

THE ELEMENTS – SYMBOLS, FORMULAS AND EQUATIONS

Chemical **SYMBOLS** are a short way of writing **ELEMENTS**. E.g. **H (hydrogen)**, **N (nitrogen)**

Chemical **FORMULAS** are a short way of writing **COMPOUNDS**. E.g. **NaCl (sodium chloride)**

Note that for *English* names of inorganic compounds, the order of the electronegative and the electropositive element is different than in *Czech*.

E.g. **NaCl - Cz : chlorid sodný, En : sodium chloride**

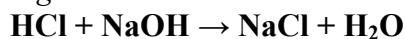
Here are some common compounds, their names and formulas.

NaCl – sodium chloride	H ₂ SO ₄ – sulphuric acid	ZnSO ₄ – zinc sulphate	C ₆ H ₆ - benzene
ZnO – zinc oxide	HCl – hydrochloric acid	Na ₂ CO ₃ – sodium carbonate	NH ₃ - ammonia
CO ₂ - carbon dioxide	NaOH – sodium hydroxide		

These formulas are useful for writing **EQUATIONS**.

Equations are a short way of expressing chemical reactions and their results.

E.g.



We read as: hydrochloric acid **reacts with** sodium hydroxide **to form** sodium chloride **and** water.

1. Try and complete these equations:



(copper oxide reacts with hydrogen to form copper and water)

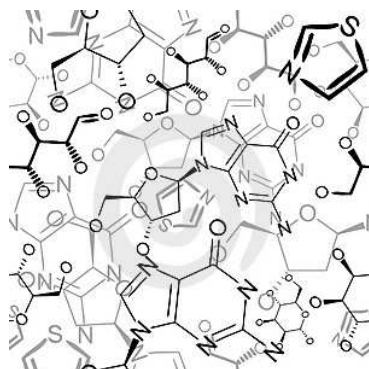
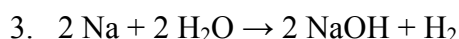
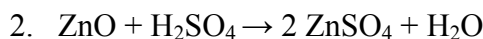
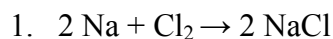


(sodium carbonate reacts with hydrochloric acid to form sodium chloride, carbon dioxide and water)



(zinc reacts with hydrochloric acid to form zinc chloride and hydrogen)

2. Express these equations in words:



THE ELEMENTS - COMPARING

1. Discuss the following issues:

- How often do we use comparing and contrasting in everyday life? Try to recall what you have compared today.
- Why do we compare things? What is it good for?
- How do you compare?
- Give some examples from your chemistry classes.

2. Read the following passage and find as many comparisons as you can.

The Wonder Metals

1 The study of metals began in the Middle Ages when alchemists searched for a technique to convert “base metals”, like lead, to gold. They never succeeded in making gold but at least by experimenting with the metals (in contrast to the ancient Greeks, who only speculated about them) they made discoveries.

5 All but 20 of the over 100 elements identified to date are metals but only 7 of these are common in the earth’s crust. Iron, the most widely used metal, is rarely found in the free state (not combined with other metals) and must be extracted from naturally occurring compounds (ores) such as hematite, magnetite, and pyrite. The beautiful colors of rocks are due almost entirely to these iron compounds. In fact, iron pyrite is often
10 called fool’s gold because of the similarity of its color to gold. Iron is very strongly magnetic, and the fact that the earth is a magnet itself tipped scientists off to the fact that iron is a major component of the earth’s core, or centre.

 Pure iron is a relatively soft, silvery metal that is very active chemically (that is, it combines with oxygen to corrode or form rust). It is usually mixed with other elements
15 or compound to form alloys such as steel, stainless steel, or cast iron, which are more durable and rust resistant than pure iron.

 Aluminum is the most abundant metal, but it was not used until a century ago because it is so active chemically and difficult to extract. Like iron it is soft, but in contrast to iron and steel, aluminum is very light and more resistant to corrosion. These qualities
20 make it useful for airplanes, trains, automobiles, rockets, and house siding.

 In the 1940s, magnesium emerged as an important metal. Although it is less abundant in the earth, more chemically active, and harder to extract than aluminum, it is present in sea water and that means there is almost an endless supply of it.

 In the space age, the extraordinary properties of titanium have made it the new
25 wonder metal. Lighter and stronger than steel, it is more resistant to corrosion and able to withstand heat.

 The remaining major metals are sodium, potassium, and calcium, all too active chemically (they react violently with water) for use in construction.

3. Can you give some more examples of comparing words?

Comparing similarities

Magnesium is like
as important as
similar to aluminum.
comparable to

Both carbon dioxide **and** hydrogen are gases.
Carbon dioxide and hydrogen are **both** gases.

Magnesium **resembles** aluminum in many ways.
parallels

Contrasting differences

Iron is **unlike** aluminum.
is **different from**
differs from

Unlike iron,
In contrast to iron, aluminum is light.
Compared to iron,
In comparison to iron,

Iron is heavy, **whereas** aluminum is light.
Carbon is an element, **while/whilst** carbon dioxide is a compound.

Although/even though/though copper and aluminum are both good conductors, aluminum is used in aviation because it is far lighter.

Iron is a **relatively** soft metal.
comparatively

Iron is (far/much) heavier than
less abundant than aluminum.
not as soft as

Adjectives – comparing

2. stupeň (comparative) *light* → *lighter* *lehký* → *lehčí*

- koncovka **-er**: jednoslabičná přídavná jména a dvouslabičná přídavná jména končící na -y po souhlásce (light → lighter, y → -ier: heavy → heavier)
- pomocí výrazu **more**: všechna ostatní přídavná jména a také příslovce, která končí na -ly. (abundant → more abundant, heavily → more heavily)
- nepravidelné tvary**: good/well → better, bad/badly → worse, far → further (*nebo* farther) little → less, old → older/elder (elder brother – o členech rodiny)

- před druhým stupněm lze použít následující výrazy: **far** (= a lot), **much**, **a lot**, **a bit**, **a little**, **slightly** (= a little); e.g. much heavier – mnohem těžší

3. stupeň (superlative) *the lightest* *nejlehčí*

- a) light → lighter → **the lightest**, heavy → heavier → the heaviest
 b) abundant → more abundant → **the most** abundant
 c) good → the best, bad → the worst, far → the furthest, little → the least, old → the eldest

4. Use the right comparative or superlative

- Iron is (abundant) than silver. (comparative)
 Lead is much (heavy) than aluminium. (comparative)
 Radium disintegrates far (quickly) than tin. (comparative)
 Platinum is (expensive) metal. (superlative)
 Lithium is (light) metal. (superlative)

5. Listen to these statements about three metals: iron, aluminium and lead. Complete the chart.

	IRON	ALUMINIUM	LEAD
Density			
Does it corrode?			
Is it easy to extract?			

Now write 3 sentences, comparing these metals.

E.g. *In contrast to iron, aluminium doesn't corrode.*

6. Tables, charts, and graphs are useful for organizing information. Circle the answer that best completes the statement according to the information in the chart.

The Physical Properties of Six Metals

Metal	Specific Gravity	Melting Point (°C)	Boiling Point (°C)	Atomic Radius (Å)	Ionic Radius (Å)
Group I					
Copper	8.9	1083	2595	1.17	.96
Silver	10.5	960	2212	1.34	1.26
Gold	19.3	1063	2966	1.34	1.37
Group II					
Zinc	7.14	420	907	1.25	.74
Cadmium	8.65	321	765	1.41	.96
Mercury	13.60	-38.87	357	1.44	1.1

- The atomic radius of cadmium is that of mercury.
 - as high as
 - not as high as
- mercury, cadmium has a high boiling point.
 - Like
 - Compared to
- The specific gravity of cadmium and copper are
 - similar
 - identical
- Compared to the other metals in this table, gold has specific gravity.
 - a relatively high
 - the highest
- The properties of cadmium and zinc are
 - comparable
 - identical
- Copper and gold have high boiling points.
 - comparatively
 - equally
- The melting points of the Group II metals are those of Group I.
 - lower than
 - as low as
- The ionic radius of copper is to that of cadmium.
 - similar
 - equal

7. Read the text and then order the seven metals according to their melting points.

List the metal with the highest melting point first.

The melting point of *platinum* is high compared to most metals but not as high as that of *chromium*. The melting point of *zinc* is less than half the melting point of *gold* and

approximately three times the melting point of *sodium*. *Mercury* has the lowest melting point of all the metals. *Copper* and gold have similar melting points, but the melting point of copper is slightly higher than gold and lower than platinum.

8. Work in small groups. Write a short text, comparing two items of your choice.

9. HOMEWORK

FUTURE - BUDOUCNOST

FUTURE SIMPLE

will/shall+ infinitiv

Tento tvar se používá pro vyjádření prostého děje děje budoucího, např. když se o činnosti rozhodneme v momentě mluvení:

- What would you like to drink? – **I'll have** an orange juice, please.
nebo když předvídáme, co se stane - s výrazy *probably, I expect, I'm sure, I think*
- Do you think Ann will pass the exam? – Yes, I'm sure **she will pass** easily.
nebo když nabízím, že něco budu dělat/ žádám někoho, aby něco udělal:
- That bag is too heavy. **I'll help** you with it. / **Will you shut** the door, please?

Shall se běžně pro vyjádření budoucnosti v hovoru nepoužívá, je to spíše tvar objevující se v psaném projevu. Dnes se spíše objevuje ve významu „Mám to udělat?“ nebo ptám-li se na něčí názor nebo dávám-li návrh.

- **Shall I close** the door?
- I have no money. What **shall I do**?
- Where **shall we go** this evening?

FUTURE CONTINUOUS

Průběhový tvar will being se použije, chceme-li vyjádřit že v určitou dobu nebo po určitou dobu v budoucnosti:

- Don't phone between 7 and 8. **We will be having dinner** then.
- This time next week **I'll be lying** on a beach.

JINÉ ČASY K VYJÁDŘENÍ BUDOUCNOSTI

Přítomný čas prostý (present simple) se používá k vyjádření budoucnosti, když je řeč o jízdách řádech, programech kin, televize, atd.:

- **The train leaves** at 10:00 and **arrives** at 12:30.
- What time **does the film begin**?

Jinak mluvíme-li o činnostech, které jsme si **zařídili**, o kterých víme, že je budeme v budoucnu dělat, používáme **průběhový tvar přítomného času (present continuous)**

- What **are you doing** on Saturday evening? – **I'm going** to the theatre.
- **I'm not working** tomorrow, so we can go somewhere.

V těchto větách lze použít i konstrukci **be going to** (What are you going to do on Saturday evening? – Co hodláš dělat...), ale přítomný čas průběhový je tu přirozenější.

Rozdíl mezi použitím průběhového tvaru a konstrukce **be going to** je následující: Použitím průběhového tvaru spíše naznačím, že je něco už zařízeno, domluveno, použitím konstrukce **be going to** spíše naznačím, že jsem se rozhodla něco udělat, mám to v úmyslu, ale nemusím to mít zařízeno.

- **I'm leaving** tomorrow, I've got my plane tickets.
- The windows are dirty – Yes, I know, **I'm going to clean** them later.

Další použití **be going to**:

v případech, kdy říkáme, že se něco stane, protože situace to mu nasvědčuje:

- The man can't see where he's walking. There's a hole in front of him. **He's going to fall** into the hole.
- Look at those black clouds. **It's going to rain**.

CVIČENÍ

Dejte sloveso do tvaru přítomného času prostého nebo průběhového.

- 1) ***I'm going*** (go) to the theatre this evening.
- 2) ***Does the film begin*** (the film / begin) at 3:30 or 4:00?
- 3) We..... (have) a party next Saturday. Would you like to come?
- 4) The art exhibition(open) on 3 May and(finish) on 15 July.
- 5) I(not / go) to a concert tonight. It(begin) at 7:30.
- 6) You are on a train to London and you ask another passenger: Excuse me, what time(this train / get) to London?
- 7) You are talking to Ann: Ann, I(go) to town.(you / come) with me?

CVIČENÍ

- 1) Odpovězte na otázky. Všechny ty věci se chystáte udělat, ale ještě jste je neudělali
- 2) Have you cleaned the car? – (tomorrow) Not yet, ***I'm going to clean it tomorrow.***
- 3) Have you phoned Sally? – (later) Not yet.
- 4) Have you done the shopping? – (this afternoon) Not yet.
- 5) Have you read the paper? – (after dinner) Not yet.

CVIČENÍ

Co se nejspíš v těchto situacích stane? Použijte slova v závorkách

- 1) There are a lot of black clouds in the sky. (rain) ***It's going to rain.***
- 2) It is 8:30. Jack is leaving the house. He has to be at work at 8:45, but the journey takes 30 minutes. (late) He
- 3) There is a hole in the bottom of the boat. A lot of water is coming in through the hole. (sink) The boat

CVIČENÍ

Který výraz je správný?

- 1) Did you phone Ruth? – Oh, no, I forgot. ~~I phone~~ / I'll phone her now.
- 2) I can't meet you tomorrow afternoon. I'm playing / I play tennis.
- 3) I meet / I'll meet you outside the hotel in half an hour, OK? – Yes, that's fine.
- 4) Remember to buy a newspaper when you go out. – OK, I don't forget, / I won't forget.
- 5) What time does your train leave / will your train leave tomorrow?
- 6) I don't want to go out alone. Do you come / Will you come with me?
- 7) It's a secret between us. I promise I don't tell / I won't tell anybody.

CVIČENÍ

Který tvar je správnější nebo běžnější?

- 1) Ann isn't free on Saturday. ~~She'll work~~ / She's working.
- 2) I'll go / I'm going to a party tomorrow night. Would you like to come too?
- 3) I think Jane will get / is getting the job. She has a lot of experience.
- 4) I can't meet you this evening. A friend of mine will come / is coming to see me.
- 5) There's no need to be afraid of the dog. It won't hurt / it isn't hurting you.
- 6) Tomorrow at this time I will eat / will be eating spaghetti.
- 7) Look at the clouds. It will/is going to snow.

