

## **Structure of the atom – true or false**

Recommended grade: 8.

Object of activity: Decision whether a statement is true or false, explanation of why a statement is false

Target language: Names of chemical elements and compounds

Aids: Sheet with statements, soft ball or inflatable ball

Time allowed: 10 minutes

- We read the first statement and throw the ball to a student.
- The student must decide whether the statement is true or false. If he/she thinks the statement is false, the student explains why. If the students' language skills are good, they answer in English; if not, we switch to the mother tongue.
- If the student answers correctly, he/she decides to whom the student will throw the ball next. If he/she does not answer correctly, the student throws the ball back to the teacher and the teacher decides who will get the ball next. It should be remembered that the ball should be given to a student who has not had a chance to answer yet.

### Classroom language:

*Is the statement true or false?*

*Say why it is false.*

*Who are you going to throw the ball to now?*

*Throw the ball back to me, please.*

*Throw the ball to somebody who hasn't had a chance to answer yet.*

Je výrok pravdivý nebo nepravdivý?

Řekni, proč je nepravdivý.

Komu teď hodíš míček?

Hod' mi míček zpátky, prosím.

Hod' míček někomu, kdo ještě neměl možnost odpovídat.

- 1. An ion is positively charged.**  
*FALSE – It can be negative too.*
- 2. Rubidium is less reactive than potassium.**  
*FALSE – Rb is lower down the periodic table so it is more reactive.*
- 3. Ionic compounds are hard but brittle.**  
*TRUE – They have a closely-packed, regular structure.*
- 4. Magnesium fluoride has the formula MgF<sub>2</sub>.**  
*TRUE – (Mg<sup>2+</sup> and F).*
- 5. Ionic compounds only conduct electricity when dissolved in water.**  
*FALSE – They conduct electricity when molten too.*
- 6. Ar, K<sup>+</sup> and Cl<sup>-</sup> have the same electron configuration.**  
*TRUE – all are 2, 8, 8.*
- 7. The electron configuration of sulphur is 2, 8, 6.**  
*TRUE.*
- 8. Calcium ions are Ca<sup>3+</sup>.**  
*FALSE – Ca<sup>2+</sup> (it's in group 2!).*
- 9. The electron configuration of vanadium is 2, 8, 8, 2, 3.**  
*FALSE – It is 2, 8, 8, 5.*
- 10. Ionic compounds tend to have low melting points.**  
*FALSE – normally they are pretty high because they have many strong ionic bonds.*
- 11. Lithium nitride is Li<sub>2</sub>N.**  
*FALSE – Li<sub>3</sub>N (Li<sup>+</sup> and N<sup>3-</sup>).*
- 12. Fluorine has 9 neutrons.**  
*FALSE – it has 10.*
- 13. The reaction of sodium and water makes sodium oxide and hydrogen gas.**  
*FALSE – sodium + water + sodium hydroxide + hydrogen.*
- 14. Bromine is safe to drink.**  
*FALSE – Br<sub>2</sub> is very toxic like all halogens.*
- 15. Ionic bonds are strong.**  
*TRUE because of the 3-dimensional attraction between many positive and negative ions.*

## **Atom – determine the facts**

Recommended grade: 8.

Object of activity: Answers to questions relating to the atom

Cross-curricular relationships: Physics

Target language: *Atom, nucleus, proton, neutron, electron, mass, charge, proton number, centre of an atom, hydrogen*

Aids: Worksheets, blackboard

Time allowed: 15 - 20 minutes

- We copy sheets with information on coloured paper (makes for easier viewing). If there are many students in the class, we make more copies so the students do not crowd round only one copy. We place the coloured copies on the wall or on the blackboard.
- Students work in pairs. Each pair receives a copy of the question sheet.
- If there is enough space in the classroom, pairs of students seat themselves on the floor in the middle of the classroom. If not, they remain at their desks.
- One of the pair remains seated and must not leave; he/she has the question sheet. The other student walks round the classroom and gathers information from the coloured sheets on the walls. He/she must therefore remember both the question and answer written on it.
- After about four minutes, pairs of students switch their parts, i.e. the student who had been sitting now walks round the classroom and looks for answers to the questions.
- We jointly check the questions and answers and award points to the pairs of students.

Classroom language:

*He/she is the sitter.*

*This person is given a copy of the questions.*

*The second person walks around and gathers the information.*

*He/she is the seeker.*

*Sitter and seeker exchange parts*

On/Ona je tím, kdo sedí.

Tato osoba dostane kopii s otázkami.

Druhá osoba chodí po třídě a sbírá informace.

On/Ona je tím, kdo hledá.

Sedící a hledající, vyměňte si role!

Correct answers to questions 1-17:

1. nucleus
2. tiny ball
3. protons and neutrons
4. positive
5. a proton is heavier than an electron
6. electrons
7. very far
8. an electron is lighter than a proton / virtually none
9. negative
10. neutral
11. number of protons in the nucleus
12. identical number
13. H
14. one
15. the shorthand and proton number of helium

16. two  
17. one

## **Names of chemical elements - anagrams**

Recommended grade: 8.

Object of activity: Rearrangement of scrambled English letters to form names of elements and the addition of their Czech equivalent

Target language: *Lanthanum, europium, silicon, fluorine, oxygen...*

Aids: Worksheet, or glossary, if needed

Time allowed: 10 minutes

- We begin give the students a sheet of paper with eight anagrams.
- We ask the students to rearrange the letters to form names of elements in English and to translate them into Czech.
- The first three students to finish are awarded a plus for correctly decoding and translating the elements.
- A time limit of five minutes is set for the task; the remaining time is used for checking the answers and for familiarizing the student with the elements from the anagrams.
- The students work individually.

Classroom language:

*Place the letters in the correct order  
and create the name of an element.  
Translate the name into Czech.*

*Dejte písmena do správného pořadí  
a vytvořte název prvku.  
Přeložte prvek do češtiny.*

Solutions:

TNNULAMAH **LANTHANUM** - Czech: lanthan

There is also a group of elements named after this element.

MRPUEIUO **EUROPIUM** - Czech: europium

This element carries a name of a continent.

ILIICUMS **SILICON** - Czech: křemík

This element is a component of sand.

GEIRAMNMU **GERMANIUM** - Czech: germanium

This element is a component of optical cables.

NRIO **IRON** - Czech: železo

This element corrodes in air (rusts).

INELORUF **FLUORINE** - Czech: fluór

The oxygen-free acid of this element etches (leptá) glass.

OYGXEN **OXYGEN** - Czech: kyslík

One of the by-products of photosynthesis.

PCPORE **COPPER** - Czech: měď

A red-brown metal conducting electricity.

## Acids and bases - loop

Recommended grade: 8.

Object of activity: Creation of a loop from cards based on the correct placement of questions and answers on the topic of acids and bases

Target language: See cards

Aids: Cards with questions and answers, envelope or plastic bag

Time allowed: 15 minutes

- We copy the deck of cards and cut it up for each group of students (we can use variously coloured paper to help us arrange the cards if they become mixed up). Each player should receive 4-8 cards and we adjust the number of players in the group accordingly. We also adjust the number of students in the group according to ability.
- We place the deck of cards in an envelope or a plastic bag.
- One of the players shuffles the cards and deals them to all the other players, including himself/herself.
- The person to the right of the dealer starts the game. He/she reads the text at the bottom of the card and places the card in the middle of the table. This becomes the first card in the loop.
- Each group member looks over their cards and decides if he/she has the correct answer. The player who believes that he/she holds the card which follows, announces the fact to the others and reads aloud the text "*I think I have the correct answer.*"
- Each player listens carefully and decides alongside the rest, whether it is correct or considers other possible answers. Everyone in the group concentrates on the same question and participates.
- When everyone has agreed on the answer, they place the given card under the first card as in dominoes. If they are uncertain whether it is correct, they mark the card by using coloured paper or a light pencil, so as to be able to return to it, if the loop is incomplete.
- The player who placed the second card, reads the question (first part of the sentence) at the bottom of the card which he/she has just placed.
- We continue in this way, until the loop is closed. The last card should contain the answer to the question on the first card. If it does not, the players must go through all the cards and find the mistake. Lastly, we distribute the answer sheets with solutions, or jointly check them .

### Classroom language:

*Remove the cards from the plastic bag/envelope.*

*Shuffle the cards.*

*Deal the cards in a circle until all cards are dealt.*

*The person to the right of the dealer starts the game by reading a question from any of his/her cards.*

*Place the card on the table.*

*Examine the answer on each card.*

*Read the possible answer aloud.*

*Decide if the answer that was read is*

*Vyjměte karty z plastového sáčku/obálky.*

*Zamíchejte karty.*

*Rozdávejte karty v kruhu, dokud nebudou všechny rozdány.*

*Osoba napravo od rozdávajícího zahájí hru přečtením otázky z jakékoli ze svých karet.*

*Položte kartu na stůl.*

*Prověřte odpověď na každé kartě.*

*Možnou odpověď přečtete nahlas.*

*Rozhodněte, zda přečtená odpověď,*

*the best answer.*

*Place the answer below the question  
in a domino-like fashion.*

*Read the question on the card that you  
just placed on the table.*

je nejlepší odpovědí.

Položte odpověď pod otázku ve stylu  
hry domino.

Přečti otázku z karty, kterou jsi  
položil/a na stůl.

Alternative:

The whole class plays. If we have a rather small class, we copy and enlarge the cards. Each student has a maximum of two cards which he/she successively places on the floor until a loop is formed in which the last question is again followed by the answer on the first card.

## **Chemical reactions - quiz**

Recommended grade : 8.

Object of activity: Answering questions relating to chemical reactions

Target language: See cards

Aids: Cards with questions and answers

Time allowed: 15 minutes

- Each student receives one card and the cards should be laminated.
- A student asks another at his/her desk a quiz question; next, he/she questions the other students (we allow them to move round the classroom).
- If the student concerned answers correctly (he/she does not have to answer exactly in the words on the card; he/she can use his/her own words, but in English), he/she is awarded a point and writes it down. If he/she does not answer at all or answers incorrectly, he/she are not awarded any points.
- The student with the highest number of points gained within the set time, is rewarded. We use some form of signal to end the exercise.
- Lastly, we jointly review the questions and answers.

Classroom language:

*Quiz a partner.*

*Your partner answers.*

*Switch roles.*

*If your answer is correct, you get a point.*

Ptej se spolužáka.

Spolužák odpovídá.

Vyměňte si role.

Jestliže je tvá odpověď správná, připiš si bod.

Version 1:

The whole class performs the exercise. The students take turns to draw a card. They read the question aloud to the class and the student who knows the answer, replies. We can also use the cards with a data projector (we must cover the answer).

Version 2:

The students work in groups of four. Each group needs a deck of cards. The first student spreads his/her cards into a fan and says: *"Pick a card, any card!"* The second student chooses a card, reads the question loud and the third student answers it. The fourth student checks if the answer is correct or helps, if necessary, so that his/her classmate arrives at the correct answer. The students alternate clockwise to play these parts.

Version 3:

We cut the questions from the answers, shuffle them and the students take turns to drawing one card. The correct question and answer must be matched. The students accordingly form pairs.

## Chemical formulas – noughts and crosses

Recommended grade: 8.

Object of activity: Determination of which and how many atoms of a given compound a molecule contains

Target language: *Molecule, atom*; names of compounds and elements

Aids: Soft fabric ball or paper ball, cards, blackboard

Time allowed: 15 minutes

- We fasten the cards with the text on the blackboard, reverse up.
- The students form two teams, the Noughts (Os) and the Crosses (Xs). If the class is large, the students form two teams; each with its own symbol.
- The teams take turns to throw the soft ball at the cards, on at the blackboard. We turn the card over and read the text: “*A molecule of water (H<sub>2</sub>O) contains...*” The students discuss it within their groups and the team representative reads aloud the sentence: “*Two hydrogen atoms and one oxygen atom.*” We can also ask: “*What and how many atoms does a molecule of water contain?*” and the students reply: “*A molecule of water (H<sub>2</sub>O) contains two hydrogen atoms and one oxygen atom.*”
- When the team has pronounced the sentence correctly, we take the card down and draw the team symbol in its place. When the team has answered incorrectly, the next team shall be given a chance. If none of the teams has answered correctly, we turn the card over and leave it in its place.
- The object of the game is to form a line of three symbols horizontally, vertically, or diagonally (rules of noughts and crosses).

### Classroom language:

*Throw the ball at the cards.*

*A molecule of water (H<sub>2</sub>O) contains...*

*two hydrogen atoms and one oxygen atom.*

*What and how many atoms does a molecule of water contain?*

*A molecule of water (H<sub>2</sub>O) contains*

*two hydrogen atoms and one oxygen atom.*

Házejte míčkem na karty.

Molekula vody obsahuje...

dva atomy vodíku a jeden kyslíku.

Jaké atomy a kolik obsahuje molekula vody?

Molekula vody (H<sub>2</sub>O) obsahuje dva atomy vodíku a jeden kyslíku.

### Alternative:

We do not disclose the formulae of compounds; the students must establish them themselves.

### Correct answers:

A molecule of sodium chloride (NaCl) contains one sodium atom and one chlorine atom.

A molecule of silver nitrate (AgNO<sub>3</sub>) contains one silver atom, one nitrogen atom and three oxygen atoms.

A molecule of sulphuric acid (H<sub>2</sub>SO<sub>4</sub>) contains two hydrogen atoms, one sulphur atom and four oxygen atoms.

A molecule of magnesium oxide (MgO) contains one magnesium atom and one oxygen atom.

A molecule of ferric oxide (Fe<sub>2</sub>O<sub>3</sub>) contains two iron atoms and three oxygen atoms.

A molecule of nitric acid ( $\text{HNO}_3$ ) contains one hydrogen atom, one nitrogen atom and three oxygen atoms.

A molecule of sulphur dioxide ( $\text{SO}_2$ ) contains one sulphur atom and two oxygen atoms.

A molecule of sodium sulphide ( $\text{Na}_2\text{S}$ ) contains two sodium atoms and one sulphur atom.

A molecule of potassium hydroxide ( $\text{KOH}$ ) contains one potassium atom, one oxygen atom and one hydrogen atom.

A molecule of barium hydroxide ( $\text{Ba}(\text{OH})_2$ ) contains one barium atom and two hydroxyl groups.

A molecule of glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) contains six carbon atoms, twelve hydrogen atoms and six oxygen atoms.

A molecule of ethanol ( $\text{C}_2\text{H}_5\text{OH}$ ) contains two carbon atoms, five hydrogen atoms, one hydroxyl group.

## **Types of water – coloured eggs**

Recommended grade: 8.

Object of activity: Comprehension of basic types of water based on their mineral and impurity content

Target language: *Water, fresh, dirty, soft, hard, distilled, mineral...*

Aids: Worksheet

Time allowed: 20 minutes

- The students first deal with the coloured eggs. Based on the colours of the letters, they look for and arrange the English names of various types of water (hard, soft, distilled, etc.).
- The students insert these English terms into the legend, according to colours and to their Czech equivalents.
- In view of the students' expected level of knowledge, we do not need to first to introduce the vocabulary to them.
- At the end of the exercise we assess the most successful students and reward them with a plus. We also read out the individual words as a class.
- After the coloured egg exercise has ended, the students prepare for the next task. They match types of water and their characteristic.
- After some five minutes we assess the results and again reward the students who matched everything correctly.
- The students work independently and each student corrects his/her own mistakes.

### Classroom language:

*Find words for different types of water.*

*Match the types of water to their characteristics.*

Najděte slova pro různé typy vody.

Spojte typy vody s jejich charakteristikou.

### Correct answers:

waste water	non-potable water, must be purified in a waste water treatment plant
sea water (salt water)	water with the highest level of mineral substances, not potable
distilled water	water not containing any mineral substances
drinking water	water subject to high standards, potable
soft water	water from waterworks in our water tap, good mineral content
hard water	water from wells, not suitable for washing, causes lime scale (vodní kámen)
mineral water	water with a good mineral content, usually sold in bottles e.g. Mattoni
industrial water	non-potable water, only suitable for animals and for industrial purposes

## **Molar concentrations - calculations**

Recommended grade: 8.

Object of activity: Comprehension of the calculation of molar concentrations

Target language: *Molar concentration, hydrochloric acid, sodium hydroxide, volume...*

Aids: Worksheet with problems, vocabulary, blackboard

Time allowed: 10 minutes

- We give the students a work sheet with two molar concentration calculations.
- We provide a vocabulary alongside the worksheet.
- It should not take any longer than eight minutes to review the subject of the calculation of molar concentrations.
- We jointly perform the calculations on the blackboard.
- The students who solve both problems correctly and write the answer in English, receive a "1" .
- The students work independently. Each student corrects his/her mistakes when the whole class reviews the answers.

Correct answers:

1) The molarity of sodium hydroxide solution is  $2.5 \text{ mol/dm}^3$ .

2) The volume of hydrochloric acid solution is 625 ml.

## Safety symbols – picture crossword puzzle

Recommended grade: 8.

Object of activity: Review of safety symbols encountered on chemicals

Target language: *Poison, combustible, explosive, caustic, safety symbols...*

Aids: Worksheet, colour printer

Time allowed: 5 - 10 minutes

- We give each student a picture crossword puzzle.
- We announce a competition by the three best problem solvers.
- Lastly, we jointly check the answers and the mystery word.

Classroom language:

*Complete the crossword.*

*What do the hazard symbols mean?*

Doplňte křížovku.

Jaká nebezpečí symboly znamenají?

Crossword puzzle solutions:

- 1) BIOHAZARD
- 2) FLAMMABLE
- 3) RADIATION
- 4) OXIDISING
- 5) CORROSIVE
- 6) ELECTRICITY
- 7) TOXIC
- 8) HARMFUL
- 9) EXPLOSIVE

Mystery word: DANGEROUS

Supplementary activity:

The students match the symbol and its explanation. We cut them in advance into individual cards.

OXIDISING	Chemicals which react exothermically with other chemicals.
FLAMMABLE	A substance able to catch fire easily.
RADIATION	Radioactive substances. Radiation can damage cells and cause cancer.
CORROSIVE	Chemicals which may destroy living tissue on contact.
BIOHAZARD	Living organisms which may cause infection.
TOXIC	Chemicals causing health damage at low levels.
HARMFUL	Chemicals which may cause damage to health.
EXPLOSIVE	Chemicals which may explode.

## **Air – coloured cards**

Recommended grade: 8.

Object of activity: Comprehension of the unique composition of our atmosphere and of the definitions of smog, inversion, protection of air and its pollution, creation of a small poster

Target language: *Oxygen, nitrogen, photosynthesis, smog, inversion...*

Cross-disciplinary topic: Environmental studies

Aids: Top hat, A4 paper sheets for each triad, computer with Internet access, encyclopaedia

Time allowed: 45 minutes

- Each student draws card from the top hat and no one may speak.
- The students remain silent and look for the classmates who have cards with the same topic and colour.
- The students form groups accordingly.
- The students create a small poster on the topic of the cards (A4 format). They can use a textbook, the Internet and the encyclopaedias.

Note: Due to the materials required, this should be set as homework.

- The students have 25-30 minutes to create posters containing the texts illustrating the pictures on the topic and the English translation of important information (at least five facts are to be translated).
- In the remaining time each group presents its poster to its classmates, who can ask about the topic of interest to them.
- The students then mark each other's work and display it in the classroom.

### Classroom language:

*Take a card out of the hat.*

*Don't speak, please.*

*Walk around the room, and find people with the same colour card as you have.*

*You can search for the information*

*on the internet, in books, encyclopaedias etc.*

Vytáhněte z klobouku kartičku.

Nemluvte, prosím.

Chodte po třídě a najděte partnery s kartičkou stejné barvy jako máte vy.

Informace můžete hledat na internetu, v knihách, encyklopediích atd.



## **Circus with particles**

Recommended grade: 8.

Object of activity: Full comprehension of the state, movement, and position of molecular particles of water on change of temperature

Target language: *Temperature, state ( solid, liquid, particulate)*

Aids: None

Time allowed: 10 minutes

- Adequate space being needed; the exercise should be take place outside or with the desks rearranged.
- We select 16 students to represent particles. The rest of the class observes because it will answer questions.
- Selected students form a 4x4 arrangement: *“Line up in a 4x 4 arrangement.”* They stand directly beside one another with shoulders touching, and in silence: *“You must be really close with shoulders touching. You must remain silent. Particles make no sound!”*
- We tell them that they are water at a temperature of -20 °C. They have a certain energy and should therefore vibrate a little: *“You are water at -20 °C. As you have some energy, you should be vibrating a little.”*
- We continue: *“I am turning up the temperature and you are now at -5°C.”* We ask the others in what state the particles are (still solid) and how they will move: *“What state are the particles in (still solid) and what will happen to their movement?”* The particles vibrate a little more and distance themselves from the others: *“Start vibrating a little more and get a little further apart.”*
- The particles now have a temperature of 1 °C: *“You are now at 1 °C.”* We again ask the others what state the particles are in, what will their movement be like, and what change occurred: *“What state are they in now, and what will happen to their movement? What change occurred?”* The particles begin to move more freely, but slowly, they blend and remain in close proximity to one another: *“Start moving more freely but slowly, mingling with each other but still quite close.”*
- The particles have a temperature of 50 °C: *“You are now at 50 °C.”* We ask the other students the same question. The particles are now moving faster at a greater distance from each other: *“Move a little further apart and move more quickly.”*
- The particles have a temperature of 100 °C: *“You are now at 100 °C.”* We ask the others about the changes. The particles will move even faster and move further apart from each other: *“Spread out and move quickly.”*
- They are now at 120 °C: *“You are now at 120 °C.”* The particles move much faster and they are even further apart: *“Move much more quickly and more further apart.”*
- Lastly, we summarize the discovered findings (we can switch to the mother tongue). If we continue in English, the wording is as follows: *“The higher the temperature, the faster particles move and the further apart they are from one another/the more they spread out.”*

Classroom language:

*Line up in a 4x 4 arrangement.*

*You must be really close with shoulders touching.*

Vytvořte útvar 4x4.

Musíte být opravdu blízko, dotýkat se ramen.

*You must remain silent. Particles can't make noises!*

*You are water at -20 °C.*

*As you have some energy you should be shaking a little.*

*I am turning up the temperature - you are now at -5 °C.*

*What state are the particles in (still solid), and what will happen to their movement?*

*Start shaking a little more and get a little further apart.*

*You are now at 1 °C.*

*What state are they in now, and what will happen to their movement? What change has happened?*

*Start moving more freely but slowly, mingling with each other but still quite close.*

*You are now at 50 °C.*

*Move more quickly and a little further apart.*

*You are now at 100 °C.*

*Spread out and move quickly.*

*You are now at 120 °C.*

*Move much more quickly and more further apart.*

Musíte být tiše. Částice nedělají hluk!

Jste voda o teplotě -20 °C.

Máte určitou energii, měli byste se trochu třást.

Zvyšuji teplotu – nyní jste na -5 °C.

V jakém stavu jsou částice (stále pevném) a co se stane s jejich pohybem?

Začněte se více třást a trochu se rozestupte.

Nyní máte 1 °C.

V jakém stavu jsou částice a co se stane s jejich pohybem? K jaké změně došlo?

Začněte se pohybovat volněji, pomaleji, prolínejte se, ale buďte si stále blízko.

Nyní máte 50 °C.

Pohybujte se rychleji a s většími odstupy.

Nyní máte 100 °C.

Rozestupte se a pohybujte se rychle.

Nyní máte 120 °C.

Pohybujte se rychleji a více se rozestupte.

### Supplementary activity:

The students conduct several experiments and describe what happened in each of them (what happened?) and what they observed (what did you observe?):

#### **1. Three Blocks**

Here are 3 blocks. They are the same shape and size, but are made from different materials.

Find the mass of the blocks. What do you notice? Why is this?

#### **2. Syringes**

Here are 3 syringes. One is full of sand (solid), one is full of water (liquid) and one is full of air (gas).

Try and squeeze the syringes. What do you notice? Why is this?

**DO NOT PULL OUT THE PLUNGER!!**

#### **3. Balloon**

Here are 2 balloons. One was blown up today; the other was blown up a week ago. Feel both of the balloons. What do you notice? Why is this?

#### **4. Water**

Here is a beaker full of water. It is being heated by a Bunsen burner (**TAKE CARE! The equipment is hot**). The black line represents the level which the water started at. Where is the level of the water now? Why is this?

### **5. Smells nice**

Here is an air freshener. Twist it to open it. Can you smell the fragrance? Explain why you can smell it.

Walk back a few steps. Can you smell it now?

Please close it again for the next group.

### **6. Fizzy drink**

The open bottle of fizzy drink is on the balances.

Record its mass.

What do you think will happen to its mass during the lesson?

Explain why you think this will happen.

## **Carbon – troublesome Smarties**

Recommended grade: 9.

Object of activity: Comprehension of basic terms on the subject of carbon

Target language: *Coal, black, brown, tar, coke, fuel, gas, carbonisation...*

Aids: Worksheet, colour printer

Time allowed: 10 minutes

- We give the disobedient Smarties exercise to the students, in which they must arrange the correct terms relating to carbon from the letters in the coloured circles. The Smarties may be either cut out, given to the students in an envelope or left cut up on the worksheet.
- Ten minutes are allowed, but the students, however, will probably need more time at first, because they need to learn the correct strategy for solving problems with letters in the coloured circles.
- The students work independently and the top students are given a reward in the form of a plus.
- We can supplement the activity with textbook work, where the students look for important information from the Smarties.

Classroom language:

*Put the letters together and make words relating to coal.*

Dejte dohromady písmena a sestavte slova související s uhlím.

Solutions:

TAR, COKE, CARBONISATION, GAS, FUEL, ANTHRACITE, BROWN, BLACK, COAL

## **Alternative sources of energy – semi-crossword puzzle**

Recommended grade: 9.

Object of activity: Comprehension of the issue of alternative sources of energy, insertion of missing words into the crossword puzzle

Target language: *Clean energy, solar power, geothermal, stove, biomass...*

Cross-disciplinary topic: Environmental studies

Aids: Worksheet with crossword puzzle, dictionary

Time allowed: 15 minutes

- Pairs of students receive a partially completed crossword puzzle, but every student has a different partially completed puzzle.
- We give the students five minutes to review the words in the crossword puzzle and to ensure that they understand them. If necessary, they can ask the instructor, or look in the dictionary.
- The students take turns to define the words in their respective crossword puzzles to enable their partner to insert the missing words. We ensure that they do not look into each other's crosswords and that they do not simply copy the words. If they cannot guess a word, they can leave it for later. If they cannot guess the word even later, they can disclose the word to one another.
- When all squares have been completed, the students have identical crosswords and compare them. They also check grammar and spelling.

### Classroom language:

*Help your partner fill in the other half of the crossword.*

*Give a definition for the words.*

*Take turns.*

*If you can't guess a word, return to it later.*

*Compare the crosswords and check spelling.*

Pomoz partnerovi doplnit druhou polovinu křížovky.

Vysvětli slova.

Střídejte se.

Pokud nemůžeš slovo uhodnout, vrať se k němu později.

Porovnejte si křížovky a zkontrolujte pravopis.

## **Biochemistry – “Raining” card game**

Recommended grade: 9.

Object of activity: Review of basic information about sugars, fats, proteins, and vitamins

Target language: *Sugar, fat, protein, vitamin...*

Cross-curricular relationships: Biology

Aids: Cards

Time allowed: 20 minutes

- We divide the students into groups of three or four, and hand out to them the cut up “Raining” cards.
- We familiarize the students with the rules of the game which only differs slightly from the classic “Raining” game. Each student receives four cards and one card is placed on the table, face up. The player in line must either throw out the card of the same suit as that of the placed card (hearts, spades, diamonds, clovers), or the card with the same numerical value. The queen can be placed on top of a card of any suit or value, except for an ace and a “7.” The player who puts forward the queen, decides what suit follows on the next drawn card. The next player whose turn follows after the “7” has been drawn, must take two cards, or put down another “7”. When an ace is laid down, the next player in turn, stands still, i.e. he/she can neither take a card, nor lay one down (certain rules allow the ace to be trumped by another ace). If the player does not have a card which he/she can lay down, or if he/she does not want to do so, he/she must take a new card from the deck on the table. The first player to get rid of all cards wins.
- In our case, the players must also correctly translate the English expression written on their card before they can take their turn. To make this easier, they have four choices written in plain text.
- We allow the students a total of 20 minutes during which they can count their wins.
- The instructor checks during the game if the players are observing the rules. The game should under no circumstance develop into an ordinary card game.
- When the game is finished, we assess the winner and review all the material (orally or via prepared activities).

Classroom language:

*Choose the correct translation for the English word.*

Vyber správný překlad pro anglické slovo.

Alternative:

Before the students lay out their cards, they must both correctly translate the text and explain it, or provide a specific example of it. The instructor decides whether the students are to use English or Czech.

## Salts – word puzzle

Recommended grade : 9.

Object of activity: Use of a word puzzle to learn realize how acids react with bases, metals, metal oxides, and metal carbonates to form salts

Target language: *Acid, metal, alkali, metal oxide, metal carbonate, salt, water, hydrogen*; see cards

Aids: Pieces of the puzzle, envelope or plastic bag

Time allowed: 15 minutes

- We divide the students into groups.
- Each group is given an envelope or bag containing individual pieces of a word puzzle.
- The students arrange acids and bases (alkalies), metals, metal oxides and metal carbonates to see what salts are formed in the reactions:



- The first group to match the elements/compounds correctly, wins.
- Lastly, we jointly check and read through all material.

### Classroom language:

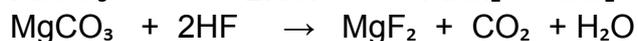
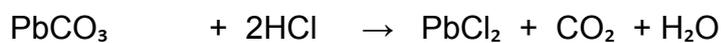
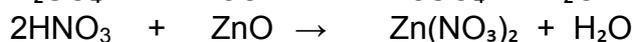
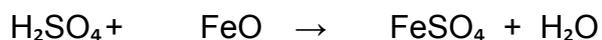
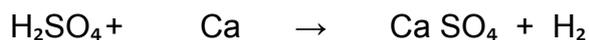
*Put the correct pieces together.*

*Learn how a reaction with an acid forms a salt.*

Spojte k sobě správné dílky.

Naučte se, jak reakcí s kyselinou vzniká sůl.

### Correct solutions:



## **Mixtures, atoms and molecules – fill in the blanks**

Recommended grade: 8.-9.

Object of activity: Insertion of missing letters into the words on the subject of mixtures, atoms and molecules

Target language: *Atom, mixture, solution, filtration, ion, element, molecule...*

Aids: Blackboard

Time allowed: 10 minutes

- We write on the blackboard words which relate to two (or perhaps more) topics of discussion. We have mixtures and their classifications, atoms and molecules. Each word lacks at least one letter (at the instructor's discretion).
- We divide the students into groups. The number of students is based on the number of topics to be covered.
- Individual group members stand behind the line, facing their group of words.
- The first member of each group runs to the blackboard and inserts letters into any word of his topic. He/she then returns to his/her group and hands the chalk to the next member.
- We continue this exercise, until all of the words are filled in.
- The group which correctly fills in the highest number of words, wins.

Classroom language:

*Run to the board.*

*Fill in one of the words.*

*Run back and give the chalk to the next team member.*

Vyběhněte k tabuli.

Doplňte jedno ze slov.

Utíkej zpátky a dej křídu dalšímu členu týmu.

### **Mixtures**

MI\_TU\_E  
S\_LUTION  
FIL\_RA\_ION  
\_VA\_ORATION  
SE\_IMENTATION  
\_E\_OSOL  
SU\_LI\_ATION  
\_MULSION  
THA\_ POINT  
\_OILING POINT

### **Atoms and molecules**

CHEMICAL\_OND  
\_T\_M  
ELE\_EN\_  
MOLE\_ULE  
ELE\_T\_ON  
\_E\_TRON  
IO\_  
CÔ\_PO\_ND  
LIQUID S\_ATE  
P\_O\_ON

Alternative:

The words can be used to play "Hangman".

Supplementary activity:

We give the students time to memorize as many words on the blackboard as possible. We cover the words and the students write them down on paper.

## Chemical reactions – matching game

Recommended grade: 8.-9.

Object of activity: Matching the text with the word

Target language: See cards

Aids: Cards, worksheet with frames

Time allowed: 10 to 15 minutes

- We cut up the worksheet with text into cards and laminate them (two rows of cards on one sheet).
- We copy the worksheet with empty frames.
- Pairs of students receive a deck of cards, a list with terms and empty frames.
- They must place the card with correct description or text into an empty frame.
- The pair of students which correctly completed the task first, wins.
- Lastly, we jointly check the answers (we can enlarge a copy of the sheet with correct solutions, place it on the blackboard or repeat the same procedure which the students implemented in pairs).

### Classroom language:

*Place the descriptions next to the matching words in the blank squares.*      Umístěte popisy do prázdných okének vedle odpovídajícího slov.

### Alternative:

We can also cut up and laminate the cards with words, and ask the students to form pairs of matching cards.

### Correct solutions:

<b>Chemical Reaction</b>	A change when new products are made that are different from the reactants	<b>Combustion</b>	Another name for burning
<b>Freezing or Melting</b>	A physical change	<b>Fire triangle</b>	Fuel, oxygen, heat
<b>Fizzing</b>	Means a gas has been produced	<b>Oxide</b>	Made when a substance burns in oxygen
<b>Change in smell, colour, temperature</b>	Means a chemical reaction has taken place	<b>Fossil Fuel</b>	Naturally occurring fuels that were made underground a long time ago

<b>Corrosive</b>	Some acids	<b>Carbon Dioxide</b>	Made when carbon burns in oxygen
<b>Product</b>	Any new substance that is made during a chemical reaction	<b>Air</b>	21 % oxygen, 78 % Nitrogen, 1 % other gases
<b>Reactant</b>	The substances we start with	<b>Fuel</b>	Produces energy when it is burned
<b>Squeaky Pop</b>	Test for Hydrogen	<b>Main fossil fuels</b>	Coal, oil, and natural gas
<b>Milky Limewater</b>	Test for Carbon Dioxide	<b>Water vapour</b>	Produced when hydrogen reacts with oxygen
<b>Acid + Metal</b>	Produces Hydrogen	<b>Acid + Carbonates</b>	Produces Carbon Dioxide

## **pH around us - experiment**

Recommended grade: 8.-9.

Object of activity: Demonstration to the students that chemistry is all around us, comprehension of the terms indicator, pH, acid and hydroxide

Target language: *Indicator paper, knife, soap, vinegar, lemon, egg, tomato...*

Aids: Method, 100 ml beaker, indicator paper, knife, vinegar, mineral water, eggs, tomatoes, ketchup, mayonnaise, baking soda, shampoo, lemon, washing detergent, Savo, Coca-Cola, juice, deodorant, hair polish, etc., running water, cloth

Time allowed 30 minutes

- We divide the students into pairs and give each pair the required aids (see above).
- The students are given a set of instructions for the laboratory experiment to review (see below).
- After handing out the necessary aids, the students follow the instructions. Each group measures the pH of at least five samples. More rapidly working groups can measure the pH of more samples.
- Students write their results into the prepared table.

### Method of working (ENG):

Take a beaker and make a solution, e.g. squeeze the juice of a tomato or a lemon, or mix a powder into water.

Pour the liquid compound into the prepared beaker.

Spray aerosol compounds directly on the indicator paper.

Take the indicator paper and immerse it in the solution.

Read the pH on the scale and write the value into the prepared table.

When the experiments have been performed, show the prepared table to the instructor.

## Hydrocarbons – quartet (similar to “Go fish”)

Recommended grade: 9.

Object of activity: Memorisation of the names and formulae of eight basic hydrocarbons (methane-octane)

Target language: *Hydrocarbons, methane, butane, propane, pentane, hexane ...*

Aids: Cards

Time allowed: 20 minutes

- We divide the students into groups of four and hand decks of cards to them.
- Students play according to the rules of Quartet, i.e. the player to the left of the dealer begins. The player asks any of the others for a specific card from the quarter of which he/she must have at least one card. If the player requested has this card, he/she must give it to the person asking. The latter can ask either the same player or another player for another card.

Note: If the player does not have the card in question, he/she takes the next turn and can ask someone else for any card which would fit into his/her quartet.

**Ensure** that they only ask for a card belonging to the quarter, from which they hold at least one card! The winning player is the one who has the highest number of quartets at the end of the game.

- The instructor checks during the game that the rules are obeyed and is ready to answer questions relating to hydrocarbons which the students may ask if they do not understand something.
- We allow the students 20 minutes. During this time, they can play several rounds of the game.
- After the game is finished, the students read the names of hydrocarbons, formulae and they determine how many atoms of carbon and hydrogen they have.
- We summarize the topic of hydrocarbons and write the names of eight basic ones together with their formulae into the notebook.

Classroom language:

*Míra, I would like to get 3A from you.*

*Have you got 3A?*

*Methane has one atom of carbon and four atoms of hydrogen.*

Míro, od tebe bych rád/a dostal/a 3A.

Máš 3A?

Metan má jeden atom uhlíku a čtyři atomy vodíku.

## What is the chemical element?

Recommended grade: 8.-9.

Object of activity: Arrangement of the letters in the word to form the name of an element

Target language: Names of elements in the periodic table

Aids: Cards with scrambled letters in the names of elements, sheets of paper/blackboard

Time allowed: 10 -15 minutes

- We provide as many copies of names with scrambled letters as there are groups and cut them up into individual cards. We always use only some cards and not all of them at once; otherwise, the game would last too long. The cards should be laminated for re-use.
- The students divide into several teams.
- Each team receives a card with the same name of the element to be unscrambled (fairness). The cards are given to them reverse up, and are turned over and the name is unscrambled only when the teacher gives the signal.
- They write the name of the element on paper, or the team representative writes it on the blackboard. We limit the time allowed for unscrambling the name.
- The first team to write the name of the element correctly is awarded a point.
- We repeat the process for the additional cards.
- The team with the highest number of points, wins.
- Lastly, we jointly read the names of the elements and ensure that they are correctly pronounced.

### Classroom language:

*Turn the card over.*

*Unscramble the word.*

*Write the word down on the paper/board.*

Otočte kartu.

Rozkódujte slovo.

Napište slovo na papír/tabuli.

### Alternative:

The students are given a worksheet with scrambled letters in the names of elements and form their correct individual names. This may also be given as homework.

### Solutions:

- |              |       |            |       |
|--------------|-------|------------|-------|
| 1. aluminium | _____ | 2. argon   | _____ |
| 3. arsenic   | _____ | 4. barium  | _____ |
| 5. beryllium | _____ | 6. boron   | _____ |
| 7. bromine   | _____ | 8. kalcium | _____ |
| 9. carbon    | _____ | 10. cesium | _____ |

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11. chlorine	_____	12. chromium	_____
13. cobalt	_____	14. copper	_____
15. fluorine	_____	16. gold	_____
17. helium	_____	18. hydrogen	_____
19. iodine	_____	20. iron	_____
21. krypton	_____	22. lead	_____
23. lithium	_____	24. magnesium	_____
25. manganese	_____	26. mercury	_____
27. neon	_____	28. nickel	_____
29. nitrogen	_____	30. oxygen	_____
31. phosphorus	_____	32. platinum	_____
33. potassium	_____	34. radium	_____
35. silicon	_____	36. silver	_____
37. sodium	_____	38. strontium	_____
39. sulphur	_____	40. tin	_____
41. titanium	_____	42. uranium	_____
43. xenon	_____	44. zinc	_____

## **Symbols of chemical elements – dominoes**

Recommended grade: 8.-9.

Object of activity: Review of the names of chemical elements and their symbols (matching)

Target language: Names of chemical elements

Aids: Domino cards with names of elements and their symbols

Time allowed: 15 minutes

- We cut up the worksheet into individual cards which should be laminated.
- Pairs play and players sitting opposite one another play against another pair sitting at right angles, but members of pairs must not talk to one another.
- The cards are spread on the desk face down and thoroughly shuffled.
- Each pairs draws 21 cards so that the entire deck is dealt out before the game begins (two decks of 21).
- The opening player chooses one of his/her cards, reads the expression written on it, and places it in the middle of the table.
- The player whose turn it is next, selects a card matching the card already laid down. He/she places the card at the end of the line and again reads the expression.
- The card may only be placed at one end of the line. No cards may be added to the middle of the line. A player who does not have such a card to put down says "Go on" and misses a turn.
- The game ends, when one of the players puts down his/her last card. The game is won by the pair with the smallest remaining number of cards. The game also ends, if none of the players is able to continue. The pair with the smallest number of remaining cards wins.

These rules are subject to many variations, but the following domino rule always applies, namely that only a card which corresponds to the card already laid down can be added at either end of the set.

## **We are buying chemical elements and their compounds**

Recommended grade: 8.

Object of activity: Collection of the right number of cards with symbols of elements in order to form their compounds

Target language: Chemical elements and their compounds

Aids: 2 decks of cards, *product cards and element cards*

Time allowed: 15 minutes

- We divide the students into groups of three.
- We place the product cards round the classroom (we hang them on the wall).
- Each group has a deck of element cards.
- The groups “buy” products from the element cards – 2 H and 1 O must be provided to buy the H<sub>2</sub>O product.
- They take the product card and place the required number of all elements next to it.
- The product cards must be matched to the element cards prior to the next purchase.
- Points only awarded for correctly matched cards.
- The group which correctly places the element cards next to matching product cards, wins.
- Lastly, the students state: “H<sub>2</sub>O requires two Hs and one O.”

### Classroom language:

*You can ‘buy’ products using your element cards.*

*Each product card must be matched to its element cards.*

*Take your product card and place the appropriate number of element cards next to it.*

*H<sub>2</sub>O requires two Hs and one O.*

Produkty můžete nakoupit za své prvkové karty.

Ke každé produktové kartě musí být přiřazeny prvkové karty.

Vezměte svou produktovou kartu a umístěte vedle ní odpovídající počet prvkových karet.

H<sub>2</sub>O vyžaduje dvě H a jedno O.

## Separating mixtures - test

Recommended grade: 9.

Object of activity: Selection of the correct answer to the question from four possible options

Target language: See worksheet.

Aids: Worksheet

Time allowed: 10 minutes

- Each student is given a worksheet with questions.
- Each student must try to mark the correct answer within the time limit.
- They then exchange the worksheets among themselves and check the answers. The students legibly correct their mistakes and return the worksheet to their classmates.

Note: We can occasionally repeat the test during the school year.

### Correct solutions:

1. Which one of these solids dissolves in water?  
Salt   sand   chalk   sulphur
2. When can filtration be used ?  
To separate a solid from a liquid.  
To separate two liquids.  
To crystallise salt.  
To separate a mixture of different coloured dyes.
3. During filtration, an insoluble solid collects in the filter paper. What is this called?  
Solute                  solvent                  filtrate                  residue
4. During filtration a liquid passes through the filter paper. What is this called?  
Chalk                  residue                  filtrate                  insoluble
5. Which techniques could be used to get salt from a dry mixture of salt and sand?  
Dissolve the salt, filter the solution, re-crystallise the salt.  
Fractional distillation.  
Chromatography.  
Filter the dry mixture, crystallise the salt.
6. Seawater is a mixture, what does it consist of...?  
Salt and gases          water                  Water, salt and gases          Water and salt
7. Which of these is a mixture?  
Oxygen          quartz          air          copper sulphate
8. Which of these is not a mixture?  
Seawater          granite                  Calcium carbonate          air

9. Which of these statements are true?

Mixtures have a fixed composition.

Mixtures are hard to separate.

In mixtures, the atoms or compounds are joined together.

Mixtures do not have a fixed composition.

10. Which of these statements are true?

Compounds are easy to separate.

Compounds have a fixed composition.

Compounds do not have a fixed composition.

In compounds, the atoms or particles are not joined together.

## **How to treat an insect bite**

Recommended grade: 8.-9.

Object of activity: Learning how to get rid of pain caused by a wasp or a bee sting, design of a page of a health book

Target language: *Wasp and bee sting, treat, neutralise, indicator, pH, chemical (n), water, vinegar, bicarbonate, weak acid and alkali*

Cross-curricular relationships: ICT, biology, art class

Aids: Worksheet, PC, books, pH indicator, water, acid, antacid, weak base marked '*wasp sting*,' weak acid marked '*bee sting*'

Time allowed: Small project

- The students perform a part of the task at school and a part at home.
- Each student receives a worksheet and works either in a pair or in a small group.
- The students complete the worksheet over the course of the experiment.
- The students design a page of a health book containing information about insect bites, how to treat them, and what chemicals are present in wasp and bee stings, either as homework, or in consultation with the art teacher.

### Classroom language:

*While doing the investigation, complete the worksheet.*

*Determine how to stop the pain from bee and wasp stings.*

*You need a container of a weak acid labelled 'bee sting' and a container of a weak alkali labelled 'wasp sting'.*

*You also need vinegar, water and bicarbonate and a universal indicator.*

Během výzkumu, vyplňte pracovní list.

Určete, jak se zbavit bolesti způsobené bodnutím včely a vosy.

Potřebujete nádobku slabé kyseliny označené včelí bodnutí a nádobku slabé zásady označené vosí bodnutí.

Také potřebujete ocet, vodu, žrávčí sodu, potom univerzální indikátor.

## **Metals and their reactions – domino**

Recommended grade: 8.

Aim of the activity: Correct matching of cards

Target language: See cards

Aids: Domino cards

Time allowed: 15 minutes

- We cut the worksheet into individual cards (they should be laminated).

Note: We can use a smaller number of cards for the game, depending on how much time is available.

- Students form groups of four. Each group member receives ten cards which he/she places face-up on the desk.
- The first player places one domino card in the middle.
- Each student looks at his/her card and if she/she has the card which follows the card just placed, the question and answer must match. They discuss the alternatives (they read the text aloud ) and select the card which they believe is correct.
- The process is repeated until all of the cards have been laid down.
- Lastly, we discuss the correct solutions. We can prepare larger cards so that all the students can see them and place the solutions on the board. The students go to the board and match the correct cards (they must always read the text). The others check the answers.

### Classroom language:

*Lay out the cards on the desk face up.*

*Place one domino in the middle.*

*Have a look at all the other cards, and decide which card goes with it.*

*Discuss possible answers.*

*Keep going until all the dominoes are paired.*

Vyložte karty na lavici lícovou stranou nahoru.

Položte jedno domino doprostřed.

Podívejte se na všechny ostatní karty a rozhodněte, která karta k ní patří.

Prodiskutujte možné odpovědi.

Pokračujte, dokud nebudou spárované všechny karty.

## Isotopes – board game

Recommended grade: 8.

Object of activity: Collection of neutrons, protons, and electrons, and the creation of isotopes

Target language: *Proton, electron, neutron, isotope, mass, atomic number, names of chemical elements*

Aids: Playing dice, cards with isotopes and particles

Time allowed: 30 minutes

- The students play in groups of three or four.
- One of the players is the banker that holds all of the cards with isotopes and particles.
- Each player begins with two neutrons, two protons, and two electrons.
- Each player rolls the dice and the player with the highest score begins.
- The first player rolls two dice and either receives a particle, loses a particle, or receives a card with chance, depending on his/her score
  - 2 - Pick up a chance card
  - 3 - Pick up 5 neutrons
  - 4 - Pick up 5 electrons
  - 5 - Pick up 5 protons
  - 6 - Pick up 4 protons
  - 7 - Pick up 4 neutrons
  - 8 - Pick up 4 electrons
  - 9 - Pick up 2 neutrons
  - 10 - Pick up 2 electrons
  - 11 - Pick up 2 protons
  - 12 - Pick up a chance card
- The next player then rolls.
- The player can exchange his/her particles for a card with isotope at any time during the game.
- The player who collects all the isotopes of a given element must call out: *"ISOTOPES!"* and is awarded 30 bonus points plus the mass number of the element in points. They exchange the cards with particles for cards with the corresponding isotope.
- Lastly, each states say how many particles are needed for a given element: *"To claim boron – 11, you will need 5 protons, 5 electrons and 6 neutrons."*

For example:

11

B

5

*to claim boron – 11, you will need 5 protons, 5 electrons and 6 neutrons*

Classroom language:

*You act as a banker.*

*Hold all the isotope cards and particles.*

*Each player starts with 2 neutrons,  
2 protons and 2 electrons.*

Ty hraješ bankéře.

Spravuj všechny karty s izotopy  
a částicemi.

Každý hráč začíná se 2 neutrony,  
2 protony a 2 elektrony.

*Roll the dice. The player with the highest score goes first.*

*Collect particles, lose particles, or pick up a chance card depending on which number is rolled.*

*You can exchange your particles for an isotope card at any time.*

*When you collect all the isotopes of, an element shout ISOTOPES and get a bonus 30 points.*

Házej kostkou. Hráč s nejvyšším skóre začíná.

Sbírej částice, ztrácej částice nebo získej šanci. Záleží na tvém skóre.

Můžeš kdykoli vyměnit částice za kartu s izotopem.

Když nasbíráš všechny izotopy prvku, vykřikni ISOTOPES a získej bonus 30 bodů.

## **The house that Tom built**

Recommended grade: 9.

Object of activity: "To build a house" using questions and answers

Target language: *Tile, glass, brick, concrete, limestone, building material*

Aids: worksheets

Time allowed: 30 minutes

- Each group of three students receives a picture of a house (preferably in A3 format), questions and text, where they can search for the required information.
- The students look for answers to the questions but they must not make notes. They must remember the answers.
- One of the group members asks for a question from a section.
- The group is awarded a card from a section (Tile, Brick, Glass, Concrete) for a correct answer, which they place on the corresponding part of the house (the parts are numbered). If the answer is wrong, the next group is given a chance.
- The group which covers all parts of the house first, wins and so the house has been built.

### Classroom language:

*Research the answers to the questions, but **don't** write anything down.*

*You must answer the questions from memory.*

*One person from the group requests a question from a given section.*

*Place the card on a number in the relevant part of your house.*

*Vyhledejte odpovědi na otázky, ale nic si nepište.*

*Musíte odpovědět na otázky z paměti.*

*Jedna osoba ze skupiny požádá o otázku z dané sekce.*

*Položte kartu na odpovídající číslo v části domu.*

## **Ionic jigsaw**

Recommended grade: 8.-9.

Object of activity: Creation of ionic compounds using pieces of a jigsaw puzzle

Target language: *Positive and negative ion, anion, cation, chemical compound, metal, non-metal...*

Aids: Pieces of jigsaw

Time allowed: 15 minutes

- We make several copies of the pieces of the jigsaw, cut them up and laminate them. We arrange them into individual sets.
- The students can work in groups, pairs, or independently. The instructor gives instructions in English.
- Tasks which the jigsaw may be used for:

### **A**

*Arrange your jigsaw into three groups:*

*Metals, non-metals and electrons.*

*Make a list of the ions for each of the metals and non-metals.*

*Find a sodium ion, a calcium ion and an iron ion in your jigsaw.*

*Describe how you would make each of these ions into an atom again.*

*Find a bromide ion, a nitrate ion and an oxygen ion.*

*Describe how you would make each of these ions into an atom again.*

Uspořádejte dílky skládačky do tří skupin: Kovy, Nekovy a Elektron

Vytvořte seznam iontů pro ve skupině Kovy a Nekovy.

Najděte dílky s iontem sodíku, vápníku a železa.

Popište, jak byse z těchto iontů znovu vytvořili atom.

Najděte ion bromidu, dusičnanu a kyslíku.

Popište, jak byste z těchto iontů znovu vytvořili atom.

### **B**

*Make sodium chloride (this is a common salt used in cooking).*

*The chemical formula for sodium chloride is NaCl.*

*Where is sodium chloride commonly present?*

*Make and note the name and formula for potassium chloride, sodium iodide and potassium fluoride.*

*Make and note the name and formula for calcium, oxide, lead oxide, calcium fluoride and silver chloride.*

Vytvořte chlorid sodný (jedná se o kuchyňskou sůl).

Vzorec pro chlorid sodný je NaCl.

Kde je chlorid sodný běžně přítomný?

Vytvořte a zapište si vzorec pro chlorid draselný, jodid sodný a fluorid draselný.

Vytvořte a zapište si vzorec pro oxid vápenatý, oxid olovnatý, fluorid vápenatý a chlorid stříbrný.

## C

### Classroom language:

*Make and note the name and formula for zinc carbonate.*

*Make a note down the THREE different atoms that go together to make up zinc carbonate.*

*Make and note the name and formula for lead sulphate, iron sulphate, silver nitrate and potassium nitrate.*

*For each of the four compounds write down atoms that create these compounds.*

Vytvořte a zapište název a vzorec pro uhličitan zinečnatý.

Zapište tři různé atomy, ze kterých lze vytvořit uhličitan zinečnatý.

Vytvořte a zapište název a vzorec pro síran olovnatý, síran železnatý, dusičnan stříbrný a dusičnan draselný. Pro čtyři uvedené sloučeniny zapište atomy, které je tvoří.

## D

*Make and note the name and formula for aluminium oxide, iron oxide and aluminium sulphate.*

*Make and note the name and formula for some of your own chemical compounds.*

Vytvořte a zapište název a vzorec pro oxid hlinitý, oxid železitý a síran hlinitý.

Vytvořte a zapište název a vzorec některých vašich chemických sloučenin

## Medication – numerical codes

Recommended grade: 9.

Object of activity: Comprehension of the classification of medications based on their effect on the organism

Target language: *Pharmaceuticals, analgesics, antidepressant, medicine, fever...*

Aids: Worksheet

Time allowed: 10 minutes

- We provide the students with a worksheet with numerical codes and explain to them how to arrange the terms using these codes.
  - Each number designates a single letter of the alphabet.
  - The student records these letters based on the number in the code until he/she arrives at the term for the class of medication (in English) and an example of a specific medication (in Czech).
- The students work independently. They compete to see who can decode all of the words first.
- After the terms have been assembled, we review the effects of the medication on the organism and the situations in which they are administered to a person, etc. (in English).
- Lastly, we jointly summarize the exercise, using the vocabulary.

### Classroom language:

*Paralen is an antipyretic drug.*

*We use/take it when we have a fever.*

*painkillers*

*antidepressants*

*drugs active against bacteria*

*sedative drugs*

*antihistamines*

*antipyretic drugs*

Paralen je lék proti teplotě.

Užíváme/bereme ho, když máme horečku.

léky proti bolesti

léky na zmírnění deprese

léky působící proti bakteriím

uklidňující léky

léky používané k léčbě všech projevů alergie

léky proti teplotě

### Correct answers:

ANALGETICS

ANTIDEPRESSANTS

ANTIBIOTICS

SEDATIVES

ANTIHISTAMINES

ANTIPIRETTICS

IBALGIN

DEPREX

PENICILIN

ROHYPNOL

ZYRTEK/XYZAL

PARALEN

## **Discovering oxygen – working with text**

Recommended grade: 9.

Object of activity: Answering questions based on an article

Target language: See written texts

Aids: Copies of articles

Time allowed: 15 minutes

- We hand out the texts with questions to the students. The students work independently.
- The students read the articles and prepare the answers to the questions under the text. They are allowed to make notes. We place a time limit for preparation. They can use a mini-dictionary to help them to understand the text completely.
- We jointly read the articles aloud and the students interpret their answers to the entire class.
- Lastly, they interpret the information which they read about famous chemists, using their own words.

## **Dancing raisins - experiment**

Recommended grade: 8.-9.

Object of activity: Comprehension of the principle of a chemical reaction

Target language: *Dancing raisins, experiment, beaker, vinegar, baking soda...*

Aids: Instruction sheet, beaker (250 ml), vinegar, baking soda, raisins,

Time allowed: 20 minutes

- We begin by dividing the students into pairs; each pair is given a 250 ml beaker, approximately 300 ml of vinegar, and a packet of baking soda.
- The students are also given laboratory instructions and a worksheet with several questions to consider.
- After the required aids have been distributed, the students follow the instructions; they can repeat the experiment.
- They insert questions into the worksheet in the course of the experiment, to be shall be assessed at the end of the class.

## Halides - pexeso

Recommended grade: 8.

Object of activity: Matching the correct name in English to the formula of the halide

Target language: *Sodium chloride, manganese (III) iodide, cadmium dichloride ...*

Aids: paper, colour printer, scissors, pencil

Time allowed: 15 minutes

- We divide the students into groups of three.
- We provide each group with pexeso cards prepared in advance, on which the students look for the formulae of selected halides and their English translation.
- After explaining the principle of the game (same rules as in classic pexeso; the student look for two matching cards, in all cases a formula of a halide and the English translation).
- We allow the students 10 minutes for the game and observe the winners of individual matches. The students can repeat the game several times during these 10 minutes. They must always attempt to name a halide in English.

### Supplementary activity:

We hand out a table with formulas and names of halides to the students, and they must fill in the missing formulas and names of compounds (the table is in Czech).

Název	Vzorec	Název	Vzorec
chlorid stříbrný		bromid měďnatý	
	NaCl		CaI <sub>2</sub>
jodid manganitý		chlorid hořečnatý	
	ZnBr <sub>2</sub>		KF
fluorid vápenatý		fluorid draselný	
	FeCl <sub>3</sub>		RbBr

## **Chemistry equipment - pexeso**

Recommended grade level: 8.

Aim of the activity: to match the correct name in English to the picture of chemistry equipment

Target language: *Test-tube, boiling flask, beaker, watch glass, burner ...*

Aids: Paper, colour printer, scissors, or list of vocabulary, if needed

Time allowed: 15 - 20 minutes

- We divide the students into groups of three to four.
- We provide the groups with pexeso cards prepared in advance, in which the students find various pictures of chemical equipment and short English descriptions. We additionally lend students an English vocabulary to refer to if necessary.
- After explaining the principle of the game (same rules as in classic pexeso – the student search for two cards that match together, always a picture and the English word), the game can begin.
- We allow the students 15 minutes for the game and note the winners of individual matches. The students can repeat the game several times during the said 15 minutes. We encourage the students to read the word on the card.
- At the end of the exercise we assess the best pexeso players in individual groups.

## **Safety symbols - pexeso**

Recommended grade: 8.

Object of activity: Matching the symbol and the correct term, comprehension of the labelling of chemical compounds

Target language: *Corrosive, explosive, toxic, irritant...*

Aids: Worksheet with cards, colour printer, scissors

Time allowed: 15 minutes

- We divide the students in groups of three and give each group the cut-up pexeso cards.
- After the cards have been cut up, the students can begin playing; the rules are the same as for classic pexeso. They match the picture of the chemical symbol and its meaning in words.
- We can provide the students with a vocabulary during the first game if they do not know certain words and if they do not remember them when cutting up the cards. The player states each time what the given symbol means, or reads it.
- The students can within the 15 minutes allotted, play the pexeso game several times, adding up the points received during this period.
- When the game has finished, we reward the students who received the highest number of points during the game (awarding them a plus in the activity of the lesson).

### Supplementary activity:

The students can glue their symbols in their notebooks, describe them, and provide examples of individual types of chemical substances. The students can work in groups.

## Become a magician - experiment

Recommended grade: 8.

Object of activity: Identification of various types of cations of elements which colour the flame of a burner

Target language: *Experiment, flame test, graphite, compounds, cation...*

Aids: (Bunsen) burner, 5\*lead, lighter (matches), 10% HCl solution, water, beaker (2\*100 ml), sample no. 1 – LiBr or LiCl, sample no. 2 - Na<sub>2</sub>SO<sub>4</sub> or NaCl, sample no.3 - KNO<sub>3</sub> or K<sub>2</sub>CO<sub>3</sub>, sample no.4 - CaCO<sub>3</sub> or CaBr<sub>2</sub>, sample no.5 - CuI<sub>2</sub> or CuBr<sub>2</sub>, worksheet with instructions, table of colour changes of the flame when using various cations of elements, sheet of results

Time allowed: 15 - 20 minutes

- We divide the students into two-member teams.
- We provide these teams with a worktable, including the following prepared tools, namely, burner (preferably gas), 5\*lead, lighter, beaker with 10% hydrochloric acid, beaker with water and five unknown substances (preferably on a watch-glass).
- We also provide the teams with a set of instructions, a sheet for recording results and a table of flame colour changes (see points 1, 2, 3).
- We provide the students with space to perform the flame investigations and caution them of the need to comply with the written instructions.
- We assess accuracy (i.e. whether the students correctly determined and recorded individual cations in the prepared results sheet).
- Each student hands his/her their results sheet to the instructor, who rewards the team for correctly completed results sheets.

Pracovní postup (ČJ):

**NEPŘEKLÁDAT DO AJ!!!**

Uchopte tuhu a namočte ji do 10% roztoku kyseliny chlorovodíkové, následně ji žíhejte

v plameni kahanu tak dlouho až se plamen přestane zabarvovat. Poté tuhu lehce omočte ve vodě tak, abyste na ni mohli přichytit krystalky vzorku. Vložte tuhu s krystalky vzorku do plamene a pozorujte změny zbarvení plamene. Dle barvy plamene do záznamového archu zapište, jaký kation daný vzorek obsahoval. Jako pomůcku lze využít tabulku barevných změn plamene. Postup opakujte i s dalšími čtyřmi vzorky.

## **Pesticides – true or false**

Recommended grade: 9.

Object of activity: Review of important information about pesticides

Target language: *Pesticides, acaricides, herbicides, insecticides...*

Aids: Strips of paper with text, top hat/plastic bag

Time allowed: 10 minutes

- We cut the table up into individual strips and place them in the top hat / bag.
- The class is divided into teams.
- One team representative comes to the top hat and pulls out a strip of paper.
- He/she shows it to the others and they jointly decide if the statement is correct or not.
- If they answer correctly, the team is awarded a point. If they can correct the incorrect statement, they are awarded two points and if they can do it in English, they are given an additional point.
- The team with the highest number of points, wins. We can reward the most active students with a "1" grade.

### Classroom language:

*Take a piece of paper out of the hat.*

*Decide all together if the statement is true or false.*

*Do you know the correct answer?*

*One extra point for you if you can say it in English.*

Vytáhne proužek z klobouku.

Společně rozhodněte, zda je tvrzení pravdivé či nepravdivé.

Znáte správnou odpověď?

Jeden bod navíc pro vás, pokud to řeknete anglicky.

### Correct answers:

<b>Statements</b>	<b>xxx</b>	<b>xxx</b>
1) Pesticides – insect killer	YES	NO
2) Herbicides - weed killer	YES	NO
3) Acaricide - mite killer	YES	NO
4) Insecticide – spider killer	YES	NO
5) Fungicide - mushroom and molds killer	YES	NO
6) Rodenticide - bird killer	YES	NO
7) Molluscicide - snail killer	YES	NO
8) Pesticides are only synthetic	YES	NO
9) Pesticides are often not a component of GM crops	YES	NO
10) Pesticides can damage our health	YES	NO

## **Important metals**

Recommended grade: 8.

Object of activity: Comprehension of the basic properties and uses of metals

Target language: *Slug, mercury, copper, gold, iron, silver ...*

Aids: Worksheet, top hat, access to a PC and internet

Time allowed: 45 minutes

- Each student takes a card from the top hat; nobody may speak.
- The students silently look for the three classmates who have cards with the same topic and colour.
- The students form groups on this basis.
- The students then complete the worksheet, in which they record the information o metals which they found, i.e. a basic description of the metal concerned (i.e. properties and uses), as well as its brief history. Lastly, they try to summarize the information about the metal in short English sentences (may also be given as homework). Each group actively uses available information from Internet. They work with Czech web pages.
- The students use the remaining time to look for information and to record it in their worksheets.
- The worksheets are submitted to the instructor for review at the end of the lesson. Close cooperation with the English teacher would be appropriate to help correct the English text which the students created.
- We return the worksheets to the students during the next lesson, to enable them to use them for presentation to the others.
- During the presentation, each group writes on five words the blackboard , which their classmates should memorize, relating to significant metals.
- Lastly, we can hang the individual worksheets on the walls for the students to see.

### Classroom language:

*Take a card out of the hat.*

*Don't speak, please.*

*Walk around the room, and pair up with others who have the same colour card as yours.*

*Search for the information on the internet.*

*Complete the worksheet.*

Vytáhněte z klobouku kartičku.

Nemluvte, prosím.

Chod'te po třídě a najděte partnery s kartičkou stejné barvy jako máte vy.

Hledejte informace na internetu.

Vyplňte pracovní list.

## **Fire extinguisher – fill in the blanks**

Recommended grade: 8.

Object of activity: Comprehension of the principle of using certain types of fire extinguishers when extinguishing various sources of fire

Target language: *Water, powder, sand, halon, fire-extinguishers, extinction...;*  
passive voice

Aids: Worksheet, dictionary

Time allowed: 10 - 15 minutes

- We hand a worksheet to pairs of students on which they will find two texts with missing words. The first text is in the mother tongue, and they must fill in the missing words without any hints. The second text is identical in content, but in English and the students have hints available to them, i.e. they choose from a group of words all of which belong in the text.
- We set a time limit for the insertion of the texts. They first complete the Czech text, then the English text (we allow a little more time and permit the use of a dictionary). We reward rapid correct answers.
- Lastly, we jointly check the answers.

Classroom language:

*Complete the missing words in the text.*

*Doplňte do textu vynechaná slova.*

Solutions:

Při hašení požárů můžeme používat různé hasební prostředky. V případě, že hoří dřevo, uhlí nebo seno lze použít vodní hasicí přístroj. Tento hasební prostředek nikdy nesmíme použít při hašení elektrických zařízení pod napětím nebo lehkých kovů. Malé požáry lze hasit pískem, který je zadusí.

Pěnový hasicí přístroj využíváme na hašení unikající nafty nebo benzínu, nelze jej použít na lehké kovy nebo elektrická zařízení pod proudem. Elektrická zařízení pod napětím můžeme hasit práškovým hasicím přístrojem, který využijeme i při požárech knihoven nebo archívů, abychom nezničili jednotlivé artefakty.

Halonový hasicí přístroj je velmi univerzální, ale nesmíme jej používat v uzavřených prostorech.

When extinguishing a fire, we can use different means of extinguishing. If wood, coal or hay are on fire, a water extinguisher can be used. This fire extinguisher must never be used to extinguish electrical fires or fires of equipment under a voltage, or burning light metals. Small fires can be put out with sand which deprives them of air. A foam extinguisher is used for extinguishing burning oil or petrol leaks, but it cannot be used on light metals, electrical fires or equipment under voltage. Electrical equipments under voltage can be extinguished with a powder fire extinguisher, which is also used when libraries or archives are on fire, so that individual artefacts shall not be destroyed.

A halogen fire extinguisher is extremely versatile, but cannot be used in enclosed spaces.

## pH – crossword puzzle

Recommended grade: 8.

Object of activity: Comprehension of terms relating to pH

Target language: *Hydroxide, acid, scale, pH, indicator...*

Aids: Worksheet/data projector

Time allowed: 10 minutes

- We distribute copies of the crossword and cut-out strips to the students containing crossword terms and their definitions.
- After inserting words into the crossword, the students must match the correct definitions to them.
- The student providing the most rapid correct answers, wins and receives a reward.

Classroom language:

*Complete the crossword  
with the words below it.*

*Match a word to its definition.*

Doplň křížovku slovy, která jsou pod ní.

Ke slovu přiřaď jeho definici.

Solutions:

				P	H	E	N	O	L	P	H	T	A	L	E	I	N	
				S	E	V	E	N										
		L	I	T	M	U	S											
I																		
N	D	I	C	A	T	O	R											
			H	Y	D	R	O	X	I	D	E							
						A	C	I	D									
						A	L	K	A	L	I	N	E					

## **Atoms and molecules - quiz**

Recommended grade: 8.

Object of activity: Application of knowledge of atoms when solving quiz problems

Target language: *Electron, proton, atom, molecule, cation, anion, nucleus, shell...*

Aids: Cards with questions and answers, soft ball, blackboard/data projector, magnet, self-adhesive putty

Time allowed: 10 -15 minutes

- We copy the cards with questions (they must be large enough), cut them up, and place them on the board face up, using a magnet or self-adhesive putty, (a data projector may also be used).
- We divide the students into several teams.
- The first member of the team throws the ball and tries to hit one of the questions (the team may decide in advance which question they want because they can read its wording). The team must always answer the question which they hit, regardless of whether or not they intended to do so. They must find the correct answer within 10 seconds (the whole team discusses it). They answer by a complete sentence, e.g.: *“An electron has a negative charge and is located outside of the nucleus of the atom.”*
- When they choose the correct answer out of the four clues, they are awarded a point. We either remove the card from the board, or turn it over. If the team answers incorrectly, the next team in line is given a chance.
- A student who has already thrown, goes to the back of the line and the next student throws.
- The team with the highest number of points wins and the most active students may be rewarded with a grade of one or a plus.
- After the game is finished, we jointly go through the whole quiz and review the correct answers.

### Classroom language:

*Throw the ball and hit one of the questions.*

*You've got 10 seconds to answer.*

*An electron has a negative charge and is located outside of the nucleus of the atom.*

*The atom is the smallest part of a chemical element, but can be divided further.*

*A molecule is a group of two or more atoms.*

Hod' míčkem a tref jednu z otázek.

Máte 10 sekund na odpověď.

Elektron má negativní náboj a je umístěn v jádru atomu.

Atom je nejmenší část chemického prvku, ale může být dále dělen.

Molekula je skupina dvou nebo více atomů.

### Correct answers:

1d, 2b, 3c, 4c, 5a, 6b, 7b, 8a, 9d, 10a

## **Atom – Devil’s crossword**

Recommended grade: 8.

Object of activity: Comprehension of the term atom in a wider sense

Target language: *Atom, molecule, shell, electron ...*

Aids: Worksheet

Time allowed: 15 minutes

- We hand out a Devil’s crossword to the students and explain its principle in Czech:
  - students arrange words on the given topic from the scrambled letters
  - they write the unscrambled word on the prepared line
  - they write the letter, whose order is given in parenthesis behind the word, into the mystery word squares
  - Lastly, the students connect the Czech terms with the English translations
- When the exercise has been completed, the class reviews the unscrambled words and their correct arrangement. The students translate the mystery word into English.

Classroom language:

*Unscramble the letters and make words.*

*Uspořádejte písmena a vytvořte slova.*

### Solutions

1. ATOM - ATOM
2. MOLEKULA - MOLECULE
3. OBAL - SHELL
4. JÁDRO - NUCLEUS
5. HMOTNOST - WEIGHT
6. ELEKTRON - ELECTRON
7. PROTON - PROTON
8. UHLÍK – CARBON

Mystery word: MALÝ A MENŠÍ – SMALL AND SMALLER

## **Separating components of mixtures - quantification**

Recommended grade: 8.

Object of activity: Comprehension of the principles of the chosen methods of separating the components of mixtures

Target language: *Extraction, distillation, centrifuging, boiling point, solid, gas, density*

Aids: Worksheet, dictionary

Time allowed: 10 -15 minutes

- We hand out a worksheet to the students and explain the principle of the exercise. The students can work in pairs.
- The students find the Czech names of separation methods on the worksheet together with their English translations and in other sets of data, an abridged principle of these methods, again with its English equivalent.
- At the end of the exercise, we assess the most successful students and jointly read the new words.
- It is important to supplement the activity with further exercises (now only in Czech), based on which the students can understand the individual separation methods.

Classroom language:

*Match Czech words to their English equivalents.*

*Match the separation methods to their separation rules.*

Spojte česká slova s jejich anglickými ekvivalenty.

Spojte separační metody s jejich principy.

## **Chemistry equipment – word search**

Recommended grade: 8.

Object of activity: Recognition of basic chemical laboratory equipment

Target language: *YTest-tube, measuring cylinder, chemical spoon, beaker, watch glass, burner ...*

Aids: Worksheet

Time allowed: 15 minutes

- We hand out identical word searches to the students.
- If some of the students have not solved one before, we explain to them how it is done: The terms provided from the written legend are successively crossed out in the imaginary word search squares, in eight directions, i.e. vertically, horizontally, diagonally to the right and diagonally to the left, in both directions.
- The students mark insulators in red crayon and conductors in green.
- The student who finds the highest number of words in the time allowed, wins.  
Note: The letters remaining in this crossword puzzle are not a solution.

## **Symbols and names of chemical elements**

Recommended grade: 8.

Object of activity: Memorisation of selected symbols and names of elements

Target language: *Chemical elements*

Aids: Cards with names of elements and their symbols

Time allowed: 20 minutes

- We hand out a card to each student.
- The students then walk round the classroom and create triads, namely, element—symbol – element properties.
- After arranging the triads we check and read the individual expressions alongside the students, to ensure correct pronunciation.

Classroom language:

*Walk around the classroom  
and make triplets: name of an element -  
symbol – property of the element*

Chodte po třídě a tvořte trojice:  
název prvku – značka – vlastnost  
prvku.

## **Mass ratio - calculations**

Recommended grade: 8.

Object of activity: Learning to calculate mass ratios using equations containing unknown variables

Target language: *Mass ratio, juice, salt, syrup, soup...*

Aids: Worksheet with problems, printer, vocabulary list, blackboard

Time allowed: 10 minutes

- We give the students a worksheet with two problems to be solved using mass ratios.
- We also provide a vocabulary.
- The exercise should not occupy longer than eight minutes for reviewing the calculation of mass ratios.
- After the exercise is we finished, we jointly solve the problems on the blackboard. We use equations with unknown variables; it would be a good idea to show the students the calculation procedure when substituting into the equation.
- The students who calculate both problems correctly and have written the answer correctly in English, receive a reward.
- The students work independently. Each student corrects his/her mistakes when the class as a whole reviews the answers.

Correct answers:

- 1) Mass ratio of salt in this soup is 0.025.
- 2) Mass ratio of fruit syrup in this juice was 0.034.

## Separating waste – word search

Recommended grade: 8. and 9.

Object of activity: Comprehension of the basic principles of separation of waste (recycling) and related terms

Target language: *Dustbin, dump, paper, plastics, waste...*

Aids: Worksheet with word search and table

Time allowed: 10 minutes

- We hand out identical word searches to the students.
- If some of the students have not done one earlier, we explain how it is done: The terms provided from the written legend are successively crossed out in the imaginary squares of the word search in eight directions, i.e. vertically, horizontally, diagonally to the right and diagonally to the left, in both directions.
- The words which the students must find and cross out in the word search are in English; but they are listed in Czech in the legend, which means that the students must translate the words and then look for them in the word search. The students can write the English equivalents into the prepared table.
- The student who crosses out all of the words the first, wins. Note: The letters which are not crossed out, form a mystery word.

Classroom language:

*First translate the Czech words into English.*

Nejdříve přeložte česká slova do angličtiny.

*Then search for them in the word search. Potom je hledejte v osmisměrce.*

*Find the mystery word.*

Najděte tajenku.

Correct solutions:

R	W	G	L	A	S	S	W	B	C
P	E	A	D	U	M	P	P	A	A
L	A	C	S	S	T	B	A	T	R
A	R	E	Y	T	S	L	P	T	D
S	O	E	R	C	E	U	E	E	B
T	T	i	D	N	L	E	R	R	O
i	D	U	S	T	B	I	N	Y	A
C	Y	E	L	L	O	W	N	G	R
S	:)	M	E	T	A	L	:)	G	D
C	O	M	B	U	S	T	I	N	G

Mystery word: **sorting waste**

## **Mixtures - pexeso**

Recommended grade: 8.

Object of the activity: Practice of students' knowledge of mixtures using the game of pexeso - methods of separating components of mixtures and their principle

Target language: *Smoke, mist, filtration, emulsion, homogeneous ...*

Aids: Pexeso cards

Time allowed: 15 minutes

- We divide the students into groups of three.
- We hand out the pexeso cards cut-up in advance to the groups and the students must find the mixtures, the methods of separation in English, and the illustrating picture.
- After explaining the principle of the game (same rules as for classic Pexeso the students look for two matching cards (always a picture and the English text).
- We give the students 15 minutes for the game and note the winners of individual matches. The students can play the game several times during this period. Each time they turn over a card, they read any text and ensure that everyone in the group understands (otherwise they can use the dictionary available to them); in the case of a picture, they try to determine what the picture illustrates.

Note: If we consider it appropriate, we can review the pictures jointly with the students before the game begins and name them so the game does not falter later on.

- At the end of the exercise, we assess the best pexeso players in individual groups.
- We summarize / review the methods of separating components of mixtures and their principle in the mother tongue.

### Classroom language:

*Turn over two cards.*

*Do the cards match?*

*Always read the text aloud.*

*What is in the picture?*

Otočte dvě karty.

Patří karty k sobě?

Vždy přečtete text nahlas.

Co je na obrázku?

### Alternative:

We give each student a single card. He/she must then find the missing one of the pair.

## **Energy resources - jigsaw**

Recommended grade: 9.

Object of activity: Comprehension of the differences between renewable and non-renewable resources of energy

Target language: *Energy sources, coal, natural gas, biomass, hydroelectric power ...*

Aids: Worksheet with puzzle

Time allowed: 10 minutes

- We divide the students into pair teams and provide them with a cut-up jigsaw puzzle.
- The students wait for the instructor's start signal to assemble the jigsaw. We give the students a maximum of 10 minutes for assembling it.
- The first pair to assemble it correctly is rewarded with a plus (the winning pair 3 pluses, second place 2, and the third one).

Classroom language:

*Assemble the jigsaw.*

*You've got 10 minutes to do it.*

Sestavte skládačku.

Máte na to 10 minut.

Supplementary activity:

We discuss the advantages and disadvantages of various energy resources. The students should consider what energy resources we should use and why.

## **Important acids – emoticon alphabet**

Recommended grade: 8.

Object of activity: Practice of the nomenclature of acids and comprehension of the basic properties and uses of important acids

Target language: *Sulphuric acid, nitric acid, phosphoric acid, hydrochloric acid...*

Aids: Worksheet

Time allowed: 25 minutes

- We give the students an emoticon alphabet and explain how to arrange the requested terms, i.e. each emoticon represents a single letter of the alphabet; the students write the letters using emoticons, until the name of the important acid in English has been assembled. The students work independently in pairs, or in small groups.
- When the students have decoded all the acids, they write the formulae of all five acids without looking into their textbook (they use the rules of nomenclature).
- They look in their textbook to find the maximum concentration of each acid, at least three properties, and two possible applications. The students look for the information in Czech, but present it in English. As homework, we can ask the students to look for information about the acids on English web pages. They submit them in the next chemistry lesson.
- When the exercise has ended, we jointly check the results.

### Classroom language:

<i>Each emoticon represents one letter of the alphabet.</i>	Jeden smajlík reprezentuje jedno písmeno abecedy.
<i>Search for the names of acids.</i>	Vyhledejte názvy kyselin.
<i>Write down their formulas.</i>	Napište jejich vzorce.
<i>Find out their maximum concentration, at least three properties, and two examples of usage.</i>	Zjistěte jejich maximální koncentraci, alespoň tři vlastnosti a dva příklady použití.

### Solutions:

**NITRIC ACID, HYDROCHLORIC ACID, SULPHURIC ACID, PHOSPHORIC ACID, SULPHUROUS ACID**

### Supplementary exercise:

The students can draw diagrams which illustrate the use of the acids and their properties, including other information in English (sample provided below).

## **Beketov's metal displacement series – between the lines**

Recommended grade: 9.

Object of activity: Application of the laws of the reactive metal series to practical examples

Target language: *Slug, copper, gold, iron, metal, reactivity...*

Aids: Blackboard

Time allowed: 10 minutes

- We write sentences on the blackboard containing hidden English names of metals (one name per sentence).
- Students form groups.
- They try to find the names in the sentences as quickly as possible. They write down the names of the metals. They write larger or smaller symbols between the metals, according to reactivity.
- The group which correctly completes the task first, wins. We can set a time limit for the task, e.g. 5 minutes.
- After the exercise has been completed, we review alongside the students the individual rules of reactivity of metals.

### Classroom language:

*Find the names of metals in the sentences.*

*Compare the reactivity of the metals.*

*Sodium is further to the left than iron on the line of metals and is therefore more reactive.*

Ve větách najděte názvy kovů.

Porovnejte reaktivitu kovů.

Sodík stojí v řadě kovů více vlevo než železo, proto je reaktivnější.

Solutions: 1) sodium > iron 2) aluminium > gold 3) titanium > silver 4) lead < zinc  
5) copper > platinum.