Bilingual chemistry - practical considerations

Beata Nawrot

Written texts seem to be highly valued during CLIL lessons. Teachers very often work with a particular text and treat it as a starting point in planning a lesson. Thus, all of the activities presented in the article are based on an authentic text concerning the periodic table. The text is to serve as a possible source for teaching both chemistry and English at the same time. The main aim of the article is to work on a list of various activities, based on the same text, which will focus on different content and language aspects. The idea standing behind the paper is to prove the possibilities CLIL offers to teachers and students, as well as to face the real challenge of creating such tasks. By putting CLIL in motion, we are able to explore in more detail some of the possible CLIL strategies and hopefully apply them in a Polish-English bilingual classroom.

Each of the activities presented is a form of investigating whether CLIL may serve as a satisfying means of teaching chemistry and English without neglecting none of the subjects. The tasks are followed by a brief discussion of the methodological aspects of CLIL. The analysis of the activities will hopefully lead us to a conclusion about the possible potential of CLIL, which might be used in Polish-English classrooms.

The following text concentrates on the periodic table and the information we can find in it. Moreover, it defines atomic mass and atomic number in relation to the number of protons, electrons and neutrons. It is important to remember that the content of a text should be suitable for language level used in it. The idea of the periodic table is one of the fundamental aspects in teaching chemistry in Polish junior and senior secondary schools, which is why the choice of the text concerning this area seems to be justified. The level of the language in the text is quite easy so it is suitable for students of junior secondary schools who begin working with chemistry in school curriculum. What is more, the information in the text has been visualized in the form of the picture presented below the text, which also makes the text more understandable to the students.

After reading this section, you will be able to do the following:

- Define and determine the atomic number of an atom.
- Define and determine the mass number of an atom.

The periodic table of the chemical elements (also Mendeleev’s table) is a tabular display of the chemical elements. It is divided into 18 groups and 7 periods. Each element has got a different name and symbol. For example, Mg stands for magnesium, Na for sodium and N for nitrogen. Elements are listed in order of increasing atomic number, which means that, e.g., the atomic number of magnesium is bigger than the atomic number of sodium. The atomic number of carbon is smaller than the atomic number of nitrogen.

The atomic number of an element indicates the number of protons or electrons of an atom of that element. For example, an atom of carbon has 6 protons in its nucleus, so its atomic number is 6. No other element has atoms with 6 protons in its nucleus. As a result, the number of protons or electrons in an oxygen atom is bigger than in an atom of carbon and the number of protons or electrons in a copper atom is smaller than in an atom of zinc. The atomic mass of an element indicates the total number of protons and neutrons in the nucleus of an atom of that element. The atomic mass of, e.g., sodium is 23.

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At the University of Virginia
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Atomic Number and Mass

A Physical Science Activity

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- Define and determine the mass number of an atom.

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The atomic number of an element indicates the number of protons or electrons of an atom of that element. For example, an atom of carbon has 6 protons in its nucleus, so its atomic number is 6. No other element has atoms with 6 protons in its nucleus. As a result, the number of protons or electrons in an oxygen atom is bigger than in an atom of carbon and the number of protons or electrons in a copper atom is smaller than in an atom of zinc. The atomic mass of an element indicates the total number of protons and neutrons in the nucleus of an atom of that element. The atomic mass of, e.g., sodium is 23.

Based on: http://galileo.phys.virginia.edu/

In order to explore the true CLIL spirit on a practical level, there was a need to analyse and apply the basic elements of both English and chemistry methodology. As far as chemistry is concerned, Kulawik and Litwin (2005: 5) enumerate the following teaching methods:

1. Verbal methods
   - Description
   - Lecture
   - Small talk
   - Description with the usage of realia, models, tables, graphs, etc.
   - Discussion
   - Working with a coursebook, an activity book, a dictionary, a magazine, etc.

2. Illustrative methods
   - Observation of an experiment conducted by a teacher or a student
   - Observation of models, tables, graphs, etc.
   - Computer programmes, etc.

3. Practical methods
   - Chemical experiments carried out by students
   - Creating of models
   - Workshop classes
   - Didactic games, etc.

While creating the following activities, I was trying to combine both methodologies. As a consequence, the paper enumerates a few exercises typical for English or chemistry lessons.
which treat the chemical text as a source of possible language input. They have been modified in order to focus on a specific language point, e.g., grammar, vocabulary or language skills. Each of the activities is followed by a short comment on the methodologies used.

**Aims:**
Language: Combining, predicting, sequencing

**Materials:**
Sheets with the prepared text extracts

**Preparation:**
1. Divide the text into sections, making sure that each section break is somewhere in the middle of the sentence. There should be enough parts for each student in a group to have one. Write the prepared text in parts, writing the number 1 next to the beginning. Do not write any other numbers.
2. Cut into slips. Five slips for five students in a group. Duplicate for the whole class.

**Example:**
The periodic table of the chemical elements (also Mendeleev’s table) is a tabular display of the chemical elements. It is divided into groups and periods. Each element has got a different name and symbol. For example Mg stands for magnesium, Na for sodium and N for nitrogen. Elements are listed in order of increasing atomic number, which means that, e.g., the atomic number of magnesium is bigger than the atomic number of sodium. The atomic number of carbon is smaller than the atomic number of sodium. The atomic number indicates the number of protons or electrons in an atom of that element.

For example, an atom of carbon has 6 protons in its nucleus, so its atomic number is 6. No other element has atoms with 6 protons in its nucleus. As a result, the number of protons or electrons in an oxygen atom is bigger than in an atom of carbon and the number of protons or electrons in a copper atom is smaller than in an atom of zinc. The atomic mass of an element indicates the total number of protons and neutrons in the nucleus of an atom of that element.

The atomic mass of, e.g., sodium is 23.

**Comment:**
The activity focuses on the text as a whole. It does not refer to particular vocabulary or a grammatical structure. It can be conducted at the beginning of a lesson as a way of introducing the text. It is aimed at combining, predicting and sequencing which have been introduced as one of the ways of linking language learning with thinking processes. Through working with a chemical text, the students are able to practice reading skills in a foreign language, silently and aloud, which gives them an opportunity to practice pronunciation. Moreover, the students work in groups which dispels their fears and teaches them cooperation.

The periodic table is a tabular display of the chemical elements.

The **atomic number** is the number of protons or electrons of an atom. The **atomic mass** is the number of protons and neutrons of an atom.

**Procedure:**
1. Write the text title on the board.
2. Divide the class into groups of five. Give out the slips. Ask students to read the slips to each other. They must keep their own slips of paper. Tell them that the students with the slip number 1 has the beginning of the text. Ask them to work out the correct order of the text and to stand in that order.
3. Ask the students who have the first part of the text to read out their slips. Then, get the rest of the group to read their slips in their chosen order to check that they are correct. Do this them in their groups.
4. Choose a group to read out their text in their chosen order. The whole class listens and checks.
5. Take the slips, give out copies of the text, one for each student.
6. The students sit down, they read the text and make sure that their order was correct.

**Comment:**
The main aim of the activity is for the students to understand the terms: the periodic table, atomic mass and atomic number. As a result, the students practise reading the text with understanding and selecting information and making notes. They work in pairs which serves as a way of building scaffolding. What is more, they are encouraged to practise writing skills while creating their own definitions. The activity allows the teacher to work on several language skills at the same time which has been mentioned as one of the core features of CLIL methodology. In addition, the general ability to define terms requires from the students to activate their thinking skills.

**Aims:**
Language: Giving descriptions (speaking), information gap

**Materials:**
Sheets with the text, students’ periodic tables

**Procedure:**
1. Distribute the texts and ask the students to read it silently.
2. Tell the students to choose from the text information they regard as important and make notes.
3. Collect the texts.
4. Ask the students to compare their notes in pairs.
5. Write on the board three terms: periodic table, atomic mass and atomic number.
6. Ask the students to use their notes and write the definitions for the terms in pairs.
7. Ask a few pairs for their definitions.
8. Give the texts once again and go through the definitions given in the text to make sure the students understand them.
9. The students correct their definitions if they have any mistakes.

**Comment:**
The main aim of the activity is for the students to understand the terms: the periodic table, atomic mass and atomic number, as well as to be able to define the terms. The students practise reading the text with understanding and selecting information and making notes. They work in pairs which serves as a way of building scaffolding. What is more, they are encouraged to practise writing skills while creating their own definitions. The activity allows the teacher to work on several language skills at the same time which has been mentioned as one of the core features of CLIL methodology. In addition, the general ability to define terms requires from the students to activate their thinking skills.

**Aims:**
Language: Giving descriptions (speaking), information gap

**Materials:**
Sheets with the text, students’ periodic tables
**Aims:**

Language: the ordinal numbers, the names of the elements

**Content:**

The periodic table

**Materials:** Sheets with the crossword

**Preparation:**

Choose a few elements from the periodic table and their atomic masses and atomic numbers.

**Procedure:**

1. Tell the class you are going to read out some numbers which either stand for atomic mass or atomic number. Explain that the students should write a what is question to which the number is the answer.
2. Write example on the board:
   
   T: 12
   
   S: What is the atomic mass of a carbon atom?
3. Read out the next number. Give students time to write the question individually. Then check the questions to make sure they understand what to do.
4. Continue in the same way with the remaining answers, but do not check them yet.
5. Students compare their questions in pairs, then you check their questions.
6. The follow-up: You may wish to ask the students to look at the periodic tables and answer your questions building full sentences.

**Comment:**

The idea of creating a crossword is very popular among teachers and students who enjoy working with this type of activity. It introduces the atmosphere of fun in the classroom and motivates students to complete the task. Working with the periodic table visualizes the activity which also acts as a motivational factor. On the one hand, the task gives the students an opportunity to practise spelling of the names of the elements in English, on the other hand it checks if they are able to use their periodic table in the right way. Moreover, one of the grammatical aspects has been stressed, namely, the ordinal numbers. Once again we are given an opportunity to practise both Chemistry and English during a single lesson.

**Aims:**

Language: writing practice: what is questions, listening practice: (understanding of the cardinal numbers), speaking (analysing and defining)

**Content:**

Atomic mass and atomic number

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**TASKS**

**Preparation:**

Prepare a text about the atomic mass and the atomic number.

This activity should be conducted after the students have read and analysed the text about the atomic mass and the atomic number. It can be introduced as a final activity during a lesson devoted to this topic or as a revision activity at the beginning of the next lesson.

**Procedure:**

1. The students work in pairs.
2. Each student is to choose one element on the periodic table. They do not tell its name to their partners.
3. They describe them to their partner using information given on the periodic table, for example: This element is in the first group and third period. Its atomic mass is… Its atomic number is… It’s a metal/non-metal. It has 11 protons/electrons.
4. The students are to use their periodic tables and guess the names of the elements chosen by their friends.

**Comment:**

The task focuses on students’ speaking skills. In order to complete the task, they must fully understand the concept of atomic mass and atomic number, which is the content aim of the activity. There is an information gap involved which serves as a motivational factor. The task allows the teacher to make sure that the students have understood the difference between atomic mass and atomic number, as well as to check whether they are able to apply the knowledge. The activity gives the students a chance to meaningfully produce the introduced words and terms. In this way, the students practise the pronunciation of the phrases but also the strategy of giving description in English.

**An alternative version:**

The task can be modified. The students may be asked to write their descriptions of the chosen elements and give them to their partners to guess the name of the element. In this way we enable the students to practise their writing skills instead of speaking.

**Aims:**

Language: the ordinal numbers, the names of the elements

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**Task 4**

**Content:**

The periodic table

**Materials:**

Sheets with the crossword

**Preparation:**

Prepare a crossword

**Procedure:**

1. Students work individually and complete the crossword, using their periodic tables
2. Students compare their answers in pairs.

**Comment:**

This activity should be conducted after the students have read and analysed the text about the atomic mass and the atomic number. It can be introduced as a final activity during a lesson devoted to this topic or as a revision activity at the beginning of the next lesson.

**Aims:**

Language: the ordinal numbers, the names of the elements

**Content:**

The periodic table

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**Task 5**

**Content:**

Atomic mass and atomic number

**Preparation:**

Choose a few elements from the periodic table and their atomic masses and atomic numbers.

**Procedure:**

1. Tell the class you are going to read out some numbers which either stand for atomic mass or atomic number. Explain that the students should write a what is question to which the number is the answer.
2. Write example on the board:
   
   T: 12
   
   S: What is the atomic mass of a carbon atom?
3. Read out the next number. Give students time to write the question individually. Then check the questions to make sure they understand what to do.
4. Continue in the same way with the remaining answers, but do not check them yet.
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**Comment:**

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**Aims:**

Language: writing practice: what is questions, listening practice: (understanding of the cardinal numbers), speaking (analysing and defining)

**Content:**

Atomic mass and atomic number

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**The Chemical Puzzle**

**ACROSS**

1. I am in the first period and the first group
2. I am in the second group and the second period
3. I am in the first period and the first group
4. I wait in the tenth group and the sixth period
5. Find me in the fourth period and the eighth group
6. You can find me in the thirteenth group
7. I am in the fourth period and the first group
8. You can find me in the seventeenth group

**DOWN**

1. You can find me in the seventeenth group and the third period
2. You can find me in the fifteenth group and the fifth period
3. You can find me in the nineteenth group and the third period
4. I am in the second group and the second period
5. You can find me in the thirteenth group
6. I am in the first group and the third period
7. It's a metal/non-metal. It has 11 protons/electrons
8. I am in the second group and the second period
Example:
The periodic tables

Materials:
The periodic table, the names of the elements.

Cardinal numbers

Answering:
Are you Oxygen?
What’s your atomic mass?

Language: Asking questions:
Aims:
to the teacher saying the numbers.

well. In addition, the students have the possibility
their writing skills, however, the follow-up part
mass and atomic number. The students practise
checks if they understand the concept of atomic
read and analysed the text. It makes the students
Comment:
This is a short activity which can be conducted at
the end of the lesson after the students have read and analyzed the text. It makes the students use the periodic tables in a meaningful way and checks if they understand the concept of atomic mass and atomic number. The students practise their writing skills, however, the follow-up part enables them to practise their speaking skills as well. In addition, the students have the possibility to practise their listening skills when they listen to the teacher saying the numbers.

Aims: Language: Asking questions:
What’s your atomic number?
What’s your atomic mass?
Are you Oxygen?
Answering:
Yes, I am.
No, I’m not. I’m Calcium.

Cardinal numbers

Content:
The periodic table, the names of the elements.

Materials:
The periodic tables
Small cards with atomic number or atomic mass

Preparation:
Prepare a set of small cards with different atomic masses and atomic numbers (each card should have only one number, either atomic mass or atomic number of the same element).

Example:

<table>
<thead>
<tr>
<th>Atomic Mass</th>
<th>Atomic Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>40</td>
<td>108</td>
</tr>
</tbody>
</table>

Both cards represent a Calcium atom which has an atomic number of 20 and an atomic mass of 40.

Procedure:
1. Distribute the cards among the students. Each student gets one card.
2. Tell the students to find the number in their periodic tables and to remember the name of the element which has that number for its atomic mass or atomic number. From now on, they represent this element.
3. The students must not tell their friends the name of their element.
4. Explain to the students that their task is to find a friend who is the same element.
5. If a student has got an atomic mass on his/her card, he/she should ask about an atomic number and vice versa.
6. The students walk around the classroom, asking and answering questions:
   A: What’s your atomic number?
   B: 20
   A: Are you oxygen?
   B: No I’m not. I’m calcium.
   7. The activity finishes when all the students find their pair.
8. The students sit in the pairs they’ve created and check in their periodic tables if they’ve matched the numbers correctly; in other words, they check if the numbers represent the same element.

Comment:
The task may be conducted after students have read and analysed the text with the teacher.

The activity seems to have got many advantages. First of all, it allows to practise working with the periodic table and, at the same time, it focuses on practising specific language structures. Secondly, it activates the whole class at the same time and does not require much preparation on the part of the teacher. Furthermore, there is an information gap involved which acts as a motivational factor. While walking around the classroom and asking questions, students hear different numbers which helps them to memorize the atomic masses and atomic numbers of different elements. This knowledge is very useful for their future work with chemistry. In addition, the students practise asking and answering questions as well as pronouncing the cardinal numbers.

Aims: Language: The comparative (writing, analysing, comparing); content: atomic mass and atomic number

Materials:
Sheets with the sentences to complete.

Preparation:
Prepare a set of sentences to complete comparing atomic mass and atomic number of different elements.

Complete the sentences with the comparative forms of the adjectives: small/ big.

1. Atomic mass is always ....................................
2. Atomic number of silver is ....................................
3. Atomic mass of nitrogen is ....................................
4. The number of protons in an oxygen atom is bigger than in a gold atom.

Content:
The position of elements in the periodic table, ordering

Materials:
The periodic tables.

Preparation:
Prepare a set of cards with one name of an element on each of them.

Procedure:
1. Divide the class into groups of five.
2. Give each student in a group one card with the name of an element on it.
3. The task may be conducted after students have read and analysed the text with the teacher.

Comment:
The text contains examples of the comparative forms in English, so it is worth to use it while teaching about the atomic mass or the atomic number of elements. However, the activity is only a form of revising the rules for the comparative, not introducing them for the first time. It allows the students to work with the periodic tables which adds authenticity. The students practise writing the comparative, so a specific grammatical point, while analysing and comparing the numbers, which helps to link language learning with the students’ thinking skills. The teacher may check if the students will be able to read the information in the periodic table correctly and if they have fully understood the text.

An alternative version:
And the possible way of checking understanding of the information in the text would be a set of “true or false” sentences. The students’ task is simply to decide whether the sentences are true or false, according to the information in the text.

Example:
1. Atomic mass is always bigger than atomic number. T/F
2. Atomic number of silver is smaller than atomic number of sulphur. T/F
3. Atomic mass of nitrogen is bigger than atomic mass of hydrogen. T/F
4. The number of protons in an oxygen atom is bigger than in a gold atom. T/F

Aims: Language: The names of elements (pronunciation)

Content: The position of elements in the periodic table, ordering

Materials:
The periodic tables.

Preparation:
Prepare a set of cards with one name of an element on each of them.

Procedure:
1. Divide the class into groups of five.
2. Give each student in a group one card with the name of an element on it.
1. Tell the students that they are going to work in pairs and draw models of atoms in their notebooks.
2. Give each student one card but ask them not to show it to each other.
3. Their task is to listen to a friend and draw a model according to his/her suggestions.

*Example:
It has got 6 neutrons and 6 protons in the nucleus. It has got 2 shells. On the first shell, it has got 2 electrons and on the second shell, it has got 4 electrons.

4. Having finished drawings, the students look at the periodic tables and check the order.
5. The students show the cards to each other and check if they guessed correctly.

**Comment:**
This task could be introduced at the end of the lesson, since it requires understanding of the information in the presented text. Although it is quite complicated, it contains elements which should be attractive in the eyes of the students. Firstly, there is an element of visualization which makes the activity more enjoyable. The fact that students do not see their cards increases their motivation to complete the task correctly. They must listen to each other carefully and at the same time describe the model clearly. At the end of the activity, they must relate to the periodic table and name the element having the picture of its model. If they are able to do it, it means that they have understood the idea hidden in the text.

**Aims:**
Language: The structure: It has got... Vocabulary (pronunciation): protons, electrons, neutrons, nucleus, shell
Listening practice: understanding and applying

**Content:**
Atomic mass and atomic number

**Preparation:**
Prepare a set of cards with models of different elements.

**Example:**

3. Tell the students that the winner is the first group which will stand in the order of increasing atomic number of the elements in that group and correctly pronounce the names of the elements.
4. Students use their periodic tables, search for their elements, compare the atomic numbers and stand in a line presenting the correct order.
5. The teacher asks the group to say the names of the elements aloud. The rest of the class looks at the periodic tables and checks the order.
6. The teacher may wish to check the order in the rest of the groups.

**Comment:**
The activity focuses on the names of the elements and their place in the periodic table so it can be conducted as one of the first activities after the students have read the text. It activates the whole class and requires movement on the part of the students which brings a lot of fun. The timing factor is also a motivational factor, since each group wants to be first. Moreover, the task is cognitively demanding, since the students are asked to compare the numbers and decide about the correct order.

**Task 10**

**Aims:**
Language: reading practice: dictating, writing missing words in the text (spelling), listening (understanding), speaking (pronouncing the words)

**Content:**
Atomic number and atomic mass

**Preparation:**
Make photocopies of the same text with different words missing (A and B versions, one copy of A and B for each pair)

**Procedure:**
1. Divide the class into pairs of A and B.
2. Give each student their version of the text and explain that they should keep them secret. Explain that their texts are the same, although different words are missing.
3. Demonstrate that they should take turns to read the text and dictate the missing words to their partner (student A starts). Add that they can ask their partner any question they wish, e.g., Could you repeat? How do you spell it?
4. When they have finished, the students compare their texts and check if they are the same.

**Comment:**
This activity is a good idea for introducing the text. It gives the students an opportunity to read aloud in a non-threatening context and motivates them to do it in a clear way. The activity also requires proper turn taking and active listening. In this way, we have a chance to practise all four language skills at the same time. Of course, this task should be followed by further explanation and analysis of the text to make sure that the students understand foreign words and the information in the text.

**Version A**

**Version B**

The periodic table of the chemical elements (also Mendeleev’s table) is a tabular display of the chemical elements. It is divided into 18 groups and 7 periods. Each element has got a different name and symbol. For example Mg stands for magnesium, Na for sodium and N for nitrogen. Elements are listed in order of increasing atomic number, which means that, e.g., the atomic number of magnesium is bigger than the atomic number of sodium. The atomic number of carbon is _______ than the atomic number of nitrogen.

**The atomic number of an element indicates the number of __________ electrons of an atom of that element. For example, an atom of carbon has 6 protons in its nucleus so its atomic number is 6. No other element has atoms with 6 protons in its nucleus. As a result, the number of protons or electrons in an oxygen atom is bigger than in an atom of carbon and the number of protons or electrons in a copper atom is smaller than in an atom of zinc.**

The atomic __________ of an element indicates the total number of protons and neutrons in the nucleus of an atom of that element. The atomic mass of, e.g., sodium is 23.

**Version A**

**Version B**

After reading this section you will be able to do the following:

- Define and determine the atomic number of an atom.
- Define and determine the mass number of an atom.

**Atomic Number and Mass**
A Physical Science Activity

University of Virginia
Physics Department

**After reading this section you will be able to do the following:**

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The atomic number of carbon is _______ than the atomic number of nitrogen.

The atomic number of an element indicates the number of __________ electrons of an atom of that element. For example, an atom of carbon has 6 protons in its nucleus so its atomic number is 6. No other element has atoms with 6 protons in its nucleus. As a result, the number of protons or electrons in an oxygen atom is bigger than in an atom of carbon and the number of protons or electrons in a copper atom is smaller than in an atom of zinc. The atomic __________ of an element indicates the total number of protons and neutrons in the nucleus of an atom of that element. The atomic mass of, e.g., sodium is 23.
Conclusions

The main aim of the article was to assess whether CLIL may serve as a practical tool for teachers working in Polish-English bilingual classrooms. People who are not familiar with the concept of CLIL may regard bilingual teaching simply as teaching a school subject in a foreign language. When this happens, teaching a foreign language very often becomes teaching a particular terminology of a chosen subject. It is clearly visible that the emphasis is put on different aspects of teaching, from teaching and complementing the content and learning only specific forms of language, to teaching the content and developing a high degree of language competence. From a linguistic point of view, it is understandable that the best option is to favour content and language at the same time. In order not to neglect any of the subjects, it is advisable to consider the application of various possibilities CLIL offers to teachers.

The paper was an attempt to assess whether CLIL acts as a useful and stimulating factor for a teacher working in a bilingual classroom. People who are not familiar with teachers working in Polish-English bilingual classrooms. Whether CLIL may serve as a practical tool for various possibilities CLIL offers to teachers.

The article suggests a set of ten activities which, hopefully, could be applied during chemistry lessons in Polish-English classes. All of the activities are related to the same text concerning the idea of atomic mass, atomic number and the periodic table. In this way, we are able to check if it is possible to apply some of the typical CLIL strategies. Since bilingual lessons tend to be based on a text, either prepared by a teacher or simply extracted from a course book, the choice of an authentic chemical text seemed to be a rational choice as a starting point for the activities. At this point, we may conclude that using an authentic text in a bilingual classroom is crucial and should be given a lot of attention and time for deep analysis. It has been stated that CLIL favours authentic texts and treats them as a source of possible ideas for introducing and further developing particular content and language aspects. Authentic materials very often refer to students’ interests and improve the quality of the lesson. The activities clearly prove that CLIL may enrich the learning environment and lead to more effective linking of aims related to content and language.

The set of the activities can be illustrated in a form of the following table which juxtaposes the exercises in relation to the core features of CLIL methodology.

<table>
<thead>
<tr>
<th>Task no.</th>
<th>Multiple focus</th>
<th>Safe environment</th>
<th>Authenticity</th>
<th>Active learning</th>
<th>Scaffolding</th>
<th>Co-operation</th>
</tr>
</thead>
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First of all, the activities clearly present the multiple focus nature of CLIL. In order to support language learning in content classes, the teacher must be fully aware of the language introduced during a lesson. CLIL requires form a teacher a full control over the language he/she uses in the classroom. Thus, each of the tasks has clearly specified language and content aims. In this way, a “bilingual teacher” does not have to worry that he/she is neglecting one of the subject while favouring the other one.

Moreover, CLIL allows for a lot of group work in the classroom. Solving problems together or co-operating in groups challenges the students and makes the tasks more realistic. While completing the tasks, the students have a chance to communicate in a foreign language which may act as a motivational factor in improving their productive skills.

Secondly, in the real world, language skills are generally integrated, which is why it is vital to create activities that link several language skill at the same time. CLIL certainly gives teachers such a possibility. While analysing the suggested tasks, we may notice that, very often, different language skills are inter-connected, e.g., reading with writing or listening and speaking. A good bilingual classroom surely requires such combinations and CLIL helps us to achieve them in a single activity.

What is more, since learning a subject in a foreign language is directly connected with the need to think in a foreign language, it is important to state that CLIL seeks to combine language with the students’ knowledge and thinking skills. Careful selection of language in the activities does not exclude the emphasis on the students’ cognitive processes. The majority of the tasks require from the students active thinking and understanding of the information in a given text. Moreover, some of the activities are advisable as tasks which could be used during the next lesson, as a way of activating students’ knowledge in the process of introducing new information. At this point, we can add that activating students’ knowledge is one of the methods of building “scaffolding” in the classroom. Another extremely important strategy regarded as “scaffolding” is fostering creative and critical thinking. There are many techniques that CLIL supporters enumerate in relation to creative and critical thinking. One of the activities discussed requires...
from the students describing the location of an element in order for their partners to guess the name, which certainly encourages them to use creativity. It seems that there are many subjects taught in bilingual classes that call for creative and critical thinking, e.g., science subjects. It is strongly advisable to foster these processes through CLIL activities which certainly serve as a source of linking language learning with students’ thinking skills.

Last but not least, in order to encourage teachers working in bilingual classrooms to consider CLIL as a useful tool in everyday work, it is important to add that, while creating CLIL tasks, the two methodologies do not disturb one another. Typical English activities may be completed by chemistry elements and chemistry tasks may be enriched by the language teaching methodology. The set of exercises analysed in paper proves that there is no clash between the two teaching systems. As both an English and chemistry teacher, I am deeply convinced that it is possible to combine these two methodologies. CLIL has enabled me to introduce into chemistry tasks elements of language teaching methodology and vice-versa.

In addition, working with activities which combine content aims and language aims offers a teacher a lot of opportunities to increase students’ motivation and make a lesson more enjoyable in the eyes of the students. Teachers of subjects sometimes considered as dull and unattractive (e.g., mathematics or physics) may wish to enrich their lessons with activities partly based on the methodology of teaching a foreign language. The tasks presented contain elements rarely used during typical chemistry lessons, such as movement or information gap. This fact is another factor which should be taken into consideration by Polish-English bilingual teachers.

In conclusion, Content and Language Integrated Learning has proved to be a successful and stimulating approach which may be adapted while working with bilingual classes. Although the set of the suggested activities presents only a few of the possible CLIL techniques, it certainly proves that CLIL methodology is extremely valuable for students as well as teachers. It is vital to be aware of the benefits resulting from applying this approach in the classroom and face the real challenge of creating CLIL activities.

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