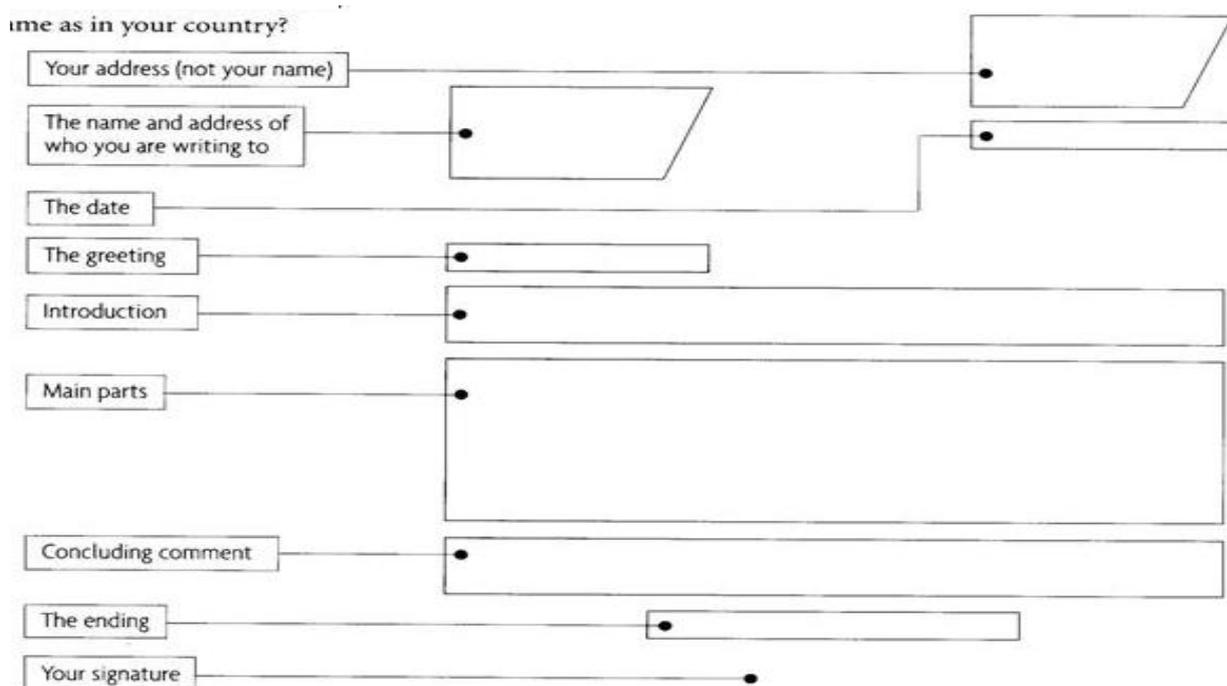
**WRITING**

**Writing a formal letter**

Match the greetings and the endings. Which are formal? Which are informal?

|                         |  |
|-------------------------|--|
| 1. <i>Dear Helen</i>    | a. <i>Yours Bob</i>                        |
| 2. Dear sir or Madam    | b. Yours faithfully<br>Robert J Fleming    |
| 3. <i>Darling Rosie</i> | c. <i>Love Bob</i>                         |
| 4. Dear Ms Mc Donald    | d. <i>Lots of love</i><br><i>Bobby xxx</i> |
| 5. <i>Dear Philip</i>   | e. Yours sincerely<br>Robert Fleming       |

Look at this outline of a formal letter





### Text 3:

## AN INTRODUCTION TO CHEMISTRY



Chemistry is the science that studies the **substances**<sup>1</sup> that make up the universe. Chemists investigate properties of substances to find out what they are made of and how they change under different conditions. Chemists heat and freeze different objects. They also add other substances to the items to see how they react. The basis of chemistry lies in the basic elements that make up everything that exists in the world. All of those elements can be viewed on the periodic table of **elements**,<sup>2</sup> which you will most likely become very familiar with throughout your academic career.

Chemical changes aren't just happening in chemists' labs. They happen all the time in nature. Think about the process of breathing. You inhale oxygen and exhale carbon dioxide. That is chemistry. When you light a fire, wood turns to ashes. A chemical change takes place. These are examples of chemistry on a very basic level. Chemists have been studying chemical changes for a very long time. Chemistry crosses over into many different fields. It's important in medicine, engineering, energy, and **industry**.<sup>3</sup>

Chemistry takes a substance and looks at the molecules that make up that substance. The molecules are then broken down to atoms. Atoms are so tiny that they cannot be seen with the naked eye. You actually need to use a very powerful **microscope**<sup>4</sup> to see an atom. Chemists can bond atoms to each other to see what happens. When an atom is sliced in half, a nuclear reaction occurs. Chemists who discovered how to split an atom in a controlled environment created the atomic bombs that were dropped on Hiroshima and Nagasaki in Japan during World War II. Chemists have also discovered how to create life-saving drugs. Chemistry is a pretty powerful thing.

### READING COMPREHENSION:

---

Tick (✓) the right answer

1. *Chemistry is the study of*

- The process of breathing air in and out.
- The substances that make up the universe.
- How to create medicines and drugs.
- How different sciences relate to each other.

2. *Why does the author describe the process of breathing and lighting a fire?*

- To provide common examples of chemical changes
- To show how many things do not require chemistry
- To contrast the sciences of chemistry and physics
- To explain how complicated the world of chemistry is

- 
- substances** – something that has weight and takes up space
  - elements** – one of the substances that each has its own kind of atom
  - industry** – making or producing goods on a large scale by businesses and factories
  - microscope** – an instrument with a special lens for making a smaller object appear larger

3. Which of the following professionals would most likely NOT use chemistry?

- a. A lawyer
- b. A doctor
- c. A science teacher
- d. An engineer

4. Read the following sentence: “Chemists investigate **properties** of substances to find out what they’re made of and how they change under different conditions.” The word **properties** means

- a. Theories or guesses
- b. Models or fake versions
- c. The best of something
- d. Characteristics or features

5. This passage is mainly about

- a. How chemists split an atom.
- b. How chemical reactions are always taking place.
- c. An introduction to the science of chemistry.
- d. Why people should become chemists.

6. What is one example from the passage of chemical changes in nature?

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7. Explain why the author says that chemistry is “a pretty powerful thing.”

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# Chapter 2: CHEMISTRY BASICS

## Text 1:

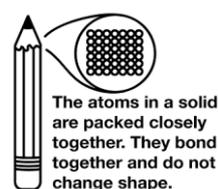
### Why Does Matter Matter?

by Kelly Hashway

What do trees, air, and water have in common? They all have matter. That means they take up space. You might be wondering why these things look so different if they all have matter. Everything found on Earth can be grouped into one of three states of matter: solid, liquid, or gas. In order to figure out which state of matter an object fits in, we have to examine its properties. The properties we look at are shape, mass, and volume. Mass is the amount of matter an object has, and volume is the amount of space the matter takes up.

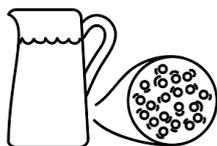
Solids are easy to recognize. They have definite shape, mass, and volume. Trees are solids. They are made up of tiny particles called atoms. These atoms are packed closely together, and they hold the solid in a definite shape that does not change. If you look around your house, you will see lots of solids. Televisions, beds, tables, chairs, and even the food you eat.

#### Solid



#### Liquid

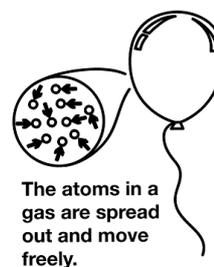
The atoms in a liquid are close together. They slide around.



Liquids do not have definite shape, but they do have definite mass and volume. Liquids are similar to solids because their atoms are close together, but what makes a liquid different is that those atoms can move around. Liquids can change shape by flowing. If you've ever spilled a glass of milk, then you know it spreads out across the floor. It does this because the milk is taking the shape of the floor. Since liquids do not have a definite shape of their own, they will take the shape of their containers. This is why the same amount of milk can look different in a tall glass, a wide mug, or spread out on your kitchen floor.

Gases do not have definite shape or volume. Like liquids, gasses will take the shape of their containers. If a gas is not in a container, it will spread out indefinitely. This is because the atoms in a gas are spaced farther apart than in a solid or a liquid. And being spread out like this allows them to move around freely. Think about the air you breathe every day. That air is spread across the empty space around the earth. You've probably also noticed that you usually cannot see the air. This is another property of gases. Even though we cannot see them, you come in contact with them every day. There's air in the tires of your family car and your bicycle. The sun is made up of gases, and the clouds in the sky are mostly made from water vapor.

#### Gas



When trying to remember the three states of matter, think about water. If it freezes into a solid, it becomes ice. Its atoms are packed together keeping its shape. Of course, we know water can also be a liquid. It flows in rivers or it can be poured from a glass. When water evaporates it becomes water vapor, a type of gas in the air. Try a little experiment of your own by placing an ice cube in a covered glass or container. You will be able to observe the ice first in its solid form and then watch as it melts into a liquid to become water. Eventually the water will turn to water vapor and your glass or container will be filled with this gas.



**You can see three different states of matter in this picture. The pot is made of solid matter. The water inside the pot is liquid.**

**When the liquid is heated it becomes water vapor, which is a gas.**

**Matter is everywhere! Can you find a solid, a liquid, and a gas around you right now?**

## READING COMPREHENSION:

Choose a word from the box to complete each sentence.

|        |       |         |        |        |       |           |        |
|--------|-------|---------|--------|--------|-------|-----------|--------|
| solids | gases | liquids | volume | mass   | shape | container | space  |
| chair  | milk  | ice     | air    | clouds | juice | melting   | atoms  |
|        |       |         |        |        |       |           | matter |

- The three basic properties of matter are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
- All matter is made up of tiny particles called \_\_\_\_\_.
- Volume is the amount of \_\_\_\_\_ that matter takes up.
- Mass is the amount of \_\_\_\_\_ an object has.
- Liquids take the shape of their \_\_\_\_\_.
- \_\_\_\_\_ do not have a definite shape or volume.
- \_\_\_\_\_ do not have a definite shape, but they do have a definite volume.
- \_\_\_\_\_ have a definite shape and volume.
- A \_\_\_\_\_ and \_\_\_\_\_ are examples of solids.
- \_\_\_\_\_ and \_\_\_\_\_ are examples of liquids.
- \_\_\_\_\_ and \_\_\_\_\_ are examples of gas.
- Solid ice is \_\_\_\_\_ when it is changing into a liquid.

Fill in the blanks with the appropriate words

| Verb      | Adjective | Noun   |
|-----------|-----------|--------|
| .....     | .....     | Solid  |
| .....     | .....     | Liquid |
| .....     | .....     | Gas    |
| Examine   | .....     | .....  |
| Freeze    | .....     | .....  |
| Evaporate | .....     | .....  |

Tick the right option

**Properties of Matter** \_\_\_\_\_

- Three states of matter are
- density, weight, and gas
- gas, liquid, and mixture
- solid, liquid, and gas
- buoyancy, mass, shape

**The particles of matter making up a(n)** \_\_\_\_\_ **are packed together tightly.**

- helium
- liquid
- gas
- solid

**The temperature at which a substance changes from a solid to a liquid.**

- boiling point
- melting point
- pure substance

**Which would cause liquid water to change to a solid?**

- warming
- heating
- freezing
- dripping

**How can a liquid become a solid?**

- a. By something removing heat from it and slowing down the particles.
- b. By something removing heat from it and speeding up the particles.
- c. By something adding heat to it and slowing down the particles.
- d. By something adding heat to it and speeding up the particles.

**A SOLID is all matter that has a shape of its own.**

- a. True
- b. False

**Which state of matter is easily compressed and easily changes shape to fill its container?**

- a. solid
- b. liquid
- c. gas
- d. plasma

**An example of a gas is**

- a. chocolate syrup
- b. a rock
- c. pencils
- d. helium

**What type of substance can be poured and takes the shape of its container?**

- a. Liquid
- b. Gas
- c. Solid
- d. Plasma

**Sand is a liquid because it takes the shape of its container.**

- a. True
- b. False

**Sublimation is when a \_\_\_\_\_ changes directly to a \_\_\_\_\_.**

- a. Solid, liquid
- b. Gas, liquid
- c. Plasma, gas
- d. Solid, gas

**LANGUAGE**

**Gerund # Infinitive**

| <b>Gerund</b>  | <b>Infinitive</b>   |
|--|---|
| <p><b>Using a gerund suggests that you are referring to real activities or experiences.</b></p> <ul style="list-style-type: none"> <li>⊗ A gerund is a noun made from a verb by adding "<b>-ing</b>." You can use a gerund as the <b>subject</b>, the <b>complement</b>, or the <b>object</b> of a sentence.</li> </ul> <p>Examples: <u>Reading</u> helps you learn English.<br/> <span style="padding-left: 100px;">subject of sentence</span></p> <p>Her favorite hobby is <u>reading</u>.<br/> <span style="padding-left: 150px;">complement of sentence</span></p> <p>I enjoy <u>reading</u>.<br/> <span style="padding-left: 50px;">object of sentence</span></p> <ul style="list-style-type: none"> <li>⊗ Gerunds can be made negative by adding "<b>not</b>." Examples: <i>He enjoys not working.</i></li> <li>⊗ Some verbs (<i>go enjoy quit discuss mind can't stand suggest...</i>) are followed by gerunds as objects.</li> </ul> | <p><b>Using an infinitive suggests that you are talking about potential or possible activities or experiences.</b></p> <ul style="list-style-type: none"> <li>⊗ Infinitives are the "<b>to</b>" form of the verb. You can also use an infinitive as the <b>subject</b>, the <b>complement</b>, or the <b>object</b> of a sentence.</li> </ul> <p>Examples: <u>To learn</u> is important.<br/> <span style="padding-left: 100px;">subject of sentence</span></p> <p>The most important thing is <u>to learn</u>.<br/> <span style="padding-left: 150px;">complement of sentence</span></p> <p>He wants <u>to learn</u>.<br/> <span style="padding-left: 50px;">object of sentence</span></p> <ul style="list-style-type: none"> <li>⊗ Infinitives can be made negative by adding "<b>not</b>." Examples: <i>I decided not to go.</i></li> <li>⊗ Some verbs (<i>promise plan refuse want</i></li> </ul> |

|   |   |
|---|---|
| <p>Examples: <i>She suggested going to a movie.</i></p> <p>☸ When you use a verb after a preposition in a sentence, use a gerund.</p> <p>Examples: "<i>He ended his speech by thanking everyone.</i>"</p>   | <p><i>need decide hope...</i>) are followed by infinitives. Examples: <i>She wants to go to a movie.</i></p> <p>☸ Use an infinitive verb (<i>without to</i>) with modal verbs</p> <p>Examples: "<i>We could go shopping tomorrow.</i>"</p> <p>☸ We use <i>to + infinitive</i> after an adjective / adverb + <i>enough</i>.</p> <p>Examples: "<i>Simon isn't old enough to drive.</i>"</p> |
| <p>We use the Gerund or the Infinitive after the following verbs with no difference in the meaning: <b><i>start, can't bear, can't stand, cease, continue, intend, love, hate, prefer, neglect, and propose.</i></b></p> <p>Examples: <i>He began talking.</i><br/><i>He began to talk.</i></p> |   |
| <p>Some verbs have different meaning when used with Gerund or Infinitive: <b><i>forget, go on, remember, regret, stop, and try.</i></b></p>   |   |

| Word              | Infinitive meaning   | Gerund meaning  |
|-------------------|--|---|
| forget / remember | with regard to the future<br><i>Remember to switch off the lights.</i> | with regard to the past<br><i>Do you remember switching off the lights?</i> |
| go on             | start something new<br><i>Go on to read.</i>                           | continue with the same action<br><i>Go on reading.</i>                      |
| regret            | with regard to the future<br><i>I regret to say that.</i>              | with regard to the past<br><i>I regret saying that.</i>                     |
| stop              | interrupt another action<br><i>I stopped to smoke.</i>                 | terminate<br><i>I stopped smoking.</i>                                      |
| try               | do something complicated<br><i>Try to solve this riddle.</i>           | do it and see what happens<br><i>Try talking to him.</i>                    |

## Activities

**Decide whether to use Infinitive (with/without to) or Gerund.**

- 1) What can we do \_\_\_\_\_ (live) a healthy life?
- 2) In our society, people spend more and more time \_\_\_\_\_ (work).
- 3) So we often don't bother \_\_\_\_\_ (prepare) healthy meals.  
In order to save time, we tend \_\_\_\_\_ (buy) fast food.
- 4) At fast food restaurants, we can \_\_\_\_\_ (eat) quite a lot without \_\_\_\_\_ (have) \_\_\_\_\_ (pay) a fortune.
- 5) And children enjoy \_\_\_\_\_ (eat) chips and burgers and \_\_\_\_\_ (drink) lemonade and cola.
- 6) That's a problem because \_\_\_\_\_ (eat) habits are hard \_\_\_\_\_ (shake)
- 7) The high amount of carbohydrates in fast food and sugary drinks is blamed for \_\_\_\_\_ (destabilize) the body's regulation of appetite.
- 8) So we keep on \_\_\_\_\_ (want) \_\_\_\_\_ (eat) more.

- 9) Bad \_\_\_\_\_ (eat) habits result in people \_\_\_\_\_ (become) obese.
- 10) Obese people risk \_\_\_\_\_ (suffer) from heart diseases.
- 11) We can avoid \_\_\_\_\_ (risk) such diseases by \_\_\_\_\_ (choose) \_\_\_\_\_ (eat) healthy food.
- 12) Be careful though. Some people are convinced \_\_\_\_\_ (do) something for their health by \_\_\_\_\_ (live) on energy bars or cornflakes.
- 13) And this is what the advertising for these products wants \_\_\_\_\_ (make) us think.
- 14) In reality, however, these foods are often heavily sugared \_\_\_\_\_ (give) them flavor.
- 15) But sugar is not mentioned as clearly as the low fat - that's why experts warn against \_\_\_\_\_ (rely) on the ads.
- 16) \_\_\_\_\_ (live) a healthy life, we ought \_\_\_\_\_ (choose) our food wisely.
- 17) We should \_\_\_\_\_ (eat) regular meals and try \_\_\_\_\_ (find) ways of \_\_\_\_\_ (exercise) more.

***Complete the sentences with the correct form (infinitive or gerund) of the verb.***

Early automobiles

Many inventors were trying \_\_\_\_\_ (build) gas-powered, self-propelled vehicles in the late 1800's. A French inventor succeeded in \_\_\_\_\_ (create) a steam-powered tricycle in 1769. A German engineer, Nicklaus August Otto, is known for \_\_\_\_\_ (invent) the four-stroke gas-powered engine in 1876. Both Gottlieb Daimler and Carl Benz managed \_\_\_\_\_ (build) and \_\_\_\_\_ (sell) autos in Germany in the 1880s.

By 1898 there were 50 companies responsible for \_\_\_\_\_ (market) cars in the United States alone. That number happened \_\_\_\_\_ (expand) to 241 by 1908. It was in 1908 when Henry Ford started \_\_\_\_\_ (make) automotive history. It was in that year that he managed \_\_\_\_\_ (put) together the first assembly line and \_\_\_\_\_ (lower) the price of automobiles so that everyone could buy one. He began \_\_\_\_\_ (arrange) workers so that they could each do a small part of the job in sequence. This prevented \_\_\_\_\_ (repeat) a log of unnecessary steps in the assembly process. By 1913 he managed \_\_\_\_\_ (produce) 250,000 cars a year. His first mass-produced car, the Model T, guaranteed \_\_\_\_\_ (give) modest-incomed Americans decent transportation for a reasonable (\$500 USD!) price.

Henry Ford went on \_\_\_\_\_ (lead) the U.S. automobile industry for many years. Though he tried, he failed \_\_\_\_\_ (get) elected to the U.S. Senate in 1918. His company was started with just \$28,000 and, by 1913, managed \_\_\_\_\_ (pay) dividends of \$11 million.

While Ford declined \_\_\_\_\_ (give) away more than a modest amount during his lifetime, the Ford Foundation arranges \_\_\_\_\_ (donate) millions of dollars each year to deserving causes.



## Basic mathematical symbols

*Study the mathematical expressions and chemical formulas.*

| Symbol   | Name                            | Explanation   | Examples                      |  |
|----------|---------------------------------|---|-------------------------------|--|
|          | Read as                         |   |                               |  |
|          | Category                        |   |                               |  |
| =        | equality                        | $x = y$ means $x$ and $y$ represent the same thing or value.                | $1 + 1 = 2$                   |  |
|          | is equal to; equals             |   |                               |  |
|          | everywhere                      |   |                               |  |
| $\neq$   | inequation                      | $x \neq y$ means that $x$ and $y$ do not represent the same thing or value. | $1 \neq 2$                    |  |
|          | is not equal to; does not equal |   |                               |  |
|          | everywhere                      |   |                               |  |
| <        | strict inequality               | $x < y$ means $x$ is less than $y$ .  | $3 < 4$<br>$5 > 4$            |  |
|          | >                               |   |                               | is less than, is greater than, is much less than, is much greater than |
|          |                                 |   |                               | order theory   |
| +        | addition                        | $4 + 6$ means the sum of 4 and 6.   | $2 + 7 = 9$                   |  |
|          | plus                            |   |                               |  |
|          | arithmetic                      |   |                               |  |
| -        | sub(s)traction                  | $9 - 4$ means the sub(s)traction of 4 from 9.                               | $8 - 3 = 5$                   |  |
|          | minus                           |   |                               |  |
|          |                                 |   |                               |  |
| ·<br>(x) | multiplication                  | $3 \cdot 4$ means the multiplication of 3 by 4.                             | $7 \cdot 8 = 56$              |  |
|          | times, multiplied by            |   |                               |  |
|          | arithmetic                      |   |                               |  |
| :, ÷ (/) | division                        | $6 \div 3$ or $6/3$ means the division of 6 by 3.                           | $2 \div 4 = .5$<br>$12/4 = 3$ |  |
|          | divided by                      |   |                               |  |
|          | arithmetic                      |   |                               |  |

|               |                                   |                                     |                               |
|---------------|-----------------------------------|-------------------------------------|-------------------------------|
| <b>--&gt;</b> | resulting in                      | Na+Cl --> means Na and Cl give..... | $H_2 + Cl_2 \rightarrow 2HCl$ |
|               | <b>give(s)</b> , leads to, yields |                                     |                               |
|               | chemical equations                |                                     |                               |

Note: chemical formulas can also be read with the help of spelling: e.g. 2 FeCl<sub>3</sub> could be read as two molecules of [ef i: si: el ɪri:]

**Mathematical expressions:**

3<sup>2</sup> three squared, three to the power of two, three to the second (power)

3<sup>3</sup> three cubed, three to the power of three, three to the third (power)

3<sup>4</sup> three to the power of four, three to the fourth (power)

$\sqrt[n]{z}$  the n-th root of z

3/5 three divided by five, three fifths

3.25 three point two five

4,034 four thousand and thirty four

524<sup>th</sup> five hundred and twenty-fourth

**Check if you can read and write the expressions correctly:**

a/ read the following: 5,023 - 15.012 - 3/5 - 6H<sub>2</sub>O<sub>2</sub> - 3H<sub>2</sub>SO<sub>3</sub> -  $\sqrt[3]{1} = 1$  - 45/173 - 7<sup>6</sup> - 15,123,014 - 1.012 - 2KClO<sub>3</sub>  $\rightarrow$  2KCl + 3O<sub>2</sub>

b/ write in full:

14.023 \_\_\_\_\_

144th \_\_\_\_\_

7/6 \_\_\_\_\_

17x30 \_\_\_\_\_

25,306 \_\_\_\_\_

14<sup>-2</sup> \_\_\_\_\_

4H<sub>3</sub>PO<sub>4</sub> \_\_\_\_\_

13th \_\_\_\_\_

204x15 \_\_\_\_\_

3Cu + 8HNO<sub>3</sub>  $\rightarrow$  H<sub>2</sub>O + 2NO + 3Cu (NO<sub>3</sub>)<sub>2</sub> \_\_\_\_\_

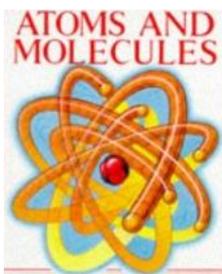
**Match the correct chemical formula with the name and the correct definitiv.**

1) MgO                      citric acid                      a) it is a white crystalline solid; it is a major chemical in the world and one of the most damaging salts in structure conservation; the hydrate is known as Glauber's Salt

2) HCL                      acetylene                      b) in the lower atmosphere is an air pollutant with harmful effects on the respiratory systems of animals, it can burn sensitive plants; it is a pale blue gas soluble in water

- 3)  $\text{CaCl}_2$  sodium chloride c) it is used for relief of heartburn and sore stomach ; to improve symptoms of indigestion
- 4)  $\text{CO}_2$  sodium sulphate d) it is a colourless gas which forms white fumes ; skin contact can cause redness, pain, severe skin burns
- 5)  $\text{C}_2\text{H}_2$  trioxygen e) it is a weak organic acid and a natural preservative; it is also used to add an acidic, or sour taste to food and soft drinks; it exists in a variety of fruits
- 6)  $\text{NaCl}$  magnesium oxide f) it is a colourless gas widely used as a fuel; it s mainly manufactured by the partial combustion of methane; it has explosive character and ability to poison
- 7)  $\text{Na}_2\text{SO}_4$  ethanol g) it is solid at room temperature; it can be produced directly from limestone; as an ingredient it is listed as a permitted food additive in EU as E509
- 8)  $\text{O}_3$  hydrogen chloride h) it is a gas at standard temperature and pressure; it exists in Earth´s atmosphere in this state; it is known as a part of photosynthesis
- 9)  $\text{C}_2\text{H}_5\text{OH}$  calcium chloride i) it is essential for animal life in small quantities; it can be harmful to animals and plants in excess; it is used for food preservation
- 10)  $\text{C}_6\text{H}_8\text{O}_7$  carbon dioxide j) it is also called pure alcohol; it is a flammable, colourless liquid, known as an essential solvent; it is used in medicines, food industry, etc.

|         |         |         |         |          |
|---------|---------|---------|---------|----------|
| 1. +... | 2. +... | 3. +... | 4. +... | 5. +...  |
| 6. +... | 7. +... | 8. +... | 9. +... | 10. +... |



## Text 2:

# ATOMS AND MOLECULES

What is the difference between atoms and molecules? It is actually pretty simple. **Molecules**<sup>1</sup> are made up of atoms. Each element on the periodic table of elements is made up of one single type of atom. Molecules are formed when atoms **bond**.<sup>2</sup> Different types of atoms can form together to make a molecule. Two or more of the same type of atom can also be bonded to make a molecule.

For example, H is the **symbol**<sup>3</sup> for hydrogen and O is the symbol for oxygen. Water is made up of both hydrogen and oxygen.  $H_2O$  is the symbol for water. Two hydrogen atoms and one oxygen atom are bonded together to create a water molecule. Oxygen gas is made up of two oxygen atoms bonded together.  $O_2$  is the symbol for an oxygen molecule.

With so many elements, imagine all the **combinations**<sup>4</sup> of atoms that have been researched and have yet to be researched. Chemistry is very complicated because there are so many different combinations.

## READING COMPREHENSION:

---

### Tick (✓) the right answer

- Water molecules are made up of
  - any two atoms bonded together.
  - two hydrogen atoms and one oxygen atom.
  - atoms of only one type of element bonded together.
  - two oxygen atoms.
- Why does the author describe the atoms that make up water?
  - to give an example of a specific molecule
  - to show how liquids are different from solids
  - to explain why water is so abundant
  - to illustrate how simple chemistry is
- Can a single atom be considered a molecule?
  - only if the atom is found in water
  - no, it takes two or more atoms bonded to create a molecule
  - only if it is an oxygen atom floating in the air
  - yes, all atoms are made up of many different molecules
- Read the following sentence: "Chemistry is very complicated because there are so many different combinations."  
The word complicated means
  - simple and basic
  - difficult to understand
  - fun and exciting
  - able to be learned easily

<sup>1</sup> **molecules** – the smallest units of a substance that can exist by themselves; are made of one or more atoms

<sup>2</sup> **bond** – to fasten together

<sup>3</sup> **symbol** – a written sign used instead of a word to represent something

<sup>4</sup> **combinations** – something that results when two or more substances are brought together

5. What is the main idea of this passage?
- Bonded atoms make up molecules.
  - Atoms and molecules are unrelated to each other.
  - Water is the most common type of molecule.
  - Oxygen and hydrogen are necessary for molecules.

6. What makes up a molecule of oxygen gas?

---

---

7. Explain why understanding bonding is important for understanding molecules.

---

---

8. The question below is an incomplete sentence. Choose the answer that best completes the sentence.

Molecules can be made up of two atoms of the same element; \_\_\_\_\_, oxygen gas is made up only of oxygen atoms.

- for example
- most importantly
- on the other hand
- therefore

## WRITING

## Writing CV

---

**There are three types of CVs:**

### **CHRONOLOGICAL CV**

A chronological CV focusses on presenting the candidate's experience on an employer by employer basis, with the posts being listed in reverse chronological order. It also contains detail of education and qualifications, together with hobbies. Some chronological CVs also contain a brief personal statement at the front which sets out the key skills and strengths of the candidate. This is the most common type of CV.

#### **How to structure a chronological CV**

- A chronological CV typically uses the following structure:
- Personal details (i.e. name and contact details)
- Personal profile or career objectives. This should not exceed 5 lines.
- Employment in reverse chronological order. Under each employer, you should

set out a number of bullet points which describe your key achievements. In order to be fully effective, you should ensure that you use power words.

- Key qualifications
- Professional memberships
- Hobbies and personal interests

### **FUNCTIONAL CV**

A functional CV typically starts with a personal profile which highlights the achievements, skills and personal qualities that you possess. This is then followed by a succession of sections, each relating to a different skill or ability. These should be ordered in decreasing order of importance. Instead of focussing on any particular job, you should describe your experience in its globality. Since you are not focussing on any particular past employment, this means

you can include any skills or experience gained in voluntary or unpaid work.

A combined CV follows both the chronological and functional format, which makes the CV slightly longer than normal.

### COMBINED CV

| <b>Français</b>            | <b>English</b>             |
|----------------------------|----------------------------|
| <b>Chapitres d'un CV</b>   | <b>CV chapters</b>         |
| État civil                 | Civil status               |
| Nom + prénom               | Name + first name          |
| Sexe (féminin – masculin)  | Sex (female – male)        |
| Date de naissance          | Date of birth              |
| Adresse                    | Address                    |
| Téléphone                  | Telephone                  |
| Études et formations       | Education and training     |
| Expérience professionnelle | Professional experience    |
| Centres d'intérêt          | Interests                  |
| Activités                  | Activities                 |
| Activités annexes          | Extracurricular activities |
| Divers                     | Additional information     |
| Divers                     | Miscellaneous              |
| Références                 | References                 |

| <b>A propos du travail</b>  | <b>About the job</b>                      |
|-----------------------------|---|
| Une carrière                | A career / A line of work                 |
| Un métier                   | A trade / job                             |
| Expérience professionnelle  | Work experience                           |
| Être responsable de...      | To be responsible for..., in charge of... |
| Accéder au poste de ...     | To reach the position of ...              |
| Travail temporaire          | Temporary work                            |
| Travailler à temps partiel  | To work part-time                         |
| Travailler à mi-temps       | To work half-time                         |
| Travail à plein temps       | Full time work                            |
| Job d'été                   | Summer job                                |
| Petits boulots              | Odd jobs                                  |
| Stage de formation          | Training session                          |
| Stage (dans une entreprise) | Internship                                |
| Formation continue          | Personal training                         |
| Licenciement économique     | Economic lay off                          |
| Chômage                     | Unemployment                              |

| <b>Postuler</b>                 | <b>To apply</b>       |
|---------------------------------|-----------------------|
| Postuler / poser sa candidature | To apply for a job    |
| Entretien de recrutement        | Recruitment interview |
| Correspondre au profil demandé  | To fit the job        |
| Un candidat                     | An applicant          |
| Une candidature                 | An application        |



|   |  |
|---|--|
| Être expérimenté                          | To be experienced                            |
| Compétences (niveau de...)                | Skills (level of proficiency)                |
| Mes attentes                              | My expectations                              |
| Capacités                                 | Abilities                                    |
| Expérience (solide ... en)                | Experience (strong ... in)                   |
| Maîtriser (quelque chose)                 | Be familiar with                             |
| Être capable de ...                       | To show ability / to be able to              |
| Prendre des décisions                     | Make decisions                               |
| Être digne de confiance                   | To be reliable                               |
| Motivé (très...)                          | Motivated (strongly ...)                     |
| Faire preuve d'initiative                 | To show initiative                           |
| Se consacrer à...                         | To commit oneself to...                      |
| Un vif intérêt pour...                    | A keen interest in                           |
| Être mobile (accepter les déplacements)   | To be willing to travel                      |
| Avoir le sens du contact                  | To be able to relate well with people        |
| Bonne maîtrise de l'anglais oral et écrit | Good skills at English both written and oral |
| Bonne connaissance de l'anglais           | Good knowledge of English                    |

| <b>Parlons d'argent</b>                   | <b>Salary</b>               |
|---|-----------------------------|
| Salaire                                   | Salary / wages              |
| Rémunération actuelle (per annum = p.a) : | Present salary (par an)     |
| Bien payé                                 | Well-paid                   |
| Mal payé                                  | Badly-paid                  |
| Sous-payé                                 | Underpaid                   |
| <b>Personnes</b>                          | <b>Persons</b>              |
| Un patron                                 | A manager                   |
| Un employeur                              | An employer                 |
| Un cadre                                  | An executive                |
| Un responsable de projet                  | A supervisor                |
| Un employé                                | An employee                 |
| Un intérimaire                            | A temporary worker/employee |
| Un ouvrier                                | A worker / a blue-collar    |
| Un stagiaire                              | A trainee                   |

## Useful expressions

Dear Sir or Madam

*(Madame, Monsieur - quand on ne sait pas qui va la recevoir)*

To Whom It May Concern ...

*(très impersonnel - A qui de droit)*

I am writing to you about your advertisement.

*Je vous écris à propos de votre annonce...*

I am writing to you to apply for the position of....

*Je vous écris pour postuler au poste de...*



**I am writing to you in reference to your advertisement.**

*Je vous écris concernant votre annonce...*

**As indicated in your advertisement...**

*Comme indiqué dans votre annonce...*

**Your advertisement in (source) for the position of ( job) sparked my interest.**

*Votre annonce dans (source) pour le poste de (emploi) a attiré mon attention.*

**I have worked as a ... (/in) ....**

*Je travaille comme...*

**In my current position I have worked ... developed... created ...**

*Dans mon poste actuel, je travaille... je développe... je crée*

**I would define myself as a .....**

*Je me définirais comme...*

**I believe it is time for me to move to another company / department ... like yours**

*Je pense qu'il est temps pour moi d'aller dans une autre entreprise... telle que la vôtre*

**I believe my qualifications would match your requirements.**

*Je pense que mes compétences seraient en adéquation avec vos besoins*

**I am available for an interview.**

*Je suis disponible pour un entretien.*

**Please find my résumé enclosed.**

*Veuillez trouver ci-joint mon CV.*

**I am sending my résumé as an attachment.**

*Je vous envoie mon CV en pièce jointe.*

**I look forward to hearing from you soon. / sincerely yours; yours faithfully. / ...**

*En attente de vos nouvelles (formules de politesse de fin de lettre: cordialement - respectueusement etc.)*

### **More tips**

- ✿ **Ideally your CV in English should not be longer than one page. Two pages are only acceptable if you have had many different jobs and a variety of experience.**
- ✿ **Spacing, aligning and layout are very important when you write your CV, in order to create a positive and professional impression.**
- ✿ **Use 'dynamic' and 'action' verbs such as attained, accomplished, conducted, established, facilitated, founded, managed, etc.**
- ✿ **Do not use the personal pronoun 'I' in your CV; use sentences without a personal pronoun: Established and managed a new sales force, not ~~I established and managed a new sales force.~~**

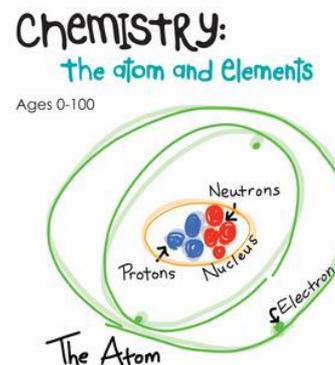


# CHAPTER 3: ATOMS AND ELEMENTS

## Text 1:

### Atoms and Elements

The world contains millions of different chemical substances, which are made of just over 100 different elements. You can find their names in the periodic table. You will probably recognise many of the names in the table: e.g. oxygen, nitrogen, chlorine, fluorine, iodine, iron, copper, silver, gold, platinum, uranium. Some of their names are quite pretty: e.g. beryllium and zirconium. Others are quite unpronounceable: e.g. ytterbium and seaborgium. Elements have been named after people, e.g. curium and einsteinium, after places, e.g. europium and californium, after planets e.g. neptunium and plutonium, or after their properties e.g. radium.



Pure elements are made of very tiny particles called atoms. Each element has a unique kind of atom: it is the number of protons in the nucleus of an atom that determines what element it is. Atoms can be combined together to make molecules. Molecular elements contain only one kind of atom e.g. oxygen, nitrogen and hydrogen. Molecular compounds contain two or more different kinds of atoms bonded together e.g. carbon dioxide, sucrose and proteins. The chemicals in our bodies are largely composed of the elements carbon, hydrogen, oxygen, nitrogen and phosphorus. Other elements are present in our bodies in much smaller amounts. Iron is an important part of the haemoglobin molecule in our blood. Without iron, our blood would not be able to carry oxygen from the lungs to our tissues for respiration.

At first it will seem an awful lot to learn, but there are rules which will make it much easier to remember the names of chemicals and how they are formed. Burning a pure element in oxygen will produce an oxide. There are no prizes for guessing which elements have been burnt to produce copper oxide, iron oxide, calcium oxide, though a few are more difficult. We do not usually call water by its chemical name, which is hydrogen oxide. In some cases there are two or more different oxides that can be produced when an element burns. Carbon monoxide and carbon dioxide are both produced when carbon containing substances are burnt. These two gases both contain the elements carbon and oxygen, but one contains twice as much oxygen as the other. Burning sulphur can produce either sulphur dioxide or sulphur trioxide.

You will have seen on the periodic table that every element has been given its own unique symbol. These are either a single uppercase letter, e.g. C H I C or an uppercase letter followed by a lowercase letter e.g. Cu Ra Te. Chemists can write the names of chemical substances using these symbols as a form of shorthand. Once you are familiar with the rules you will find it quite easy to use this shorthand form. Here are some easy ones: CO, CO<sub>2</sub>, CuO, H<sub>2</sub>O, Na<sub>2</sub>O, CaO, MgO, Fe<sub>2</sub>O<sub>3</sub>, S<sub>2</sub>O, SO<sub>3</sub>. The subscripted numbers tell you how many atoms of the element to its left are present in a molecule. Where there is no number you assume that it is one atom.

## READING COMPREHENSION:

---

Read the paragraphs above and answer the following questions.

1. What are the tiny particles of which elements are made called?

\_\_\_\_\_

2. What is the difference between the molecules of oxygen and those of carbon dioxide?

\_\_\_\_\_

3. Name the five most important elements in our bodies.

\_\_\_\_\_

4. What is the difference between Co and CO?

\_\_\_\_\_

## LANGUAGE

## AFFIXES

---

### Prefixes

#### Definition

Prefixes are small parts of words that are added to a word to change the meaning. Prefixes are added to the beginning of a word.

#### Example Prefix

"happy" becomes "unhappy" when you add the prefix "un" ("un-" means "not," so "unhappy" means "not happy")

#### Explanation

##### Prefixes:

- are added to the beginning of words.
- can be added to nouns, verbs, adjectives, and adverbs

#### Chart of common negative and positive prefixes

|           | Prefix | Meaning            | Examples              |
|-----------|--------|--------------------|-----------------------|
| Negative: | anti-  | against            | antiglare, antistatic |
|           | de-    | reduce, reverse    | demagnetize, decode   |
|           | dis-   | opposite feeling   | disagree              |
|           | dis-   | opposite action    | disconnect            |
|           | il-    | not                | illegal               |
|           | im-    | not                | impossible            |
|           | in-    | not                | incomplete            |
|           | ir-    | not                | irregular, irrelevant |
|           | mal-   | bad, wrong         | malfuction            |
|           | mis-   | bad, wrong         | misdirect             |
|           | non-   | not connected with | non-programmable      |
|           | un-    | not                | unmagnetized          |
|           | under- | too little         | underestimate         |
| Positive: | over-  | too much           | overload              |
|           | re-    | do again           | reorganize            |

**Chart of common prefixes of size**

| <b>Prefix</b> | <b>Meaning</b> | <b>Examples</b>            |
|---------------|----------------|----------------------------|
| equi-         | equal          | equidistant                |
| macro-        | large, great   | macroeconomics             |
| mega-         | large, great   | megabyte                   |
| micro-        | very small     | microcomputer, microscopic |
| mini-         | small          | minicomputer               |
| semi-         | half, partly   | semiconductor              |

**Chart of common prefixes of location**

| <b>Prefix</b> | <b>Meaning</b> | <b>Examples</b>        |
|---------------|----------------|------------------------|
| ex-           | out            | exclude, extrinsic     |
| extra-        | beyond         | extraordinary          |
| infra-        | below          | infra-red              |
| inter-        | between, among | interface, interactive |
| mid-          | middle         | midbrain               |
| peri-         | around         | peripheral, periscope  |
| sub-          | under          | subschema, subtraction |
| super-        | over           | supersonic             |
| trans-        | across         | transmit, transfer     |

**Chart of common prefixes of number**

| <b>Prefix</b> | <b>Meaning</b> | <b>Examples</b>            |
|---------------|----------------|----------------------------|
| bi-           | two            | binary                     |
| cent-         | hundred        | centenarian                |
| dec-          | ten            | decimal                    |
| hex-          | six            | hexadecimal                |
| mono-         | one            | monochromatic              |
| multi-        | many           | multiplexor, multicoloured |
| oct-          | eight          | octal                      |
| penta-        | five           | pentagon                   |
| poly-         | many           | polysaccharide             |
| quad-         | four           | quadruple                  |
| semi-         | half           | semicircle                 |
| sept(em)-     | seven          | September                  |
| tri-          | three          | triangle                   |
| uni-          | one            | unicellular                |

**Chart of common prefixes of time and order**

| <b>Prefix</b> | <b>Meaning</b> | <b>Examples</b>              |
|---------------|----------------|------------------------------|
| ante-         | before         | antecedent                   |
| post-         | After          | postdated, post-natal        |
| pre-          | before         | prefix, preceding, precedent |
| prime-        | First          | primary, primitive           |
| retro-        | backward       | retrograde, retroactive      |

### Chart of other prefixes

| Prefix         | Meaning                     | Examples                         |
|----------------|-----------------------------|----------------------------------|
| a-, ab-        | without, away               | abiotic, abstinence              |
| aqua-, hydro-  | water                       | aquatic, hydrolytic              |
| auto-          | self                        | automatic                        |
| co-            | together with               | co-ordinate, co-operate          |
| con-           | together with               | connect                          |
| geo-           | earth                       | geology                          |
| hyper-, super- | exceeding                   | hypertension, superior           |
| pro-           | before, in advance, forward | programme, progress, procreation |
| vita-          | life                        | vitalise                         |

### Suffixes

#### Definition

Suffixes are small parts of words that are added to a word to change the meaning. Suffixes are added to the end of a word.

#### Example Suffix

"paint" becomes "painter" when you add the suffix "-er" ("-er" means "person who does something," so "painter" means "the person who paints")

#### Explanation

##### Suffixes:

- are added to the end of words.
- can be added to nouns, verbs, adjectives, and adverbs.

### Chart of noun-forming suffixes

| Suffix        | Meaning          | Examples                          |
|---------------|------------------|-----------------------------------|
| -ance         | state            | performance                       |
| -dom          | domain/condition | freedom                           |
| -ence         | quality of       | independence                      |
| -er, -or      | a person who     | programmer, operator, biographer  |
| -er, -or      | a thing which    | compiler, processor, calculator   |
| -ian          | pertaining to    | electrician                       |
| -ing          | activity         | multiplexing                      |
| -ion          | action/state     | conversion                        |
| -ism          | condition/state  | magnetism                         |
| -ist, -yst    | a person who     | analyst, typist                   |
| -ity          | state, quality   | electricity                       |
| -ment         | state, action    | measurement, requirement          |
| -ness         | condition of     | readiness, cleanliness, happiness |
| -ship         | condition/state  | relationship, partnership         |
| -tion, -ation | the act of       | compilation                       |

### Chart of verb-forming suffixes

| Suffix    | Meaning | Examples                         |
|-----------|---------|----------------------------------|
| -ate      | to make | automate, activate, calculate    |
| -en       |         | harden, widen, lengthen, shorten |
| -ify      |         | simplify                         |
| -ize/-ise |         | computerize                      |

### Chart of adverb-forming suffixes

| Suffix | Meaning          | Examples   |
|--------|------------------|--|
| -ly    | in the manner of | electronically, logically, comparably, slowly, quickly, automatically, carefully |

### Chart of adjective-forming suffixes

| Suffix | Meaning               | Examples                                 |
|--------|-----------------------|--|
| -able  | capable of being      | comparable                               |
| -al    | having the quality of | computational, logical                   |
| -ar    | having the quality of | circular, rectangular, cellular, regular |
| -ble   | capable of being      | divisible                                |
| -ed    | having the quality of | computed, processed                      |
| -ful   | characterized by      | helpful, careful                         |
| -ic    | having the quality of | magnetic, automatic                      |
| -ical  | having the quality of | electrical                               |
| -ish   | like                  | yellowish                                |
| -ive   | having the quality of | interactive                              |
| -less  | without               | careless, meaningless                    |
| -ous   | like, full of         | dangerous, insidious, miraculous         |

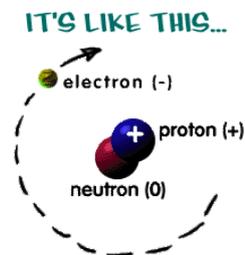
## Activities

Match each chemical suffix (COLUMN A) to its meaning (COLUMN B). The following suffixes indicate (put your answer in COLUMN C):

| A      | B   | C       |
|--------|---|---------|
| 1. ate | a. a chemical compound, for example hydrogen sulfide.     | 1. +... |
| 2. ide | b. the presence of alcohol or phenol, for example glycol. | 2. +... |
| 3. in  | c. the salt of an acid, for example sulfate.              | 3. +... |
| 4. ite | d. the salt of an acid, for example sulfite.              | 4. +... |
| 5. ol  | e. a sugar, for example fructose.                         | 5. +... |
| 6. ose | f. a neutral compound, for example glycerin.              | 6. +... |

## Text 2:

# AN ATOM APART



*By Leslie Cargile*

Have you ever walked through a cloud of gnats <sup>1</sup>on a hot summer, only to have them follow you? No matter how you swat <sup>2</sup>at them, or even if you run, they won't leave you alone. If so, then you have something in common with an atom.

Atoms are the building blocks of molecules, which when combined, make up everything. From the smallest one-celled amoeba<sup>3</sup>, to every person who has ever lived, to the largest and brightest stars in the sky, atoms are everywhere.

Even way back in the time of ancient Greece, they wondered about atoms. That's where the word comes from, ancient Greece. The word A'tomos, when translated into English, means: something that cannot be divided any further. So what's an atom look like? Up until very recently no one could say one way or another.

Technically we can't see individual atoms, since there are no microscopes powerful enough. Since technology improves all the time, it may not be long before we can actually see a whole atom through a special microscope. Even though scientists cannot see atoms with microscopes, they have developed ways to detect them and learn about them.

Atoms are made up of three basic parts; protons, neutrons, and electrons. There is a core, or nucleus, and an electron cloud. The nucleus is made up of positively charged protons and neutral neutrons. The nucleus is held closely together by electromagnetic force.

The negatively charged electrons are bound to the nucleus, and zap<sup>4</sup> around it in a cloud. Do you remember the cloud of gnats? The gnats would be the electrons zipping around you, the nucleus.

There are different ways atoms are classified. They can be classified into elements, like oxygen, carbon, or hydrogen. All of the elements known to man so far can be found on the periodic table. The number of protons an atom has decides the chemical element. The number of electrons defines the atom's chemical properties, like its melting temperature and boiling point.

The study of atoms and tiny particles that are even smaller is called quantum mechanics. Scientists still have much to learn about atoms. Maybe you will enter the study of quantum mechanics and find a brand new element. Maybe they'll even name it after you!

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<sup>1</sup> A very small flying insect that bites people and usually lives near water

<sup>2</sup> If you swat something such as an insect, you hit it with a quick, using your hand or a flat thing

<sup>3</sup> Is the smallest kind of living creature

<sup>4</sup> to move with speed or force

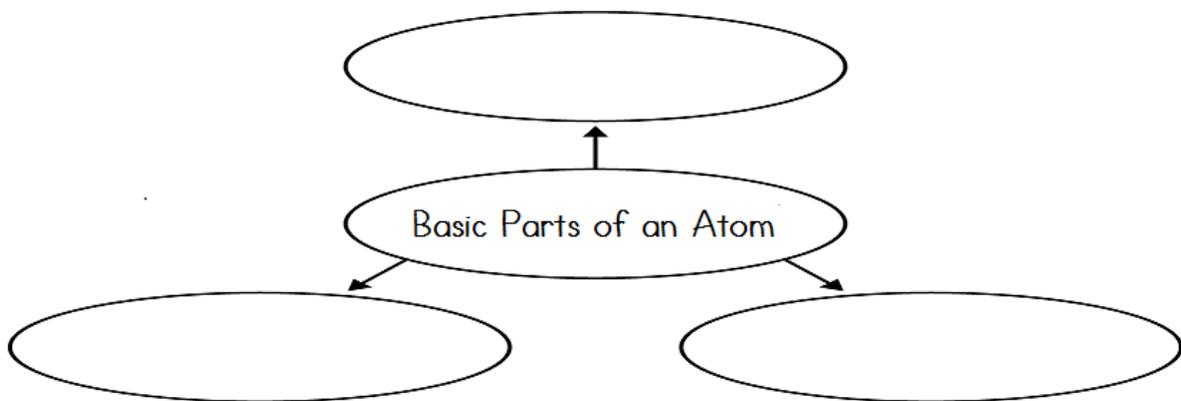
## READING COMPREHENSION

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*Tick the right option*

- 1) **What are atoms?**
    - a. tiny particles that make up all matter
    - b. tiny particles that can only be seen with a microscope
    - c. tiny particles that look like gnats
    - d. particles that are so large they cannot be seen
  
  - 2) **What does the word A'tomos mean in ancient Greece?**
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- 3) **Complete the graphic organizer.**



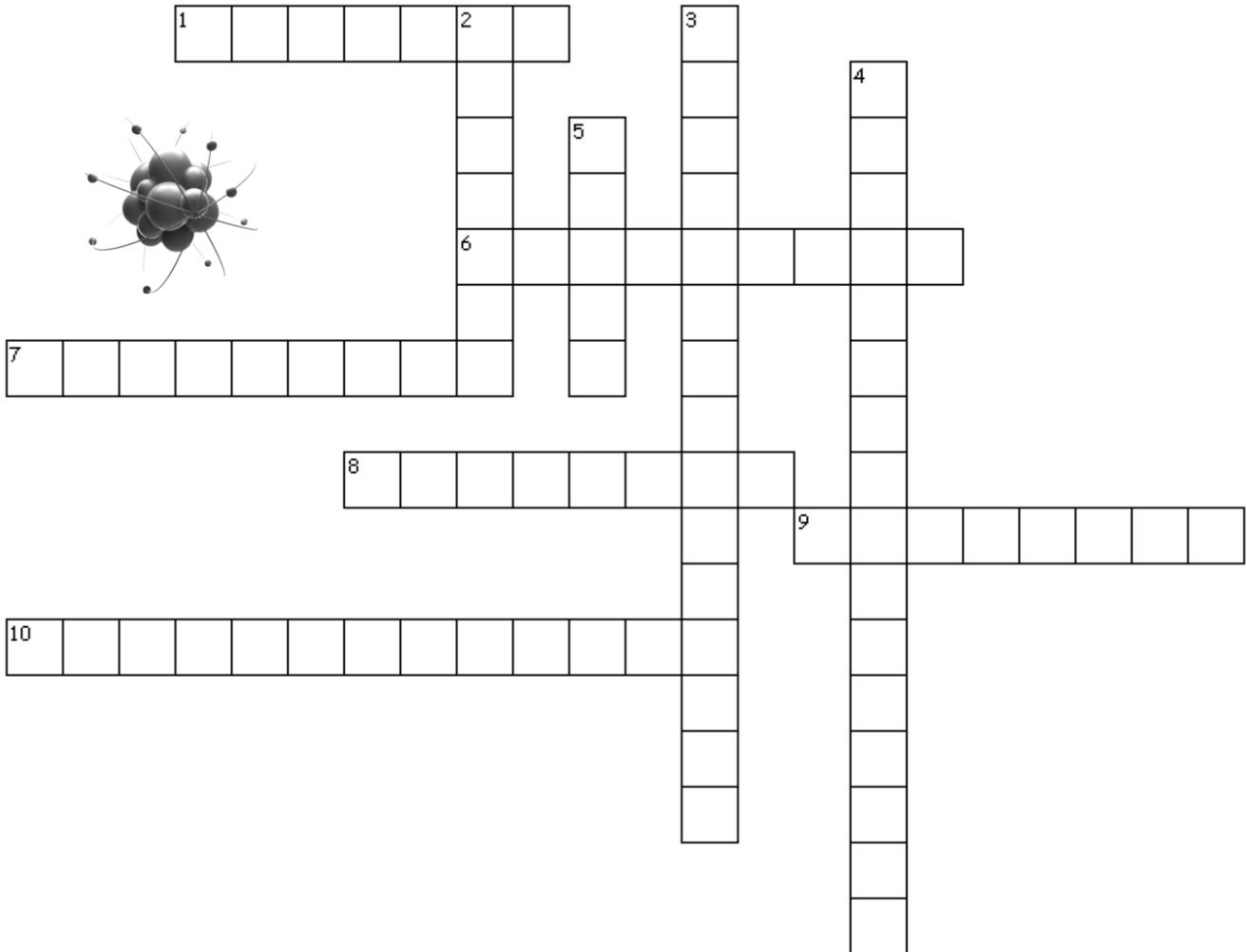
- 4) **What is quantum mechanics?**
- 

- 5) **If you wanted to find the chemical element of an atom, you would need to...**

- a. know how many electrons it has
- b. know how many protons it has
- c. know its melting temperature
- d. see it with a microscope

- 6) **The author begins this article by comparing a cloud of gnats to an atom. In this scenario, what do the gnats represent? What does the person walking through the gnats represent?**
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## Vocabulary Crossword



### Across

1. Positively charged parts of an atom
6. Negatively charged parts of an atom
7. Atoms are the building blocks for...
8. The number of electrons in atoms determine an element's \_\_\_ properties
9. Neutrally charged parts of an atom
10. A chart which lists all of the known elements

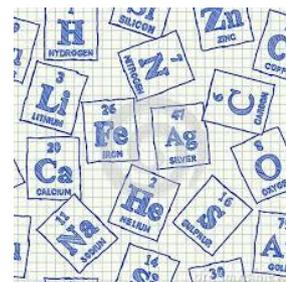
### Down

2. Protons and neutrons are found in this part of an atom
3. Type of force that holds the nucleus of an atom together
4. Area of science that studies tiny particles like atoms
5. The word A'tomos comes from this language



### Text 3:

## CHEMICAL ELEMENTS



Elements make up everything in the world. Elements are the basic substances that we cannot divide into simpler substances. We group elements by the things they have in common – what they look like, how they react with other substances, if they conduct electricity, etc. We group elements into nine official groups. The element, “Hydrogen” is in a group by itself. It is different from all the other elements.

Hydrogen is a basic substance. 90% of all atoms in the universe are hydrogen atoms. Hydrogen atoms are the lightest atoms. Hydrogen got its name from the scientist Lavoisier. Lavoisier noticed that hydrogen atoms are always present in water. The word root “Hydro” means water. Therefore, it was *intuitive* to represent hydrogen with the letter H.

The second group is the alkaline-earth metals. You can find these elements in the earth’s crust. They react with water. This group of elements contains elements such as Calcium. Calcium is a basic substance found in substances like milk and chalk. It is a member of the second group of elements. Some other members of the second group are beryllium and magnesium.

The third group is the alkali metals. These elements react very strongly with water. They might even explode if they touch water. This group of elements contains elements such as Sodium. Sodium is an element found in table salt. Scientists represent sodium with the letters Na. Some other members of the third group are lithium and potassium.

The fourth group of elements includes metals. It is the largest group of elements. It includes iron, silver, gold, nickel, platinum and titanium. Elements in this group conduct electricity. They are hard and shiny. Members of this group are called the transition metals.

The fifth group of elements is the actinides. The elements in this group are radioactive metals. Most of the members of this group are *synthetic* elements. They are non-natural elements. They are made in special labs. Some members of this group are uranium and plutonium.

The sixth group of elements is the lanthanides. Some people call this group the rare–earth elements. Some people call them the inner–transition elements. These metals are silver or silvery–white. They conduct electricity very well. They tarnish when they come into contact with air.

The seventh group consists of the nonmetals. Carbon is a member of this group. Every living thing depends on carbon. Oxygen is also a member of this group. We take in oxygen and *exhale* carbon dioxide (which is a combination of carbon and oxygen) when we breathe.

The eighth group consists of the inert gases. They are called *inert* gases because they do not react easily with other substances. Most of these gases are present in lighting. When a current of electricity goes through neon, it glows red. Some other members of this group are argon and xenon. This group is sometimes called Group Zero or Group 0.

The ninth group consists of the poor metals. These metals are different from the metals in the fourth group because these metals are soft. These metals melt easily. They also mix well with other metals to form *alloys*. Both lead and aluminum are poor metals.

The last group consists of the semi-metals. The members of this group are like metals in some ways. They are also like non-metals in some ways. Some semi-metals are arsenic and bismuth.

Depending on which other substances touch them, they can be conductors of electricity or they can *insulate*, or protect, substances from electricity. Some scientists call the semi-metals “double metals” because of their structure.

## READING COMPREHENSION

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### *Tick the right option*

1) What did Lavoisier notice about hydrogen?

- a. That it was always in water.
- b. That it was the lightest atom.
- c. That 90% of all atoms in the universe are hydrogen atoms.
- d. That it is a basic substance.
- e. All of the above are correct.

2) Where can calcium be found?

- a. In milk.
- b. In chalk.
- c. In the earth's crust.
- d. All of the above are correct.
- e. Both A and B are correct.

3) What do the third, fourth, fifth, and sixth groups have in common?

- a. They all tarnish in the air.
- b. They are all present in water.
- c. They are all synthetic.
- d. They are all metals.
- e. They are all inert.

4) Why are uranium and plutonium grouped together?

- a. They are found in the earth's crust.
- b. They are radioactive.
- c. They are metals.
- d. Both A and C are correct.
- e. Both B and C are correct.

5) Why are lead and aluminum grouped together?

- a. They mix with other metals.
- b. They are soft metals.
- c. They melt easily.
- d. All of the above are correct.
- e. Both A and C are correct.

## **VOCABULARY**

1) The best synonym for intuitive is...

- a. Non-natural.
- b. Inclined.
- c. Automatic.
- d. Simple.
- e. Passionate.

2) Something synthetic is...

- a. Non-natural.
- b. Man made.
- c. Artificial.
- d. All of the above are correct.
- e. Both b and c are correct.

3) When you exhale, you ...

- a. Breathe out.
- b. Take out.
- c. Consist of.
- d. Both a and b are correct.
- e. Both b and c are correct.

4) Inert means...

- a. non-reactive.
- b. radioactive.
- c. reactive.
- d. shiny.
- e. hard.

5) An alloy is...

- a. A combination of carbon and oxygen.
- b. A mixture of metals.
- c. A chemical laboratory.
- d. A soft metal.
- e. A non-metal.

6) The best synonym for insulate is...

- a. Melt.
- b. Protect.
- c. Conduct.
- d. Combine.
- e. Represent.

## **LANGUAGE**

### **Cause-and-Effect Linking Words**

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They are used in scientific writing to indicate cause and effect of actions or in experiments. They can also be used to compare ideas, contrast ideas and introduce examples. There are three main types of linking words: **conjunctions**, **transitions**, and **prepositions**.

## 1. Conjunctions

The most important conjunctions are **because**, **as**, **since**, and **so**. “Because”, “as”, and “since” introduce a **cause**; “so” introduces an **effect**. These are used to join two complete sentences (or independent clauses) together. They are often used like this:

➔ *First sentence conjunction second sentence.*

For example:

*I stayed at home **because** it was raining.*

Conjunction

Or:

*It was raining, **so** I stayed at home.* (use a comma before “so”)

Conjunction

You can also reverse the order of the sentences with **because**, **as**, and **since**.

For example:

Conjunction

**Because** it was raining, I stayed at home. (use a comma between the first and second sentences) Note that this is **not** possible with “so”.

## 2. Transitions

The most important transitions are **therefore**, **consequently**, and **as a result**. All of these introduce an **effect**. These are used to join two complete sentences (or independent clauses) together. They are often used like this:

➔ *First sentence; transition, second sentence.*

➔ *First sentence. transition, second sentence.*

For example:

*It was raining; **therefore**, I stayed home.*

Transition

Or:

*It was raining. **Consequently**, I stayed at home.*

Transition

## 3. Prepositions

The most important prepositions are **due to** and **because of**. Both of these introduce a **cause** in the form of a **noun phrase**. They are often used like this:

➔ *Sentence due to noun phrase.*

➔ *Because of noun phrase, sentence.*

For example:

*I stayed at home **due to** the rain.*

Preposition

Or:

***Because of** the rain, I stayed at home.*

Preposition

## Activities

### *Tick the right answer*

- 1) Many species of wildlife are becoming extinct, \_\_\_\_\_ the rainforests are being destroyed.
  - a. therefore
  - b. since
  - c. so
  - d. consequently
- 2) \_\_\_\_\_ logging provides jobs and profits, the government is reluctant to control it.
  - a. So
  - b. Consequently
  - c. Due to
  - d. Since
- 3) Hemp can be used to make paper, \_\_\_\_\_ it could reduce the need for logging.
  - a. therefore
  - b. so
  - c. due to
  - d. because
- 4) Hemp was grown throughout history \_\_\_\_\_ its versatility; it can be used to make many different things.
  - a. due to
  - b. because
  - c. since
  - d. as a result
- 5) Hemp is related to the marijuana plant; \_\_\_\_\_, it is illegal in many countries.
  - a. so
  - b. because
  - c. due to
  - d. as a result
- 6) Hemp cannot be used to produce marijuana, \_\_\_\_\_ its low THC content.
  - a. because
  - b. as
  - c. because of
  - d. consequently
- 7) Marijuana is less toxic than alcohol or tobacco. \_\_\_\_\_, some people believe it should be legalized.
  - a. So
  - b. Therefore
  - c. Due to
  - d. Because
- 8) \_\_\_\_\_ Canada has legalized hemp farming, we can expect to see pulp and paper produced from hemp very soon.
  - a. Therefore
  - b. Due to
  - c. So
  - d. As

***Join the following sentences as follow:***

1. Link the following two sentences using "because":
    - Hemp is related to the marijuana plant.
    - It is illegal.
- 

2. Link the following sentences using "as a result":
    - In the last ten years, many BC valleys have been clearcut.
    - 142 species of salmon have become extinct.
- 

3. Link the following sentences using "since":
    - Forestry is important to Canada.
    - It generates a lot of export income.
- 

4. Link the following sentences using "therefore":
    - Some people believe marijuana should be legal.
    - Marijuana is less toxic than alcohol or tobacco.
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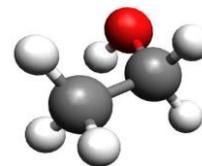
5. Link the following sentences using "due to" (you will have to change one of the sentences into a noun phrase):
    - Many species in BC are threatened.
    - Logging is taking place.
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# CHAPTER 4: CHEMISTRY IN ITS ELEMENTS

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## TEXT 1:

### ETHANOL



Ethanol ( $\text{CH}_3\text{CH}_2\text{OH}$ ; which is also called ethyl alcohol, grain alcohol, and EtOH) is a clear, colorless liquid. It is a renewable biofuel made from starch and sugar-based crops like corn grain and sugar cane or from cellulosic feedstocks like grass, wood, or recycled newspapers. Ethanol is a high-octane biofuel which performs so splendidly in internal combustion engines that early automakers presumed it would be the world's chief fuel.

American proponents of ethanol fuel highlight two principal advantages: its environmental impact and its energy security benefits. The adoption of ethanol reduces noxious emissions such as carbon monoxide (CO) and pollutants from internal combustion engines; hence, it is appreciably less deleterious to the environment than gasoline. Ethanol made from corn has been shown to reduce harmful emissions by up to 13%, whereas ethanol made from cellulosic materials reduces dangerous emissions by as much as 88%.

Ethanol is a renewable biofuel; in only six months a new crop can be grown, harvested, and converted to fuel, so it is profitable for rural crop-producing economies. In addition, it keeps 15 engines clean and can be used in gasoline engines with no modifications when combining gas with up to 10% ethanol. It can be used in specially modified vehicles called "flexible-fuel" or "flex-fuel" vehicles in concentrations of up to 85%. Gasoline combined with 85% ethanol is generally referred to as "E85." Higher ratios of ethanol in the fuel mixture result in less reliance on fossil fuels, so there is less dependence on imports.

American opponents of ethanol fuel point to three disadvantages: its price fluctuations, its energy level, and its availability.

The price of ethanol fluctuates on a different cycle than gasoline; therefore, at times ethanol is more expensive than gasoline, and at times it is cheaper. Another drawback of ethanol is that it contains less energy per gallon than gasoline; even when it is cheaper per gallon than conventional fuel, it does not take the vehicle as far as a gallon of gas. A car's fuel economy with ethanol can be expected to be 20–30% less than a vehicle which burns gasoline. So the occasional cheaper price is offset by the lower energy yields. In addition, ethanol is not as widely distributed as gasoline. It is readily available only in the Midwest; other areas have limited ethanol infrastructure.

## READING COMPREHENSION

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### *Tick the right answer*

- 1) It can be inferred from the passage that which of these statements about ethanol is/are true?
  - a. Burning ethanol made from wood produces less CO than burning ethanol made from corn.
  - b. Burning ethanol made from grain produces less CO than burning gasoline.
  - c. Burning ethanol made from newspapers produces less CO than burning ethanol made from grass.

- 2) The author's primary purpose is to
  - a. Describe and define ethanol.
  - b. Compare 2 types of ethanol.
  - c. Support the adoption of ethanol.
  - d. Explain advantages and disadvantages of gasoline.
  - e. Explain advantages and disadvantages of ethanol.
  
- 3) In line 9, deleterious most closely means
  - a. Dangerous, because it harms the environment less than gas.
  - b. Beneficial, because it helps the environment less than gas.
  - c. Splendid, because it performs less splendidly than gas.
  - d. Unreliable, because it is less unreliable than gas.
  - e. Expensive, because it is less expensive than gas.

## WRITING

## Summarization Skills Techniques

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A summary is a short statement or statements that give only the main points or core information of something excluding redundant information. Basically it reproduces main points of a speech, article, section, chapter or book.

### How do I Summarize?

When summarizing, follow the guidelines listed below:

- \* Include only the main points of the original passage
- \* Do not worry about following the original order of ideas.
- \* Keep the length down to no more than half the length of the original.

### Writing a summary essentially takes four steps:

1. Identify the main points of the passage. In some paragraphs, the main idea is expressed in the topic sentence, yet in others, it may not be explicitly stated at all. Additionally, a passage may contain one or more points that are vital to its meaning. These elements must be mentioned in your summary. However, *you will not include all the details*. Instead, only choose the most important.
2. Organize and present these main points in a coherent way. Be careful not to use the author's words or to follow the sentence structure of the original passage.
3. Make sure that you are faithful to the meaning of the source and that you have accurately represented the main ideas.
4. Cite appropriately and integrate the summary into the text effectively.

### Example Summaries:

#### Original Passage:

Height connotes status in many parts of the world. Executive offices are usually on the top floors; the underlings work below. Even being tall can help a person succeed. Studies have shown that employers are more willing to hire men over 6 feet tall than shorter men with the same credentials. Studies of real-world executives and graduates have shown that taller men make more money. In one study, every extra inch of height brought in an extra \$1,300 a year. But being too big can be a disadvantage. A tall,

brawny football player complained that people found him intimidating off the field and assumed he "had the brains of a Twinkie." (p. 301)

Locker, K. O. (2003). Business and administrative communication (6<sup>th</sup>ed.). St. Louis, MO: Irwin/McGraw-Hill.

Let's first identify the main points in the original passage.

**Topic sentence:** "Height connotes status in many parts of the world."

**Main point:** "Even being tall can help a person succeed."

**Main point:** "Executive offices are usually on the top"

**Main point:** "being too big can be a disadvantage"

For this example, we'll look at multiple summaries. As you read the sample summaries below determine if the main points were included and if the unimportant points were discarded.

Also check to see if both wording and sentence structure do not follow those of the original.

#### **Summary A:**

Throughout the world, being tall will lead to professional success. In fact, research shows that employers are more likely to hire taller men and to pay them more, as compared to shorter men with the same qualifications (Locker, 2003).

- *[This summary is too brief. Further, it changes the meaning slightly, giving the impression that being tall guarantees success.]*

#### **Summary B:**

In most countries, height suggests status. For instance, higher executives normally use top floors of office buildings. Further, research shows that men over six feet tall are more likely to be hired than those shorter than them but with the same qualifications. Taller men also receive greater incomes, possibly as much as \$1,300 a year more than those only one inch shorter than them. However, as a tall and muscular football player points out, a disadvantage to being tall is that some individuals may perceive you as threatening or even dumb (Locker, 2003).

- *[This summary is too long. Instead of focusing on the main points, it includes all of the details that are in the original passage.]*

#### **Summary C:**

Though height may connote slowness to some people, in the business world, it is almost universally associated with success. For example, taller men are more likely to be hired and to have greater salaries. Further, those in top positions within a company are more likely to work on the top floors of office buildings (Locker, 2003).

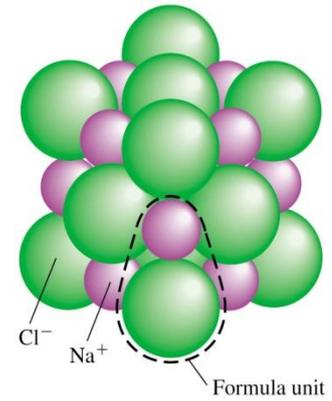
- *[This summary is the most effective. In addition to including all of the main points, it leaves out the unimportant details.]*



## TEXT 2:

### SALT

Salt is a mineral that consists mostly of sodium chloride (NaCl). It is an essential nutrient for animals, yet it is toxic to most plants. In her novel *Tongue*, author Kyung Ran Jo recounts this legend about salt: “A long time ago, a princess told the king, ‘I love you as much as I love salt.’ Believing it to be an insult, the king banished his daughter from his kingdom. But after a long time, the king realized the value of salt and the depth of his daughter’s love for him.”



Saltiness is one of the basic tastes perceived by the tongue, making it an esteemed and ubiquitous food flavoring. It also “retains vegetables’ vivid colors when parboiling, removes astringency from salad greens, freezes ice cream, quickly cools boiling water, maintains the freshness of cut flowers, removes stains on clothing, alleviates pain in your neck, is an ingredient in soap,” according to Jo. Darlene McFarlane in her article “15 Household Uses for Table Salt” recommends testing an egg’s freshness by placing it in a cup of salt water. An egg that floats is not fresh. Ants will not venture onto a salt-covered surface, according to McFarlane, so she suggests sprinkling it on windowsills and in doorways to repel them from your residence.

Salt’s historical distinction lies not so much in its taste or any of its aforementioned amazing talents, however, as in its suitability as a preservative. Salt has been used as a food preservative for centuries. One of the oldest documented salt works is the Xiechi Lake near Yuncheng in Shanxi, China. Salt was harvested from its surface as early as 6000 B.C. Salt, along with salted birds and salt fish, was unearthed with funereal offerings in ancient Egyptian tombs from the third millennium B.C. Less than half a century later, Egypt instituted exportation of salt fish to the Phoenicians, who in turn traded Egyptian salt fish with their commercial partners throughout North Africa, engendering the establishment of wide-ranging trade associations throughout the Mediterranean region. Similarly, in the first millennium B.C., Celtic people exchanged salted meat for wine and other luxury goods from ancient Greece and Rome. The wide expanse of the Celtic salt trade is exemplified by the shared Celtic, Greek, and Egyptian root word for salt, *hal*, which is iterated in the names of salt works throughout the region: Halle and Schwäbisch Hall in Germany, Halych in Ukraine, and Galicia in Spain.

Throughout history, salt has been deemed a precious commodity. In fact, the word “salary” is derived from the Middle English *salaire*, from the Latin *salarium*, which means a payment made in salt (*sal*) or for salt, from *salarium* which means “pertaining to salt.” Many historians agree that the Latin word *salarium* is related to salt and soldiers, but stress that the original association is unclear. Some surmise that soldiers were remunerated in salt. Some postulate that the word *soldier* itself is derived from the word for salt. Even today, a hardworking employee might be said to be “worth his salt” or might be commended for “soldiering on.”



### Text 3:

## Can Ocean Desalination Solve the World's Water Shortage?

*Environmentalists concerned about long-term effects of desalination. By Larry West*

Fresh *water scarcity* is already posing major problems for more than a billion people around the world, mostly in *arid* developing countries. The World Health Organization predicts that by mid-century, four billion of us—nearly two-thirds of the world's present population—will face severe fresh water shortages.

With human population expected to balloon another 50 percent by 2050, resource managers are increasingly looking to alternative scenarios for *quenching* the world's growing thirst. *Desalination*—a process whereby highly pressurized ocean water is pushed through tiny membrane filters and distilled into drinking water—is being held forth by some as one of the most promising solutions to the problem. But critics point out it doesn't come without its economic and environmental costs.

According to the non-profit Food & Water Watch, desalinated ocean water is the most expensive form of fresh water out there, given the infrastructure costs of collecting, distilling and distributing it. The group reports that, in the U.S., desalinated water costs at least five times as much to harvest as other sources of fresh water. Similar high costs are a big *hurdle* to desalination efforts in poor countries as well, where limited funds are already stretched too thin.

On the environmental front, widespread desalination could take a heavy toll on ocean biodiversity. "Ocean water is filled with living creatures, and most of them are lost in the process of desalination, even some fairly large organisms...part of the hidden cost of doing business," says Sylvia Earle, one of the world's foremost marine biologists and a National Geographic Explorer-in-Residence.

Earle also points out that the very salty residue left over from desalination must be disposed of properly, not just dumped back into the sea. Food & Water Watch concurs, warning that coastal areas already battered by urban and agricultural run-off can ill afford to absorb tons of concentrated saltwater *sludge*.

Food & Water Watch advocates instead for better fresh water management practices. "Ocean desalination hides the growing water supply problem instead of focusing on water management and lowering water usage," the group reports, citing a recent study which found that California can meet its water needs for the next 30 years by implementing cost-effective urban water conservation. Desalination is "an expensive, *speculative* supply option that will drain resources away from more practical solutions," the group says.

Despite such arguments, the practice is becoming more common. Ted Levin of the Natural Resources Defence Council says that more than 12,000 desalination plants already supply fresh water in 120 nations, mostly in the Middle East and Caribbean. Environmental advocates may just have to settle for pushing to "green" the practice as much as possible in lieu of eliminating it altogether.



## READING COMPREHENSION

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Answer the following questions:

1. What are the pros and cons of ocean desalination?  
\_\_\_\_\_
2. What are the main arguments claimed by Food & Water Watch?  
\_\_\_\_\_
3. How could desalination influence the oceans and the organisms that live in there?  
\_\_\_\_\_
4. Where is the area that supports and uses the desalination plants?  
\_\_\_\_\_
5. How do you understand the last sentence of the article? Is it derogatory, complimentary or neutral towards the environmental activists?  
\_\_\_\_\_

Match the following words with their definitions:

-  Scarcity = \_\_\_\_\_
-  Arid = \_\_\_\_\_
-  Quenching = \_\_\_\_\_
-  Desalination = \_\_\_\_\_
-  Hurdle = \_\_\_\_\_
-  Sludge = \_\_\_\_\_



- something that makes an achievement difficult
- to relieve or satisfy with liquid
- a very small supply
- relating to a financial
- very dry
- a soft, thick material that is produced in various industrial processes

-  Speculative = \_\_\_\_\_

## WRITING

### Making a presentation

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Speaking in public in a foreign language is very difficult. However, we are lucky when we do this because there are many standard phrases that we can use to structure and construct our presentation. This means that we can concentrate on the content of the presentation, and communicating what we need to say. The following are some useful phrases that you can use when you make your presentation.

**Remember:** when you give a presentation there are three main parts to the presentation:

The Introduction  
The Main Body

## The Summary

### **Introduce yourself**

Good morning/afternoon Ladies and Gentlemen, my name is X from Y (name of company, country etc) ...

### **Introduce the topic**

Today/This morning I'm going to talk about/I'd like to talk about ...

The aim of my presentation is to ...

I'd like to tell you a little about ...

### **List what the stages of your presentation are**

I've divided my presentation into X parts.

First, I'd like to talk about ...

Second, ...

Then, (I'll move on to/consider/deal with/focus on) ...

After that, ...

Next, ...

### **Introducing a new section**

Let's move on to ...

Moving on to ...

This leads to ...

Let's turn to ...

Finally ...

### **Moving backwards and forwards**

As I mentioned earlier, ...

I'll be talking more about this later.

I'll return to this point.

### **Using visual information**

This slide/diagram/transparency shows ...

If you look at this graph it shows that ...

What is interesting here is ...

I'd like to draw your attention to ...

### **Replying to difficult questions (when you don't have an answer or don't want to answer a question)**

That's a good point.

I'll come to that later if you don't mind.

I'm afraid I don't have that information to hand.

I'm afraid I'm not the right person to answer that.

### **How long will you speak for and do you want to answer questions?**

I'm going to speak for about X minutes/hours/days.

Please keep any questions until the end.

If you have any questions please feel free to interrupt.

I'd be happy to answer any questions at the end.

### **Summing up**

So, to summarize, ...

In conclusion, ...

That concludes my talk. If you have any questions I'll do my best to answer them.