

## LESSON 2: Classifying in Chemistry (from A. Rozkošná materials)

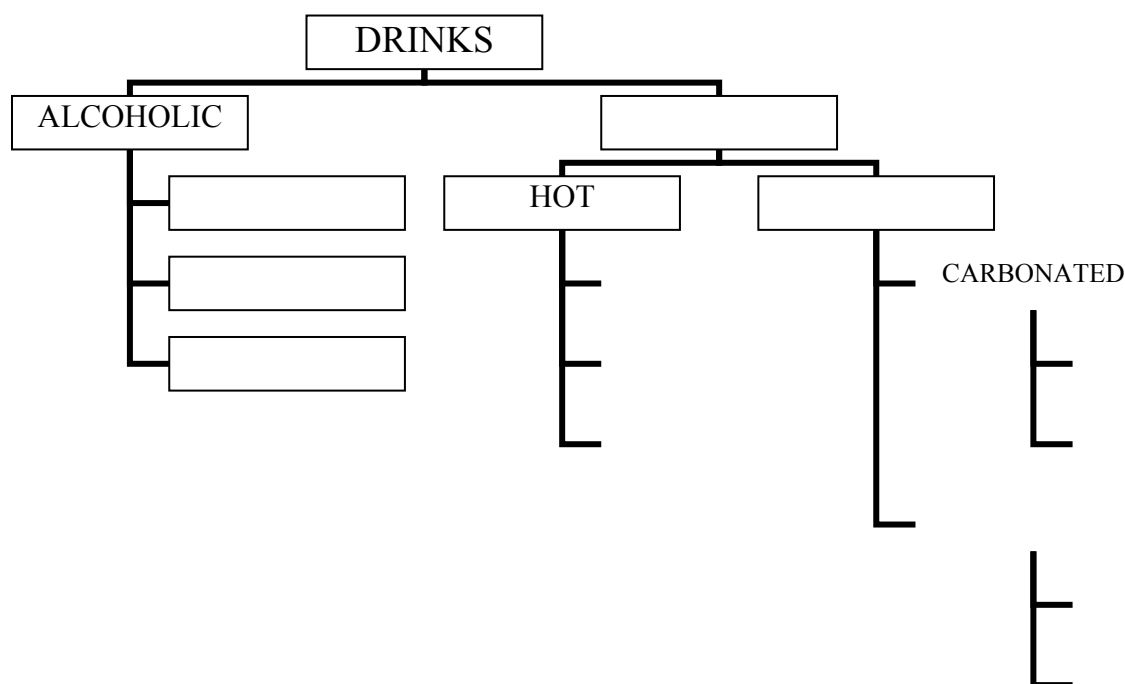
### 1. Speaking. Work in pairs. Discuss these questions:

- What did you drink this morning?
- Do you drink tea / coffee every day? Which kind?
- What's your favorite drink? How much of it do you drink every day / week?
- How often do you go drinking to a pub/tearoom/cafe? What is the best place that you know? Where is it? How often do you go there?
- What do you usually like to drink when you go out?
- Have you ever left a pub without paying?
- What drink do you hate? Why do you hate it?
- How many glasses of water do you drink every day?
- What is a typical drink of your country? What about other countries?
- What is the cheapest / the most expensive / the strangest drink that you know?
- What drink do you think is the most / least healthy?
- Do you prefer carbonated or non-carbonated drinks? (with or without bubbles)<sup>1</sup>

### 2. The following is a list of drinks.

Try to complete the classification diagram below with the following words:

non-alcoholic, coffee, cold, non-carbonated, beer, vodka, tea, cocoa, tonic, drinking water, juice, wine, coca-cola



### 3. Discussion points – classification.

- How might you classify students in this class or school? According to ...
- What are some ways you could classify foods?  
clothes?cars?schools?films?cities?academic subjects?animals?jobs?people in your town or country?music?
- A nutritionist might be interested in classifying food according to calories, cholesterol content, sugar content etc. What type of classification might interest a biologist? A meteorologist? A psychologist? A police detective? A football player?
- What about a chemist? What can you classify in chemistry? Think about chemistry books. What can we divide into groups / classes / categories?

#### 4. CLASSIFYING MATTER.

Read the following passage. Then classify the matter, using the information in the text.

##### Vocabulary:

matter (n) – hmota

solid (n/adj) - pevná látka, pevný

liquid (n/adj) - kapalina, kapalný

gas (n), gaseous /adj.) – plyn, plynný

weight / mass (n) - hmotnost, váha

shape and volume (n) – tvar a objem

movement / motion (n) - pohyb

firm / rigid (adj) – pevný, neohebný, tuhý

definite form (adj+n) – určitá (přesně daná) forma

considerable force (adj+n) – značná síla

gradually (adv) – postupně

therefore / thereby (adv) – a tak, a proto, a tudíž

heat the substance (n) – zahřát látku

orderly (adj) - uspořádaný

oxygen (n) – kyslík

iron (n)- železo

sulphur (n) – síra

carbon dioxide (adj+n) - oxid uhličitý

densely packed atoms - hustě natěsnané atomy

loosely structured - ve volné struktuře

arranged in a definite pattern – uspořádané do určitého vzorce

to pour (v) – lít

flow all over the surface - rozlévat se po povrchu

attract each other – přitahovat se navzájem

container (n) – nádoba

diffuse / spread out (v) – rozpínat se

compress or expand (v) – stlačit se nebo se roztahovat

quart - 2 pints, 1.14 of a Br.litre/ 0.94 of a US litre

#### The Nature of Matter<sup>2</sup>

1	Everything around us consists of matter: this paper, your body, the air you breathe, and the water you drink. Matter is anything that has weight or mass and takes up space.
2	All matter may be classified as either solid, liquid, or gas. Solids are firm and have a definite form. Rubber, wood, glass, iron, cotton, and sand are all classified as solids. A considerable force would be needed to change the shape or volume of an iron bar, for example, because the atoms or molecules of a solid are densely packed and have very little freedom of movement.
3	Solids may be further divided into two classes: crystalline and amorphous. Rocks, wood, paper, and cotton are crystalline solids. Crystalline solids are made up of atoms arranged in a definite pattern. When these solids are heated, they change to a liquid, known as melting, is sharp and clear. Amorphous substances include rubber, glass, and sulphur. In these substances, the pattern of atoms is not orderly, and when heated, they gradually soften.
4	Liquids, on the other hand, are not rigid. If water, milk, or oil is poured on a table, it will flow all over the surface. The atoms or molecules of liquids attract each other and thereby enable liquids to flow. But these atoms are loosely structured and do not keep their shape. Therefore a liquid will take the shape of any container in which it is poured. However, liquids have a definite volume: a quart of milk cannot fit in a pint container.
5	Gases, such as air, oxygen, and carbon dioxide, have no fixed shape or volume of their own. They diffuse or spread out to fill any container. The atoms or molecules of gases are widely spaced and move very rapidly. They either compress or expand to adapt to any area.
6	Everything we know is made of matter in solid, liquid or gaseous form.

#### MATTER

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5. **Speaking. Work in pairs.**  
**Describe the diagram that you have drawn, using the typical classifying vocabulary:**

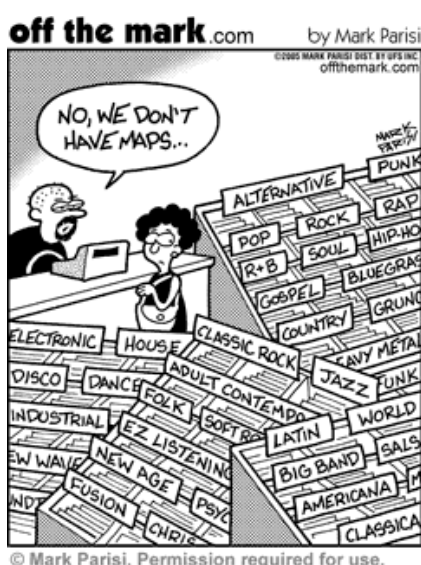
Matter	is/are may be can be could be	classified grouped divided arranged categorized	into	divisions groups types classes categories classifications
		classified categorized classed grouped	as	solid, liquid, or gas

There are three	types kinds classes categories	of matter
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Oxygen is	a type a kind a form an example	of gas
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Everything	is made up of is composed of consists of	matter.
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Amorphous substances	include comprise	rubber, glass, and sulphur
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## 6. Listening.<sup>3</sup>

**Watch the video. Fill in the gaps.**

**Useful vocabulary:**

to assume the shape - přebírat tvar

particles collide with each other (n) – částice se srážejí

separated (adj) oddělený

in a completely random manner - zcela náhodně

slip past (v) – míjet

The states of ..... are gas, liquid and solid. Gasses **assume the shape** and ..... of their container. **Particles** of a gas are **separated** from each other, move in straight lines, and **in a completely random manner**. They change direction only when they **collide with each other** or the .....

Liquids have a ..... volume, and **assume the shape** of their containers. The **particles** of a liquid are closely spaced, and so their motion is still **random**, but much more ..... The **particles slip past**, and **collide with**, near-neighbors.

Solids have a definite ..... and volume. **Particles** of solids are in ..... positions, and **collide** only **with** near-neighbors.

## 7. Presentations. Work in small groups.

**Each group will get a text describing something from the area of chemistry.**

**Read the text and underline all the things that are classified.**

**Then draw your diagram on a poster.**

**In the end of the lesson, present your poster to the others.**

**To describe the poster, use the vocabulary that you have learnt today.**

**(e.g. *may be divided into four parts, can be classified as...*)**

**Remember to have all the important stages in your presentation: 1. welcoming the audience, 2. introduction of the speakers and the topic of the presentation, 3. presenting the topic with the use of visuals, 4. conclusion.**

**You can enrich your presentation with these phrases:**

1. Good morning/ afternoon/ Hello, everyone.

2. My name is ... and this is...I would like to talk about.../I'm/ We're going to be talking about.../ We would like to show you.../ We will take a look at...

3. First of all...

As you can see on the chart/ graph/ poster...

Finally...

4. That's all./My/our presentation is over. Thank you for your attention./ Thank you for your time and attention.

**Don't forget to let your partner speak!**

Now I would like to hand over to (Mark) / And now my friend/colleague will tell you...

## 8.

**a) Choose the right word:** chemist (n) – chemistry (n) – chemical (adj)

1. **Chemistry** is a branch of science.

2. Intensive study is necessary for becoming a ..... or an expert in .....

3. At present more than a hundred ..... elements are known.
4. The famous French ..... Lavoisier established the Law of Conservation in Mass.
5. The law says that no change occurs in the mass of substances present in a ..... reaction.
6. This was the birth of ..... as an exact science.

**b) Fill in the table with the right words describing changing states of matter**

<b>Changing state of matter</b>	<b>Verb</b>	<b>Noun</b>
1. liquid to gas	<i>to evaporate</i>	<i>evaporation</i>
2. gas to liquid		
3.		melting / liquefaction
4.		solidification
5.	to sublime	
6. gas to solid		

**Based on:** <sup>1</sup> *Conversation questions for the ESL Classroom*. Available at <http://iteslj.org/questions/>

<sup>2</sup> Zimmermann, Fran. *English for Science*. New Jersey 1989.

<sup>4</sup> Alžběta Oreská et al. *English for Chemistry*. Bratislava: STU, 2006.

<sup>3</sup> Available at [http://highered.mcgraw-hill.com/sites/0072396814/student\\_view0/animations\\_center.html#](http://highered.mcgraw-hill.com/sites/0072396814/student_view0/animations_center.html#)

**GRAMMAR REVISION - passive voice**

I. Look at the sentences from the lesson:

1. Matter can be classified as solid, liquid & gas.
2. A considerable force would be needed to change the shape of an iron bar.
3. Crystalline solids are arranged in a definite pattern.
4. When they are heated, they melt.
5. If water is poured on the table...

What is the general pattern of a passive sentence?

subject + \_\_\_\_\_ + \_\_\_\_\_

Do they say what happens to the subject? (matter, force, solids, etc.)

Do the underlined phrases say who/what performs action?

Are the sentences formal or informal?

II. Think about rules or regulations in our class/ university/ students residence halls/ public transport/etc. and write 5 sentences in the passive voice, e.g.: *Mobile phones have to be switched off*