A PROPOSAL FOR A SCIENCE PROGRAM FOR FIRST GRADERS IN A SUBSIDIZED SCHOOL

Tesis para optar al grado académico de magíster en la enseñanza del inglés como lengua extranjera

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DEDICATION

This piece of work is dedicated firstly to my family. Thank you for your unconditional support which has made it possible to achieve this goal. Also, to my daughter who is my motivation and teaches me something new every day.

And finally, I would like to thank my future husband. Thank you for convincing me to take on this challenge, for accompanying me on this journey and for never letting me give in. Together we are beginning a new path as partners for life…
ACKNOWLEDGEMENTS

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I would also like to give a special thanks to my friend Hayley Smith who has been my support throughout this whole process. Thank you for the pleasure of your true friendship and for showing me that in friendships, sacrifices are easier to endure when you have a friend like you at your side.

To you both, my deepest gratitude. You are both exceptional people and professionals…

Eileen Hott
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ABSTRACT/RESUMEN

The aim of this study is to explore the necessary elements to implement a science program for first graders in a subsidized school under a CLIL approach. The dimensions explored are the teacher's role, the methodologies and contents, the language required in a science class, suitable resources and the abilities that need to be developed during a science unit.

To this end, the research is designed to be conducted through literature review and application of surveys in a bilingual school and a subsidized school in order to discover the key elements needed to develop and assess in a science unit.

The study intends to provide a description of the characteristics in different dimensions that have a key role in a science program for first graders under CLIL approach, as well as suggesting guidelines for a unit of a science program for first grade in a subsidized school that incorporates all the elements analyzed.
RESUMEN

El objetivo de este estudio es explorar sobre los elementos necesarios para la implementación de un programa de ciencias para estudiantes de primero básico, en un colegio particular subvencionado, bajo la mirada de CLIL. Las dimensiones a explorar son: El rol del profesor, las metodologías y contenidos, lenguaje requerido para una clase de ciencias, el material apto para esto, y las habilidades que se necesitan desarrollar durante una unidad de ciencias.

Con este fin, el estudio es diseñado para ser conducido por medio de la revisión de literatura además de la aplicación de encuestas en un colegio bilingüe y particular subvencionado, para poder descubrir los elementos claves necesarios para desarrollar y evaluar una unidad de ciencias.

El estudio intenta proveer una descripción de las características in diferentes dimensiones que tiene un rol clave en un programa de ciencias para estudiantes de primero básico bajo la mirada de CLIL, así como también sugerir lineamientos para una unidad de un programa de ciencias en un colegio particular subvencionado que incorpore todos los elementos analizados.
INTRODUCTION

During the last decades and as a consequence of globalization, the ability to speak a different language has become more important in every area of our society, not just in areas of business and economy but also in areas like tourism, culture and even in daily life.

Education has focused on teaching the most widely spoken languages around the world. In England, German, Spanish and French are taught, in the USA the language most commonly taught is Spanish and in certain provinces of Canada they teach French as a second language. However, in most non-English speaking countries, the language taught is English as English is seen as the Lingua Franca as well as the international language of business. As well as this, in the case of the European Union which is aiming to unite its member countries through elements such as currency and policy, it is also important to also have a common language and therefore the EU has pushed for better English teaching programs.

As Chile is always trying to become a more competitive member in global affairs and elevate its position to rival that of more developed nations to maintain its membership in OECD, the government recognizes the necessity to improve areas of social development. Within this idea, naturally the role of a second language, in this case English, is considered a high priority for the same reasons stated by the EU: increased labour, education and business opportunities as well as to be able to communicate on a more global level. To achieve this, the government's plan is for Chile to be a bilingual country "The dream of the Chilean authorities for this bicentenary has been turn Chile into a Bilingual country. Even though this initiative could not be possible at the estimated time, it is considered as a country-issue". (ETS 2010; 9)
In order to respond to this necessity, it is essential to create a language educational policy that focuses on using a methodology that provides students with more authentic opportunities to be exposed to language and to make English the medium for learning rather than the objective, therefore making English a cross-curricula subject rather than being confined to the English classroom. For this reason, CLIL (Content and Language Integrated Learning) seems to be the most suitable approach for developing language in more authentic situations, CLIL has been defined as "a dual-focused educational approach in which an additional language is used for the learning and teaching of both content and language... In the teaching and language process, there is a focus not only on content, and not only on language... CLIL is not a new form of language education. It is not a new form of subject education. It is an innovative fusion of both". (Coyle, Hood and Marsh, 2010)
CHAPTER 1: THE STUDY

1.1 Research problem

Despite the fact that in Chile there is an intention to become a bilingual country, this is still very far from becoming a reality. In 2010, all 11th grade students sat the national English SIMCE which aimed to measure the current number of students that had achieved a basic level of English, according to international standards. The results showed that only 1 out of 10 11th grade students reached a basic level of English. As well as this, the results illustrated that students from a high socioeconomic background obtained the highest results and that 64% of students that obtained the required score attended private school. Another important result showed that students that had more hours of English per week performed better in the test (Mineduc, 2011).

In order to try and improve the SIMCE results in subsidized and public schools, all the educational policies are focused on English as a foreign language. However, there are some issues involved in improving the level of English in a Chilean context:

- How can the number of hours of English be increased without reducing the number of hours given to other subjects?
- How is it possible to create more authentic opportunities to expose students to English in a formal education situation in subsidized and public schools?
It is possible to suggest that the answer to the first question could be to merge language and content and use English as a cross-curricular subject where language becomes a media to work with in other subjects. This in turn would suggest that the answer of the second question could be the implementation of a CLIL approach because as well as being an approach which combines the development of content and language, it is also an approach which is suitable for students of any level of English.

If one option is to merge language and content, this leads to other more specific issues related to:

- Which is the most appropriate subject to use to begin using a CLIL approach?
- Which is the most appropriate grade level to use to begin using a CLIL approach?

A possible answer to the issue of which subject, maybe to begin teaching Science as this discipline works based on concrete, real concepts which are taken from natural facts which can be seen and experienced and therefore transcend language barriers.

Another reason is that learning science develops the acquisition of scientific investigative abilities which, as outlined in the Chilean science syllabus (MINEDUC 2012), involves observation of a phenomenon, hypothesizing about this phenomenon and then proving or disproving the hypothesis through experimentation. This style of learning allows students to be active learners which can create more opportunities for meaningful learning as well as the obvious visual aids which can help with explanation if students get stuck with the language.
With regards to the question about which grade level to begin using CLIL, it is usually agreed that language learners that begin learning from a younger age show better results. In fact, the SIMCE results showed that 20% of students that obtained the required level began their studies in the first years of formal education (between Pre-Kinder and 4th grade). These results would seem to suggest that the best grade level to begin implementing a CLIL approach would be in the early years, more specifically 1st grade as in this grade level, students begin studying science as a separate subject. Another reason to suggest that 1st grade would be the best level to start in is that it would be more complicated for students to begin learning science in English later on in their schooling when they have become used to natural to having the subject in their mother tongue.

1.2 Research question

What are the key factors in the dimensions of the role of the teachers, methodology, content and activities and language needed for the in the implementation of a Science program for first graders under a CLIL approach?
1.3 Objectives

1.3.1 General Objectives

- To explore the characteristics of a CLIL approach in order to find common elements in the dimension of the teacher's role, methodologies, language, objectives and contents to set out some guidelines for using a CLIL approach in a subsidized Chilean school.

1.3.2 Specific Objectives

- To explore the characteristics of CLIL in order to define its main elements.
- To explore the characteristics of national science program to find its main characteristics.
- To provide suggestions for implementing a science program for a first grade class in a subsidized school using a CLIL approach based on the key elements identified.
1.4 Viability and Reliability

The study emerges because in Chile jobs as a subject teacher and English teacher in combination is very difficult to find. Bilingual schools are the only environments where it is possible to develop this type of teaching. However, in contexts where English is not worked as immersion but as a foreign language, such as subsidized schools, is more difficult to implement a subject in English because there are few teachers with the appropriate preparation to be in charge of teaching a subject in a foreign language.

The aim of this work is to explore the different characteristics of a CLIL approach to implement it in science for first graders in a Chilean subsidized school. The study is feasible because it is an investigation based on different theoretical information and complemented with a survey carried out with teachers who have experience teaching science in primary level in bilingual schools. Because of this context, it is relatively easy to find some key characteristics of a CLIL approach for science in order to provide some guidelines for implementing a science lesson using a CLIL approach in first grade in a subsidized school.

The resources to build this piece of work are first the literature review in order to obtain an informed basis about what CLIL is and what its principal elements are. The second element used to carry out this study is survey of a group of teachers that work in a bilingual school teaching science, as well as a group of primary teachers from a subsidized school that have experience teaching science in the mother tongue, Spanish.
With the theoretical information and the opinion of professionals with experience teaching science in the two contexts explored, it is possible to find the key components and use them to create a framework for a science lesson using a CLIL approach for first grade to be implemented in subsidized schools.
CHAPTER 2: LITERATURE REVIEW

2.1 Referential framework

Education nowadays is focused on teaching in a multilingual context so that people are able to interact in an ever more globalized world. Naturally, this means that the issue of learning at least another language has become more important and as the leaders in globalization are often English speaking countries, the language that it is fundamental to learn in today's society is precisely English.

In language teaching in formal educational settings, the objective is to provide students with as many chances as possible to be exposed to authentic language inside the classroom as well as outside. The most effective way to do this is by using an immersion program which is what bilingual schools aim to do. In a true immersion program, students are required to speak the second language all day, even during recess. This means that the language develops in more natural contexts not just in a formal classroom situation. However, the weak point is that the immersion approach has been developed only in some elite groups of the society who have the economic resources to pay for these types of schools and therefore is not accessible for everyone.

In order to incorporate other groups of society, there is a new approach that has been developed: Content and Language Integrated Learning (CLIL) of which the main contrast with bilingual education is the principle of a democratic approach suitable for any setting no matter the economic or social contexts.
According to Lasagabaster and Sierra in their research "Immersion and CLIL in English: more differences than similarities" (2009), some of the similarities and differences are listed in the table below:

<table>
<thead>
<tr>
<th>Immersion</th>
<th>Both</th>
<th>CLIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>The language practice is carried out in different contexts in daily situations.</td>
<td>The final objective of immersion programs and CLIL is that students become proficient in both the L1 and the L2, without any detriment to the acquisition of academic knowledge.</td>
<td>The language used is not a local language, it is a language used in specific contexts, most of the time formal educational settings</td>
</tr>
<tr>
<td>The majority of the teachers are native speakers, with an excellent command of the language.</td>
<td>The language the students are learning must be new to them in order to resemble the learning process of L1.</td>
<td>Teachers do not have need to have a high proficiency in the language, nor be a native speaker.</td>
</tr>
<tr>
<td>The starting age of exposure to the L2 is at early ages.</td>
<td>The communicative approach is fundamental because the objective is to obtain effective communication. This implies having a learning setting that motivates the language learning through significant situations.</td>
<td>Exposure to the language begins when the student incorporates into the formal education system.</td>
</tr>
</tbody>
</table>
The material is authentic material directed at native speakers.

Most of the time teachers use abridged materials. It is important to emphasize that the material is not the same as the material used for native speakers because CLIL material needs pedagogical adaptations.

The language objective is not so ambitious as the language is developed as a foreign language not as a second language.

| The language objective is to provide students with a proficiency similar to a native speaker. | The language objective is not so ambitious as the language is developed as a foreign language not as a second language. |

(Lasagabaster and Sierra, 2009).

Table 1

The implementation of CLIL approach has increased in different places in the world. In the great majority of European countries, students are provided with teaching in at least two different languages. The study carried out by the Education, Audiovisual and Culture Executive Agency (EACEA) in its document Key Data on Teaching Languages at school in Europe, determined that "Content and Language Integrated Learning (CLIL) generally exists in primary and general secondary education but it is not widespread. Indeed Luxembourg and Malta are the only countries in which CLIL type provision exists in all schools." (EACEA 2008:40)
In addition, the study says that CLIL was developed as an implementation project as in the case of Portugal and the Flemish Community of Belgium (EACEA 2008:40).

The reason that CLIL is suitable for any context is because it makes the language easy to understand for non-native speakers. Ting (2011) states in her article that scientific language is difficult even for native speakers. With CLIL, language is simplified to make it understandable to non-native speakers so therefore, at the same time, scientific language is made easier and comprehensible.
In terms of teaching, the Cambridge ESOL Teacher Knowledge Test (TKT) Handbook shows a teacher profile which describes some characteristics that CLIL teachers should have. It suggests that, amongst other things, CLIL teachers should be able to:

- Build up their awareness of different language features mentioned in the syllabus by noting these features in the materials used in the classroom.
- Develop an awareness of what, when and how they communicate with their learners and what, when and how the learners communicate with each other.
- Become aware of the range of learning skills needed and used while learners study particular curricula subjects.
- Look at the range of demands of their subject materials and check these with features mentioned in the syllabus.
- Become aware of how learning is consolidated and how materials and outcomes can be differentiated for the least able and most able learners.

(TKT handbook for teachers, 2010)

Another important characteristic in a CLIL teacher is the capability to realize the learning skills necessary for learning a curriculum subject. As well as this, it is important to become aware of the way learning consolidation takes place and how materials and outcomes need to be differentiated for different kinds of students. In this sense, it is possible to argue that a teacher who is trained to teach a specific grade level (Primary school or high school) is more suitable to CLIL than a teacher trained specifically to teach English as they have a greater awareness of the different stages of cognitive development and how to make learning accessible to specific age groups. (Muñoz, 2011 p. 50)
2.2 Theoretical framework

This piece of work tries to describe the key elements necessary to incorporate a CLIL approach in a science class for first graders in a subsidized school. For this, the first step is to describe and contextualize CLIL, developing the origins of CLIL and their principles. After this, the next step is to build up the basis of Chilean programs for science in first grade. The aim is to discover the key elements required to carry out this subject. To continue, the work moves to explore the dimensions of science under the approach of CLIL.

In order to carry out a CLIL lesson, it is important to explore the dimensions of the role of the teachers, methodologies, language, objectives, contents / activities and assessment because these are the basic elements of a class. One of the main focuses of this piece of work is to discover what the special features that compose a science class in a CLIL approach are and what makes it different from a regular science lesson.

In order to describe a science lesson, it is useful to explore some science textbooks in English implemented in Chile in both bilingual and full English schools. In these, it is possible to find the phases of a class, the contents programmed and divided into units, the steps prepared for a lesson and what the elements for assessing students are.
2.2.1 What is CLIL?

CLIL is a new approach that emerges from bilingual education. CLIL was born in the 1990s in the context of the European need for plurilingualism because globalization requested social cohesion and economic competitiveness. In the specific context of European policies, they intend to promote multilingualism, multiculturalism and mobility as well as internationalization, economic and social convergence and technological progress.

The previous experiences of CLIL were:

The Input Hypothesis by Krashen (1985)

The output hypothesis by Swain and Lapkin (1995)

The Canadian Immersion programme (Genesee 1994, Lyster 2007)


The innovation in CLIL is that this approach gives learners with different backgrounds the possibility and opportunity of accessing a bilingual education, meaning that this is no longer only a privilege for people from elite backgrounds.

Mehisto defines CLIL approach as "situations where subjects, or parts of subjects, are taught through a foreign language with dual-focused aims, namely the learning of content and the simultaneous learning of a foreign language" (Marsh, D. 2002)
The main characteristic of CLIL is the possibility to expose students to an environment where they can work both elements: language and contents, developing and training the two of them without interference, and where these elements complement and nurture one another.

**Dimensions of CLIL**

CLIL is the acronym for Content and Language Integrated Learning which means that content and language interact and complement each other to achieve the purpose of teaching a specific content. A CLIL approach provides students with effective opportunities to use the foreign language skills acquired immediately and with a clearly defined purpose rather than learn them to use them later.

One of the benefits in CLIL is that students get motivated when they are in classes where language is the medium to reach real purposes. For this reason, it is very important to maintain the expectations high enough to keep students motivated and not let the motivation decrease to a point where students quit or lose the confidence in themselves.

Another advantage is the idea of language learning as the centre of the curriculm because the only purpose is to work with the amount of significant language needed for the subject and no more than that.

CLIL provides meaningful contexts because the language and situations used are real and situated in a specific subject. This is different from a language class where the language and the situations are artificial and modified depending on the proficiency language level of the students.
The implementation of CLIL is time saving in terms of the time spent to learn a language because it provides a greater amount of exposure to the language, and there is more variety of language exposure in every CLIL class. For instance, in a science class there is a certain vocabulary related with this subject. At the same time, in social studies and math there is another kind of vocabulary different from one another, so students are exposed for greater periods of time and to a more varied language in order to help students learn faster than in a regular language class.

CLIL permits the use of different methods, because the content and language interact at the same level so it is fundamental to focus on methods to work with the subject content and the language together.

In addition to the advantages mentioned before, the CLIL Compendium (2011) describes five dimensions related to culture, environment, language, content and learning. The benefits of developing these dimensions of CLIL are the following:

1. Culture
   - CLIL builds intercultural knowledge and understanding.
   - CLIL develops intercultural communication skills.
   - CLIL teaches about specific neighboring countries/regions and/or minority groups.
   - CLIL introduces the wider cultural context.

2. Environment
   - CLIL prepares for internationalization, specifically EU integration.
   - CLIL accesses International Certification.
   - CLIL enhances school profile.
3. Language

- CLIL improves overall target language competence.
- CLIL develops oral communication skills.
- CLIL deepens awareness of both mother tongue and target language.
- CLIL develops plurilingual interests and attitudes.
- CLIL introduces a target language.

4. Content

- CLIL provides opportunities to study content through different perspectives.
- CLIL accesses subject-specific target language terminology.
- CLIL prepares for future studies and/or working life.

5. Learning

- CLIL complements individual learning strategies.
- CLIL diversifies methods & forms of classroom practice.
- CLIL increases learner motivation.
2.2.2 The Science subject: Description and components.

In Chile, science is a subject that begins in first grade. The subject studies natural phenomena related with living beings and their forms of interaction with the environment. Matter, energy and their transformation are other focuses of this subject as well as the solar system, its component and movements together with the Earth and its different dynamics.

The study of these phenomena needs a logical reasoning that implies the incorporation of hypothesis, inferences, explanations and conclusions based in registered evidences. All these elements are incorporated in the scientific investigation. Through these, Science permits students to comprehend the world around them and see it with a holistic view using different methodologies to train students to obtain a scientific view. As Bases Curriculares 2012 (2012, p. 2) states "The learning objectives of Natural Science promotes the comprehension of the great ideas of science and the progressive acquisition of scientific investigation thinking abilities and methods typical of the tasks in these disciplines".

In elementary education, the work is focused on the scientific literacy of the students. This means the capacity to apply the knowledge and abilities learnt in real-life situations, so that students can establish questions about different phenomena and find possible conclusions based of the evidence they obtain from the application of the scientific investigation. Scientific literacy refers to the scientific knowledge built and elaborated in the school.
Scientific investigation has three stages:

1. Observing and questioning.
2. Experimenting, planning and conducting the investigation.
3. Analyzing the evidence and communicating conclusions.

The first stage refers to involving the students in a particular phenomenon, asking questions about it and observing. The objective is to make students meet, discover and reason about their environment.

The next stage refers to the exploration and manipulation of the elements in the particular environment, following a work plan in order to get relevant information, organize it and communicate in an organized way.

The third stage refers to sharing the results obtained by following the work plan. The objective of this stage is to make students communicate their findings with the aim of contributing to their learning and to their learning environment.

The theme for science developed in the particular context of Chilean education is the Science of the life. This theme corresponds to the study of the living beings, describing their characteristics, recognizing their life cycles, and describing their food and energy source.

Another theme for this subject is Physics and Chemistry. These subjects develop the concepts of energy and matter with emphasis on their effects and transformations. With these concepts, students are able to understand the natural events in nature that are present in their real life.
The next theme in science is Earth science and the Universe. This topic focuses on the planet Earth and the way it relates with the Universe. Here the study is directed in the comprehension of the weather, the layers of the Earth, the movements of the Earth and the natural phenomena such as earthquakes, volcanoes and tsunamis. At the same time they are expected to develop the components of the solar system and the movements of the Earth and their impact in the life cycles.

For first grade, there are a set of leaning objectives related with the abilities of the scientific investigation. They are described in Bases Curriculares 2012 (2012, p. 6) as the following:

1. Observing and questioning: Explore and observe nature, using the senses properly during experimental guided investigations.

2. Experimenting: Explore experiment and manipulate simple materials, with guidance, using elements of the environment, and observation as well as non-standardized units of measurement. Follow instructions to use the materials and instruments safely.

3. Analyzing evidence and communicating: Communicate and compare ideas observations and experiences with others, in oral and written forms and through role games and drawings amongst others.
There are sets of themes appointed to reach these objectives. In life science the objectives are:

1. Recognizing and observing through exploration, that the living beings grow, respond to environmental stimuli, reproduce and need water, food and air to live, compared to the non-living things.

2. Observing and comparing animals according to characteristics like size, body covering, movement structures and habitat, among others.

3. Observing and identifying, through the media of exploration, the main structures of plants: leaf, flowers, stem and root.

4. Observing and classifying seeds, fruits, flowers and stems using criteria like size, shape, texture and colour, among others.

5. Recognizing and comparing different plants and animals of the country, taking into account the observable characteristics and suggesting measures for their care.

In the theme of human body and health the objectives are:

1. Identifying and describing the location and function of the senses, suggesting measures for care and prevent risk situations.

2. Describing, giving examples and practicing healthy habits to maintain a healthy body and prevent diseases.
For Physics and Chemistry the objectives are the following:

1. Exploring and describing the different types of materials in diverse objects, classifying them according their traits, and identifying their use in daily life.
2. Observing and describing the changes that occur in the materials when force, light, heat and water are applied.
3. Designing simple technological instruments, taking into account different materials and their traits to solve daily problems.

The last theme for first grade to develop is Earth science and the Universe. For this, the objectives are:

1. Describing and recording the daily cycle and the differences between day and night, starting with the sun, moon, stars and lightning observation among others and their effects in the living beings and the environment.
2. Describing and communicating the changes in the seasons and their effects in living beings and the environments.

2.2.3 Dimensions of a Science lesson under a CLIL approach.

Before describing the components of a science lesson under CLIL approach, it is necessary to focus on the 4Cs of Coyle (1999) adapted to the science subject. (Cambridge ESOL, 2011:4)
1. Content: Progression in knowledge, skills and understanding related to specific elements of a defined curriculum. In science it is essential to define what the topic is.

2. Communication: Using language to learn whilst learning to use language. For science it is necessary to define what science language students will communicate during the lesson.

3. Cognition: Developing thinking skills which link concept formation (abstract and concrete), understanding and language. In science it is important to define the cognition skills that are demanded of students in the science lesson.

4. Culture: Exposure to alternative perspectives and shared understandings, which deepen awareness of otherness and self. There is a duty to search if there is a cultural focus in the lesson and explore ways to connect it with the contents.

After considering the 4Cs of a science lesson, the next step is to describe the dimension of this lesson: the teacher's role, methodologies, language, objectives and content. In addition, it is important to give some lines to talk about assessment.

A) Teacher's role.

A teacher under a CLIL approach should be a combination of a subject teacher and a language teacher, because s/he needs to manage the components of a subject lesson and strategies of a language lesson, in order to make these two components interact. It is necessary for teachers to develop not only essential knowledge of the topic but also develop students' communicative competence.
A CLIL teacher needs to become aware of different requirements before delivering a lesson. Some of them are named in the TKT CLIL examination Handbook. In this exam, there is a CLIL teacher profile described. The following are some of the CLIL teachers' characteristics:

- CLIL teachers can recognize the language features mentioned in a syllabus recognizing them in the material used in the classroom.
- CLIL teachers know what, when and how the communication occurs and is capable to provide the instances for this to happen.
- CLIL teachers recognize the cognitive skills required for a science lesson and select activities in order to develop these skills in combination with the development of language skills.
- A CLIL teacher can note how and why they use support material or graded language to help learners understand the content of their curriculum subjects.

B) Methodologies.

More than describing specific methods, it is better to label them considerations when a CLIL teacher plans a science lesson. As the document Teaching Science through English- a CLIL approach (Cambridge ESOL 2011) states, the considerations are:

- Activating prior knowledge: this is very helpful to start the class, because learners may know information about the facts in their L1, but they can face difficulties when they try to explain it in a L2. When there is a brainstorming, students are allowed to use the L1 and then translate.
Input and output: Input needs to be planned in a science class under CLIL. In addition, the way that this input is presented taking into consideration if the input is for the whole class, group work or pair work and if the input is going to be presented orally, in written form or electronically. At the same time it is important to plan for leamers output, predicting how leamers are going to produce and communicate the content and the language.

Wait time: This consideration refers to the time teachers wait between asking questions and leamers answering them. When a leamer faces information of content in a L2, it is important to give them more processing time than students facing contents in the L1.

Collaborative tasks: It is important in a science class under CLIL to involve students in producing key subject-specific vocabulary and structures. This needs to be developed in meaningful pair or group work. Some examples could be pair works information gap or a labelling activity, asking and answering questions, planning and experiment.

Cognitive challenge: Students face cognitively challenging materials from the beginning of their courses. For this, it is important to provide them scaffolding language support strategies. For instance, written substitution tables.
• Developing thinking skills: Teachers need to ask questions which develop lower order thinking skills (LOTS). These are the what, when, where and which questions correspond to this classification. It is equally important to ask questions that demand higher order thinking skills (HOTS).

C) Language.

When teachers deliver a science lesson under CLIL, they need to consider the two kinds of content: Content-obligatory language and content-compatible language.

The first one is the language associated with specific content. This is the subject-specific vocabulary, grammatical structures and functional expressions learners need to:

1. Learn about a curricular subject.
2. Communicate subject knowledge.
3. Take part in the interactive classroom task.

The second one is the non-subject specific language. This means the language students may have learned in their language classes and permits them to communicate better about the specific subject-content in a science CLIL class. The table below gives some examples of Content-obligatory and Content-compatible language.
<table>
<thead>
<tr>
<th>Content-obligatory language</th>
<th>Content-compatible language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertebrate .._..invertebrate</td>
<td>short .._..long</td>
</tr>
<tr>
<td>Endoskeleton .._..exoskeleton</td>
<td>group, class</td>
</tr>
<tr>
<td>bones, backbone</td>
<td>head, body, tail</td>
</tr>
<tr>
<td>terrestrial</td>
<td>They lay eggs.</td>
</tr>
<tr>
<td>aquatic</td>
<td>They catch fish.</td>
</tr>
<tr>
<td><em>(explaining differences)</em> Vertebrates have endoskeletons but/whereas invertebrates have</td>
<td><em>(defining)</em> It's an animal that lives in the sea/on</td>
</tr>
<tr>
<td>exoskeletons or no skeleton</td>
<td>the land.</td>
</tr>
</tbody>
</table>

(Cambridge ESOL, 2011:5) Table 2

D) Learning outcomes and objectives.

It is important for teachers to consider the learning outcomes in each lesson, unit and course. The questions that teachers need to ask themselves are:

- What will learners know and understand, about the science subject?
- What will students be able to do at the end of the lesson or unit?
- What skills and attitudes they will develop in the lesson or unit?

The teacher must plan taking into account that the learning outcomes are learning-centred, that means the focus is on what learners can achieve not what the teacher teaches.
E) Content

To work with content, the teacher has to recogmse first what content is revisited (prior knowledge) and what content is new. This is important because it is necessary to link both by activating prior knowledge and then presenting the new knowledge based of components of the previous elements learnt before. This is defined by Vigotsky as Zone of proximal development (ZPD). Petrick (1995) states that ZPD in Vigotzky’s words is "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers". The teacher in the role of adult who guides the student, must select and work with subject-specific language, in order to develop the content properly and familiarize them with the subject content. It is essential to revisiting new concepts by using the subject-specific language.

F) Assessment

Assessment is an issue for CLIL teachers, because there is confusion about what to assess: language or content or both together. For a good assessment, it is important to conduct two types of assessment: formative and summative. The formative should focus on performance assessment. This involves the students' capacity to demonstrate their knowledge of content and language. A better way to do this is using specific criteria. Because a science lesson has tasks that are completed collaboratively, the correct procedure is to give students the opportunity to be assessed individually and collaboratively. Together with this, it is possible to assess the students in terms of the communicative, cognitive and attitudinal skills.
A good example of this could be the one described in Teaching Science through English- a CLIL approach (2011, p. 10) that provides the following example:

"Teachers can look for evidence of learners' ability to explain the effects of microorganisms on the human body (communication), reflect on the reliability of their findings (cognitive skills) and share information with other group of members (attitude)."
CHAPTER THREE: METHODOLOGICAL FRAMEWORK

3.1 Type of research

This current investigation is focused mainly on the exploration of characteristics of a CLIL approach and what the key factors are in the dimensions of the role of the teachers, methodology, objectives, content and language in the implementation of a Science program for first graders under a CLIL approach. The objective is to explore and select relevant information in order to make suggestions about how to implement a science program in first grade under CLIL approach.

The variables for this study are English teachers teaching science. They work from first grade to sixth grade in a bilingual school. The other group of teachers are primary teachers from first grade to sixth grade that teach science in Spanish.

The research is conducted using a mixture of two approaches: the first one is a quantitative research that involves statistical analysis from data obtained through the application of surveys. After tabulating the information, there is an interpretation of the results in order to select the suitable components to build a science program for first graders under CLIL approach.

3.2 Participants

The first sample for this study is a group of six teachers that work in a private, bilingual school, teaching different subjects including science. The school is located in Las Condes, Santiago and the students at the school are from a predominantly medium-high socioeconomic background.
The second sample is a group of four teachers from a subsidized school in Pudahuel, Santiago. In this school, the students come from largely low socioeconomic backgrounds. The teachers surveyed work in primary school teaching different subjects including science. The teachers of both samples work in primary school from first grade to fourth grade. Both samples are chosen because there is an easy access to meet them and it is possible for them to complete the survey. As well as this, it is important to survey groups of teachers from both contexts is to see if there are any points where the two sets of teachers coincide. These points (if there are any) will provide the common basis for implementing CLIL in a subsidized school. Another point of the survey is to find the elements of an Immersion system that can be implemented in a subsidized school despite the fact that the students have a lower level of English as well as possibly a lower achievement in Science.

3.3 Instruments

The instrument that will be used to collect the data from the teachers is a survey. There are two versions of the instrument, one in English and the second one is a Spanish version. The first one is applied for teachers who work at the bilingual school and therefore speak English whereas the Spanish version is designed for teachers in a subsidized school who do not speak English. The idea is to obtain relevant information about the components of a science class to make a selection of the common elements in both surveys with the objective of suggesting some actions to incorporate into a science class in order to make it a science lesson using a CLIL approach.
The survey is divided into five parts that correspond to the dimensions of a science class:

- Teacher’s role.
- Methodologies.
- Language
- Learning outcomes and objectives.
- Content
- Assessment

Dimension 1: Teacher’s role.

In this dimension the questions are:

1. The teacher selects and combines content and language teaching strategies in a science class.
2. The teacher selects relevant content and can make it fit with relevant language components.
3. The teacher recognizes the language features in a syllabus and identifies them in the materials.
4. The teacher recognizes when and how the communication occurs and provides the instances to make communication happen between students.
5. The teacher plans the class in order to develop the cognitive and language skills required in the science class.
6. The teacher provides adapted materials to help students understand the content of the subject.
Dimension 2: Methodologies

1. There are activities that activate prior knowledge.
2. The input is planned previously, taking into account the group of the class is directed (whole class, a group or individual student)
3. The teacher predicts the learners' output preparing reinforcement for their answers and directed the way students are going to communicate their findings.
4. The teacher lets enough time for students to process the information in the L2.
5. The class provides activities to develop collaborative and personal work.
6. The class has a set of vocabulary provided by the teacher in order to help them to understand and process the information.
7. The class incorporates activities that develops low order skills (LOTS) and high order skills (HOTS)

Dimension 3: Language

1. There is a selection of specific vocabulary connected to the content that is worked in the class.
2. There is a selection of specific language vocabulary worked in the class.
3. The vocabulary specific for content is reinforced in class.
4. The class is taught in English all the time.
5. Students can develop ideas and answers in English.
6. Students understand the content taught in the second language. They can explain concepts and ideas in both languages.
7. The teacher adapts the specific- content vocabulary for students understanding.
8. The teacher adapts and provides tools to help students to use the English properly.
Dimension 4: Learning outcomes and objectives

1. Previous knowledge is well developed during the class using it as the basis to construct the new knowledge.
2. The class reflects a clear view about the tasks students are able to do at the end of the class.
3. The class reflects the developing of the skills and attitudes required for the science class.
4. The class is planned and developed based on what students can achieve.

Dimension 5: Content

1. In the class there is an appropriate development of prior knowledge and new content, giving a time to revisiting the first one and present and work the second one.
2. The class reflects a good link of prior and new knowledge working on scaffolding: build new content with the previous one.
3. There is a good use of specific content language to develop the concept properly and familiarize them with the subject content.

Dimension 6: Assessment

1. There is formative assessment in different moments of the unit.
2. The formative assessment evaluates individual and collaborative work.
3. The formative assessment evaluates students’ ability to demonstrate:
   a) Knowledge of content and language.
   b) Communicative ability.
e) Cognitive abilities.

d) Attitudinal performance.

4. There is a summative assessment that evaluates the skills and the contents achieved in the learning process.

The same organization is used in the Spanish version:

Dimensión 1: Rol del profesor.

1. El profesor selecciona y combina estrategias de enseñanza de contenido y lenguaje específico en una clase de ciencias.

2. El profesor selecciona contenido relevante puede hacerlo calzar con componentes relevantes del lenguaje.

3. El profesor reconoce elementos del lenguaje en el programa y los identifica en los materiales.

4. El profesor reconoce cuándo y cómo ocurre la comunicación y provee de instancias para que la comunicación pase entre los estudiantes.

5. El profesor planea la clase de modo que puede desarrollar las habilidades cognitivas y de lenguaje requerida para la clase.

6. El profesor provee de material adaptado para ayudar a los estudiantes a entender el contenido del subsector.
Dimensión 2: Metodología

1. En la clase hay actividades que activan el conocimiento previo.
2. Los elementos a enseñar son planeados previamente, tomando en cuenta el grupo de la clase al cual se dirige. (Toda la clase, a grupos o individual.)
3. El profesor predice las conductas de salida de los estudiantes, preparando refuerzo para sus respuestas y dirigiendo la manera en la cual los estudiantes van a comunicar sus hallazgos.
4. El profesor da suficiente tiempo para que los estudiantes procesen la información.
5. La clase provee actividades para desarrollar trabajo colaborativo.
6. La clase tiene un set do vocabulario provisto por el profesor para ayudarlos a entender y procesar la información.
7. La clase incorpora actividades que desarrollan habilidades de bajo orden (elementales) y habilidades de alto orden (elevadas).

Dimensión 3: Lenguaje

1. Hay una selección de vocabulario específico conectado con el contenido que se trabaja en la clase.
2. Hay una selección de lenguaje específico trabajado en clase.
3. El vocabulario específico para los contenidos es reforzado en clases.
4. La clase es enseñada completamente en inglés.
5. Los estudiantes pueden desarrollar ideas y respuestas en inglés.
7. El profesor adapta el vocabulario específico de contenido para el entendimiento de los estudiantes.

8. El profesor adapta y provee herramientas para ayudar a los estudiantes a usar el idioma inglés apropiadamente.

Dimensión 4: Aprendizajes y objetivos

1. El conocimiento previo es bien desarrollado durante la clase, usándolo como base para la construcción del nuevo conocimiento.

2. La clase refleja una clara visión sobre las tareas que los estudiantes son capaces de hacer al final de la clase.

3. La clase refleja el desarrollo de las habilidades y actitudes requeridas para una clase de ciencias.

4. La clase es planeada y desarrollada en base a lo que los estudiantes pueden alcanzar.

Dimensión 5: Contenido

1. En la clase hay un apropiado desarrollo del conocimiento previo y el nuevo conocimiento dando un tiempo para revisar nuevamente el primero además de presentar y trabajar el segundo.

2. La clase refleja una buena conexión entre conocimiento previo y nuevo conocimiento, trabajando en "andamiaje": construcción de nuevo contenido con el nuevo contenido.

3. Hay un buen uso del lenguaje específico de contenido, para desarrollar el concepto apropiadamente y familiarizarlos con el contenido del subsector.
1. Hay una evaluación formativa en diferentes momentos de la unidad.

2. La evaluación formativa evalúa trabajo individual y colaborativo.

3. La evaluación formativa evalúa las habilidades del estudiante para demostrar:

   a) Conocimiento del contenido y el lenguaje.
   b) Habilidades comunicativas.

   e) Habilidades cognitivas.
   d) Presentación de actitudes.

4. Hay una evaluación sumativa que evalúa las habilidades y los contenidos alcanzados en el proceso de aprendizaje.
CHAPTER 4: ANALYSIS AND RESULTS

This chapter is organized based on graphs obtained from the data in the surveys taken before. The survey in English is for teachers that work in the bilingual school. The survey in Spanish is for teachers that work in the subsidized school. The graphs are divided into the six dimensions described in the previous chapter. The first results are obtained from the English survey.

4.1 Survey in English results

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a bilingual school use the following elements related to the teacher’s role;

Q1. The teacher selects and combines content and language teaching strategies in a science class.

Q2. The teacher selects relevant content and can make it fit with relevant language components. Q3. The teacher recognizes the language features in a syllabus and identifies them in the materials.

Q4. The teacher recognizes when and how the communication occurs and provides the instances to make communication happen between students.

Q5. The teacher plans the class in order to develop the cognitive and language skills required in the science class.

Q6. The teacher provides adapted materials to help students understand the content of the subject.
Graph number 1: Dimension 1. Teacher's role

Analysis Q1.

Five teachers out of six say that the teacher makes a combination of content and language teaching strategies, that means there is a conscious intention to balance both components in order to work with them together. It is possible to deduce that teachers use the language as a media of instruction, giving the language the same importance as the content.

The graph also shows that there is one teacher who says that it is possible to combine content and language teaching only 50% of the time. That means there is no a good balance between content and language and the way they are used to carry out a science class. One possibility is the fact that some bilingual teachers are not trained to work with primary students as they trained as English teachers, and as is said in a previous chapter, a teacher who is trained to work specifically in primary education very often performs better using CLIL, than a teacher who is trained specifically as a language teacher.
Analysis Q2.
For this question, it is possible to say that the majority of the time, teachers select relevant content and they can make it fit with relevant components of the language. This might be because there is a good understanding of the concept of CLIL which is a dual-focused approach where an additional language is used for the learning and teaching of both: content and language.

Analysis Q3.
In question three it is possible to see that there is a difficulty in recognizing language features in the syllabus and recognizing them in the material. This result would not be coherent if the teachers were language teachers trained to teach a specific subject as supposedly if a teacher is a trained language teacher, they should be able to recognize certain language components. However, if the teachers are primary teachers and they speak English the result is more understandable as very often primary teachers who speak English have not studied English in such depth and would therefore not be so aware of specific language components or the development of linguistic and communicative skills.

Analysis Q4.
Question four demonstrates an equal result in the option number 5 (100 % of the time) and option number 4 (75% of the time). That means that for the majority of the time, teachers recognize when and how communication occurs and provide students with lots of instances to communicate. This is possible if teachers have been trained in the use of CLIL because in TKT Handbook, one of the characteristics of a CLIL teacher is the ability to recognize the moments and the way communication occurs (TKT handbook for teachers, 2010)
Analysis Q5.

Question five shows that teachers are able to make lesson plans in order to develop cognitive and language skills. This is essential to develop the national program properly because one of the requirements of the program is the development of cognitive skills. At the same time, the development of language skills is a component of CLIL.

Analysis Q6.

For question six teachers say that most of the time they select and adapt material to use in their class with the objective of helping students to understand the content. This result demonstrates that teachers plan focusing on the components of CLIL, selecting the elements about language and content in a balanced way.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a bilingual school use the following elements related to methodologies;

Q1. There are activities that activate prior knowledge.

Q2. The input is planned previously, taking into account the group of the class is directed (whole class, a group or individual student)

Q3. The teacher predicts the learners’ output preparing reinforcement for their answers and directed the way students are going to communicate their findings.

Q4. The teacher lets enough time for students to process the information in the L2.

Q5. The class provides activities to develop collaborative and personal work.
Q6. The class has a set of vocabulary provided by the teacher in order to help them to understand and process the information.

Q7. The class incorporates activities that develops low order skills (LOTS) and high order skills (HOTS)

Graph number 2: Dimension 2. Methodologies

Analysis Q1.

In question one, teachers say that they activate prior knowledge using activities for this more than 75% of the time. This is a special characteristic of what is called scaffolding education which is the building of the new knowledge on the basis of previous knowledge. This results demostrates that teachers are able to incorporate this concept to their class.
Analysis Q2.

Question two demonstrates that teachers make an effort to plan a class which is appropriate for all the ability levels of the students. This result suggests that the majority of the time, teachers prepare a class which aims to achieve the total attention of the whole class.

Analysis Q3.

Question three demonstrates that half of the teachers surveyed take into account the output generated by their students 50% of the time or less. This implies that sometimes they find it difficult to direct the class in such a way that they are able to achieve the objectives proposed.

Analysis Q4.

Question four shows that the majority of the teachers provide moments for students to analyse the information. This seems to be a good strategy and could come from the teachers’ experience as learners. This is because, when someone learns something in another language, it is necessary to have a moment for processing the information in terms of understanding the concept meaning as well as the language meaning.

Analysis Q5.

Question five demonstrates that these teachers can develop the national science program requirements properly. This is crucial as the previous chapters show, collaborative work is given as one of the important elements of scientific work.
Analysis Q6.

Question six demonstrates that teachers know the vocabulary required to carry out a science class. And they say that the 100% of the time they use this set of the vocabulary in order to help students understand and process information.

Analysis Q7.

As the results for this question show, teachers are well informed about the concept of LOTS and HOTS skills. With these results it is possible to deduce that teachers know about the science methodology and how it is implemented.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a bilingual school use the following elements related to language;

Q1. There is a selection of specific vocabulary connected to the content that is worked in the class.
Q2. There is a selection of specific language vocabulary worked in the class.
Q3. The vocabulary specific for content is reinforced in class.
Q4. The class is taught in English all the time.
Q5. Students can develop ideas and answers in English.
Q6. Students understand the content taught in the second language. They can explain concepts and ideas in both languages.
Q7. The teacher adapts the specific- content vocabulary for students understanding. Q8.

The teacher adapts and provides tools to help students to use the English properly.
Analysis Q1.

From the first question, it is possible to deduce that the majority of the time, teachers are able to select the vocabulary for the content they have to teach and how to connect and work with it in their class. However, it is important to mention that half of the teachers surveyed stated that only 75% of the time they are able to select the specific vocabulary related to the content they are teaching. This could suggest that these teachers are English teachers trained to teach English rather than Primary teachers who speak English who would be more familiar with the specific vocabulary related to Science as this subject would be their speciality.

Analysis Q2.

Question 2 shows that teachers are able less frequently to select which vocabulary related to language they need to use to develop a science class properly. This result could suggest that although the teachers are aware that a CLIL class is dual based and balances language and content, teachers still find it difficult to plan to teach language in a Science class where the content has to be taught too.
Analysis Q3.

Teachers' answers in question three demonstrate that the majority of the time, teachers take the time to reinforce the content related to vocabulary in class. Although the results do not show 100% of the time, they do correlate with the results for question 1 because if teachers state that they do not always plan to use specific vocabulary, naturally corresponds that they will not practice this vocabulary 100% of the time.

Analysis Q4.

Question four demonstrates that teachers use the language as a medium in class. As it was said before, teachers use the language as a medium of instruction so there is not interference between L1 and L2. However, the teacher that said he/she uses English only 75% of the time, it is possible to suggest that he/she uses L1 in specific moments maybe to explain or talk about another topic not related with the content.

Analysis Q5 and Q6

Questions five shows that the majority of the time, students can express their ideas in English. Question six shows that students understand the content the majority of the time, because students are able to explain concepts and ideas in English.

These two questions together demonstrate that there is a good balance of language and content work, as well as a good understanding of the content in English.
Analysis Q7 and Q8

Question seven shows that teachers adapt most of the time, the specific-content language, to help students understand the content.

Question eight shows that teachers adapt the language to help students understand the content taught in a second language.

These two answers reveal that there is a conscious intention to adapt both: the language and the vocabulary for content. This means teachers are moving towards teaching using a full CLIL approach.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a bilingual school use the following elements related to Learning outcomes and objectives;

Q1. Previous knowledge is well developed during the class using it as the basis to construct the new knowledge.
Q2. The class reflects a clear view about the tasks students are able to do at the end of the class.
Q3. The class reflects the developing of the skills and attitudes required for the science class.
Q4. The class is planned and developed based on what students can achieve.
Graph number 4: Dimension 4. Language Learning outcomes and objectives

Analysis Q1.

Question 1 shows that the majority of the time, teachers recognize the previous knowledge of the students and they use it to build new knowledge. This means that they understand the concept of scaffolded learning and the zone of proximal development and they incorporate these concepts in their classes.

Analysis Q2.

Question 2 shows that the majority of the time the class is planned focusing on achieving the objectives through the different tasks of the class.

Analysis Q3.

Question 3 shows that the majority of the time, tasks and activities of the class are selected to help the development of the skills and attitudes required in a science class. This reflects the fact that the teachers are aware of the national Science Program which is based on the acquisition of certain skills.
Analysis Q4.

Question four shows that the majority of the time, all but one of the teachers surveyed prepare their classes based on what students are capable of achieving. This shows that the classes are student centred which is one of the elements of CLIL.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a bilingual school use the following elements related to content:

Q1. In the class there is an appropriate development of prior knowledge and new content, giving a time to revisiting the first one and present and work the second one.

Q2. The class reflects a good link of prior and new knowledge working on scaffolding: build new content with the previous one.

Q3. There is a good use of specific content language to develop the concept properly and familiarize them with the subject content.
Graph number 5: Dimension 5. Content

Analysis Q1 and Q2

In question 1, the majority of the time, teachers work and reinforce prior knowledge in combination with new content. In question 2, the results reflect that even though half of the teachers surveyed state that 100% of the time they achieve a good link between prior and new knowledge, the other half state that this occurs only 75% of the time.

As stated above, this shows that teachers have an understanding of the Zone of Proximal Development and of Scaffolded Learning but they do not always manage to reach a good balance between prior and new knowledge, possibly for reasons of time or perhaps because they are not sure of the students' previous knowledge.

Analysis Q3

This question shows that the majority of the time, teachers are able to teach using specific language related to the content and make students understand and learn the content despite the use of a second language.
The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a bilingual school use the following elements related to assessment:

Q1. There is formative assessment in different moments of the unit.

Q2. The formative assessment evaluates individual and collaborative work.

Q3. The formative assessment evaluates students’ ability to demonstrate:
   
   e) Knowledge of content and language.
   
   f) Communicative ability.
   
   g) Cognitive abilities.
   
   h) Attitudinal performance.

Q4. There is a summative assessment that evaluates the skills and the contents achieved in the learning process.

Graph number 6: Dimension 6. Assessment
Analysis Q1, Q2, and Q3

Question 1 shows that the majority of the time, a formative assessment is taken during the course of the unit. At the same time, question 2 reveals that the majority of the time, this assessment evaluates both individual and collaborative work. As well as this, question 3 shows that the majority of the time, the assessment measures the key elements of assessment described in the Cambridge ESOL (2011). These results demonstrate that the assessments include all of the dimensions necessary to evaluate the unit delivered using a CLIL approach.

Analysis Q4.

Question four shows that there is always a summative assessment at the end of the unit that reflects and supports, in numbers, the results of the formative evaluations taken during the learning process.

4.2 Survey in Spanish: results

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a subsidized school use the following elements related to teacher's role;

Q1. El profesor selecciona y combina estrategias de enseñanza de contenido y lenguaje específico en una clase de ciencias.
Q2. El profesor selecciona contenido relevante puede hacerlo calzar con componentes relevantes del lenguaje.
Q3. El profesor reconoce elementos del lenguaje en el programa y los identifica en los materiales.
Q4. El profesor reconoce cuándo y cómo ocurre la comunicación y provee de instancias para que la
comunicación pase entre los estudiantes.

Q5. El profesor planea la clase de modo que puede desarrollar las habilidades cognitivas y de lenguaje requerida para la clase.

Q6. El profesor provee de material adaptado para ayudar a los estudiantes a entender el contenido del subsector.

Graph number 7: Dimension 1. Rol del profesor

Analysis Q1.

The four teachers say that the teacher makes a combination of content and language teaching strategies that means there is a conscious intention to balance both components in order to work with them together as it happens with bilingual teachers.

It is possible to deduce that even though teachers from this subsidized school do not use the English language as a media of instruction, they give the science language the same importance as the content.
Analysis Q2.

For this question it is possible to say that teachers almost never select relevant content and make it fit with relevant components of language. The low results might be because when the survey names the components of language, the teachers do not have a good understanding of the concept of language and they get confused. But it is important to point that as it is stated in the theoretical framework, there is a special language in science that is possible to compare with some components of a second language.

Analysis Q3.

In question three it is possible to see that teachers are confused about the meaning of language. Of course, for bilingual teachers it is clear, but for primary teachers as the answer to the question is the majority of the time there is a recognition of language features in the syllabus and recognizing them in the material, it is possible to deduce they understand in this case, language as the scientific language.

Analysis Q4.

Question four demonstrates that teachers, the majority of the time (75% to 100%), recognize and provide instances for communicating between students. That means even in science classes in the first language, teachers provide students specific moment for communicate and inform their findings.

Analysis Q5.

Question five shows that the majority of the teachers are able to make lesson plans most of the time, in order to develop cognitive and language skills. This is essential to develop the national program properly because one of the requirements of the program is the development of cognitive skills. At the same time, the development of language skills in this case refers to the work of the scientific language.
Analysis Q6.

For question six half of the teachers say that most of the time they select and adapt material to use in their class with the objective of helping students to understand the content. This result demonstrates that teachers do not plan necessarily focusing on the components of CLIL, it seems to be that their focus of the adaptation is related with other factors in the class, possibly in students with special needs.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a subsidized school use the following elements related to methodologies;

Q1. En la clase hay actividades que activan el conocimiento previo.

Q2. Los elementos a enseñar son planeados previamente, tomando en cuenta el grupo de la clase al cual se dirige. (Toda la clase, a grupos o individual.)

Q3. El profesor predice las conductas de salida de los estudiantes, preparando refuerzo para sus respuestas y dirigiendo la manera en la cual los estudiantes van a comunicar sus hallazgos.

Q4. El profesor da suficiente tiempo para que los estudiantes procesen la información.

Q5. La clase provee actividades para desarrollar trabajo colaborativo.

Q6. La clase tiene un set do vocabulario provisto por el profesor para ayudarlos a entender y procesar la información.

Q7. La clase incorpora actividades que desarrollan habilidades de bajo orden (elementales) y habilidades de alto orden (elevadas).
Graph number 8: Dimensión 2. Metodologías

Analysis Q1.

In question, one teachers say that they activate prior knowledge using activities for this 100% of the time. This is a special characteristic of what is called scaffolding education which is the building of the new knowledge on the basis of previous knowledge. This result demonstrates that teachers are able to incorporate this concept into their class. That demonstrates also that there is a common element between a regular science class and a CLIL science class.

Analysis Q2.

Question two demonstrates that teachers make an effort to plan a class which is appropriate for all the ability levels of the students. This result suggests that the majority of the time, teachers prepare a class which aims to achieve the total attention of the whole class. This is deduced from the results: the four teachers say that this action happens the 100% of the time.
Analysis Q3.

Question three demonstrates that half of the teachers surveyed take into account the output generated by their students 75% of the time or more. This implies that sometimes they have and advantage with the bilingual teachers because it seems they direct the class better in such a way that they are able to achieve the objectives proposed. Maybe the fact that the content is taught in the mother tongue, the students' output is easier to predict.

Analysis Q4.

Question four shows that the majority of the teachers provide moments for students to analyse the information, at least the 75% of the time. This seems to be a good strategy for bilingual teachers and primary teachers from subsidized schools. The experience pointed out when someone learns something, it is neccesary to have a moment for processing the information in terms of understanding the concept meaning and reflect about the application of it.

Analysis Q5.

Question five demonstrates that the majority of the teachers can develop the national science program requirements properly 100% of the time. This is crucial as the previous chapters show, collaborative work is given as one of the important elements of scientific work. The other answers are located between 75% and 50%. Based on these results, it is possible to deduce that the language of instruction is not a barrier to develop collaborative work.
Analysis Q6.

Question six demonstrates that the majority of the teachers know the vocabulary required to carry out a science class. And they say that 75% to 50% of the time they use this set of the vocabulary items in order to help students understand and process information. This means there are some problems for a group of teachers to recognize and use the vocabulary to help students understand. Maybe the specific vocabulary, in this case scientific vocabulary is not taking into account when teachers plan the lessons.

Analysis Q7.

Question seven, teachers are well informed about the concept of LOTS and HOTS skills. With these results it is possible to deduce that teachers know about the science methodology.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a subsidized school use the following elements related to Language:

Q1. Hay una selección de vocabulario específico conectado con el contenido que se trabaja en la clase.
Q2. Hay una selección de lenguaje específico trabajado en clase.
Q3. El vocabulario específico para los contenidos es reforzado en clases.
Q4. La clase es enseñada completamente en inglés.
Q5. Los estudiantes pueden desarrollar ideas y respuestas en inglés.
Q7. El profesor adapta el vocabulario específico de contenido para el entendimiento de los estudiantes.
Q8. El profesor adapta y provee herramientas para ayudar a los estudiantes a usar el idioma inglés apropiadamente.
Analysis Q1.

From the first question it is possible to deduce that the majority of the time, teachers are able to select the vocabulary for the content they have to teach and how to connect and work with it in their class. The results suggest that teachers select vocabulary for the content in order to make it comprehensible for all the students. This action is also performed by bilingual teachers, so this is a common point.

Analysis Q2.

Question 2 shows that teachers select most of the time (75% to 100%) which vocabulary related to language they need to use to develop a science class properly. This result could suggest the teachers are aware that for a science it class is important to make a balance between scientific language and regular language.
Analysis Q3.
Teachers’ answers in question three demonstrate that the majority of the time, teachers take the time to reinforce the new vocabulary related specifically to science. This percentage is as high as in the case of bilingual teachers. This seems to be another common point.

Analysis Q4.
Question four demonstrates that teachers do not use another language as a media of instruction in class.

Analysis Q5 and Q6
These two questions together demonstrate that English is not a medium of instruction because the answers of the survey are the same in both. Three teachers answer with number 1 and one with number three.

Analysis Q7 and Q8
Question seven shows that half of the teachers adapt most of the time, the specific-content language, to help students understand the content. From this result it is possible to deduce that the adaptation is focused on students with special needs because the previous results indicate that teachers teach the content in L1.

Question eight shows that teachers do not focus on observing this action.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a subsidized school use the following elements related to Learning outcomes and objectives;
Q1. El conocimiento previo es bien desarrollado durante la clase, usándolo como base para la construcción del nuevo conocimiento.

Q2. La clase refleja una clara visión sobre las tareas que los estudiantes son capaces de hacer al final de la clase.

Q3. La clase refleja el desarrollo de las habilidades y actitudes requeridas para una clase de ciencias.

Q4. La clase es planeada y desarrollada en base a lo que los estudiantes pueden alcanzar.

Graph ten: Dimensión 4: Aprendizaje y objetivo

Analysis Q1.

Question 1 shows that the majority of the time, teachers recognize the previous knowledge of the students and they use it to build new knowledge. This means that they understand the concept of scaffolding learning and the zone of proximal development and they incorporate them in their classes. In addition, the results reflect that these two ideas are applied in both contexts.
Analysis Q2.

Question 2 shows that the 100% of the time the class is planned focusing on achieving the objectives through the different tasks of the class. This means that teachers know their objectives very well and also know how to direct the class in order to fulfil them.

Analysis Q3.

Question 3 shows that the majority of the time, tasks and activities of the class are selected to help the development of the skills and attitudes required in a science class. This reflects the fact that the teachers are aware of the national Science Program which is based on the acquisition of certain skills.

Analysis Q4.

Question four shows that the majority of the time, all but one of the teachers surveyed prepare their classes based on what students are capable of achieving. This shows that the classes are student centred which as in the case of science classes under CLIL approach.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a subsidized school use the following elements related to content;

Q1. En la clase hay un apropiado desarrollo del conocimiento previo y el nuevo conocimiento dando un tiempo para revisar nuevamente el primero además de presentar y trabajar el segundo.

Q2. La clase refleja una buena conexión entre conocimiento previo y nuevo conocimiento, trabajando en "andamiaje": construcción de nuevo contenido con el nuevo contenido.

Q3. Hay un buen uso del lenguaje especifico de contenido, para desarrollar el concepto apropiadamente y familiarizarlos con el contenido del subsector.
Analysis Q2.

Question 2 shows that the 100% of the time the class is planned focusing on achieving the objectives through the different tasks of the class. This means that teachers know their objectives very well and also know how to direct the class in order to fulfil them.

Analysis Q3.

Question 3 shows that the majority of the time, tasks and activities of the class are selected to help the development of the skills and attitudes required in a science class. This reflects the fact that the teachers are aware of the national Science Program which is based on the acquisition of certain skills.

Analysis Q4.

Question four shows that the majority of the time, all but one of the teachers surveyed prepare their classes based on what students are capable of achieving. This shows that the classes are student centred which as in the case of science classes under CLIL approach.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a subsidized school use the following elements related to content;

Q1. En la clase hay un apropiado desarrollo del conocimiento previo y el nuevo conocimiento dando un tiempo para revisar nuevamente el primero además de presentar y trabajar el segundo.

Q2. La clase refleja una buena conexión entre conocimiento previo y nuevo conocimiento, trabajando en "andamiaje": construcción de nuevo contenido con el nuevo contenido.

Q3. Hay un buen uso del lenguaje específico de contenido, para desarrollar el concepto apropiadamente y familiarizarlos con el contenido del subsector.
Graph 11: Dimension 5. Content

Analysis Q1 and Q2

In question 1, the majority of the time, the teachers work and reinforce prior knowledge in combination with new content. In question 2, the results reflect that the majority of the teachers surveyed state that 100% of the time they achieve a good link between prior and new knowledge, and only one teacher states that this occurs only 75% of the time.

As stated above, this shows that teachers have an understanding of the Zone of Proximal Development and of Scaffolded Learning which is the same as in the case of the bilingual teachers surveyed. As well as this, the teachers in the subsidized school seem to reach a good balance between prior and new knowledge, possibly because they teach using L1 so it is easier to obtain information about prior knowledge.
Analysis Q3

This question shows that teachers believe that the reinforcement of specific content language helps students to understand the meaning of the concepts and connect them with the subject content. This might be possible because for science classes there is a specific scientific language required to use in a science class.

The following graph shows the frequency (from 100% of the time to 0% of the time) of how often teachers in a subsidized school use the following elements related to assessment:

Q1. Hay una evaluación formativa en diferentes momentos de la unidad.

Q2. La evaluación formativa evalúa trabajo individual y colaborativo.

Q3. La evaluación formativa evalúa las habilidades del estudiante para demostrar:

   e) Conocimiento del contenido y el lenguaje.

   f) Habilidades comunicativas.

   g) Habilidades cognitivas.

   h) Presentación de actitudes.

Q4. Hay una evaluación sumativa que evalúa las habilidades y los contenidos alcanzados en el proceso de aprendizaje.
Analysis Q1, Q2, and Q3

Question 1 shows that three teachers always use a formative assessment that is taken during the course of the unit. At the same time, question 2 reveals that the majority of the time, this assessment evaluates both individual and collaborative work as in the case of the bilingual context. As well as this, question 3 shows that the majority of the time, the assessment measures the key elements of assessment described in the Cambridge ESOL (2011). These results demonstrate that the assessments include all of the dimensions necessary to evaluate the unit delivered using a CLIL approach.

The important conclusion of these three questions is that assessment is presented in the same way in both contexts that reinforces the idea that science has special components for assessment.

Analysis Q4.

Question four reflects that teachers always use a summative assessment which supports, in numbers, the results of the formative evaluations taken during the learning process. This is because it is easier to have results in numbers in order to analyse the learning and teaching process.
CHAPTER 5: CONCLUSIONS

At the beginning of this investigation the aim was to provide guidelines for a science program framework directed at first graders in a subsidized school under a CLIL approach. The most powerful characteristic of CLIL that makes it different from many other immersion programs is that CLIL has elements that make the learning of another language accessible for different socio-economic contexts.

In order to find out these characteristics, the research focused on six dimensions: Teacher's role, Methodologies, Language, Outcomes and objectives, content and assessment. The survey was taken to find the elements that are presented most of the time in a science class. At the same time, the aim of the survey in Spanish is to recognize what elements of the six dimensions are common in the two contexts: a bilingual school and a subsidized school in order to provide guidelines for a science program suitable to implement in first grade of a subsidized school.

The results show that science classes in the two different contexts have different strengths and weaknesses.
The following table shows the strengths in each of the two contexts.

<table>
<thead>
<tr>
<th>Bilingual School</th>
<th>Subsidized School</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher’s role</strong></td>
<td><strong>Teacher’s role</strong></td>
</tr>
<tr>
<td>• Conscious intention to use the language as a medium of instruction whilst giving language and content a balanced importance.</td>
<td>• Conscious intention to balance the scientific language and content.</td>
</tr>
<tr>
<td>• Recognize the different moments at which communication occurs in the classroom and provide opportunities for this communication to happen.</td>
<td>• Teachers recognize the scientific language in the syllabus and the material.</td>
</tr>
<tr>
<td>• Plan lessons which incorporate the development of cognitive and language skills.</td>
<td>• Teachers provide instances for communication between students.</td>
</tr>
<tr>
<td>• Plan focusing on the components of CLIL by selecting content and language in a balanced way to help students to comprehend both.</td>
<td>• Teachers plan taking into account the development of cognitive and language skills.</td>
</tr>
<tr>
<td>Methodologies</td>
<td>Methodologies</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>• Activities designed to activate previous knowledge and use it to build new</td>
<td>• There is an activation of prior knowledge.</td>
</tr>
<tr>
<td>concepts.</td>
<td>• There is an intention to plan a class focused on all the ability levels of the</td>
</tr>
<tr>
<td>• Lesson aims to achieve the total attention of the whole class.</td>
<td>students.</td>
</tr>
<tr>
<td>• Time allowed for students to analyze language and content in order to</td>
<td>• Teachers plan taking into account the output expected, this allows a better</td>
</tr>
<tr>
<td>internalize both.</td>
<td>direction of the class in the achievement of the objectives proposed.</td>
</tr>
<tr>
<td>• The class provides activities to develop collaborative work.</td>
<td>• There is a good provision of moments to analyze the information in order to</td>
</tr>
<tr>
<td>• Use a set of specific vocabulary required for a science class to help</td>
<td>internalize it.</td>
</tr>
<tr>
<td>students understand and process information.</td>
<td>• There is a good development of national science program, incorporating</td>
</tr>
<tr>
<td>• Activities designed to develop both LOTS and HOTS skills.</td>
<td>collaborative work.</td>
</tr>
<tr>
<td></td>
<td>• The class uses a set of vocabulary, to help students understand and process the</td>
</tr>
<tr>
<td></td>
<td>information.</td>
</tr>
<tr>
<td></td>
<td>• Activities designed to develop both LOTS and HOTS skills.</td>
</tr>
</tbody>
</table>
Language

- Previous selection and connection of vocabulary for content needed to teach science.
- There is a reinforcement of content related with the vocabulary of the class.
- There is a use of English as a medium of instruction.
- Students understand ideas and they are able to explain them in English.
- There is an adaptation of specific content language and language to help students understand.

Learning outcomes and objectives

- There is a construction of knowledge basing on previous knowledge.
- There is a planning of different tasks in order to reach the objectives.
- Teachers are aware of the national curriculum and select activities to develop skills and attitudes required in it.

Language

- Previous selection and good connection of vocabulary for the content with the class activities.
- There is a good balance between scientific language and regular language.
- There is time to reinforce the content related with vocabulary.

Learning outcomes and objectives

- There is a construction of knowledge basing on previous knowledge.
- There is a planning of different tasks in order to reach the objectives.
- Teachers are aware of the national curriculum and select activities to develop skills and attitudes required in it.
- The planning is based on the capacities of their students.
- There is a good use of specific language related to the content.

Content
- There is a good link between prior and new knowledge.
- Teachers teach using specific language related to the content.

Assessment
- There are formative evaluations during the process that allow an assessment of individual performance, language abilities, content knowledge and attitude.
- There is a summative assessment at the end of the process.

<table>
<thead>
<tr>
<th>Content</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Classes are prepared focusing on the capacities of their students.</td>
<td>- Classes are prepared focusing on the capacities of their students.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>- There is a good link balance between prior and new knowledge.</td>
<td>- There is a good link balance between prior and new knowledge.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>- Teachers reinforce specific content language to help students understand the meaning of the concepts and connect them with the subject content.</td>
<td>- Teachers reinforce specific content language to help students understand the meaning of the concepts and connect them with the subject content.</td>
</tr>
</tbody>
</table>

Assessment
- There is a formative evaluation focused on the evaluation of individual and collaborative work.
- There is a summative assessment at the end of the learning process that complements the formative assessment.

Table 3
The following table shows the weaknesses in each of the two contexts.

<table>
<thead>
<tr>
<th>Bilingual School</th>
<th>Subsidized School</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher's role</strong></td>
<td><strong>Teacher's role</strong></td>
</tr>
<tr>
<td>• Sorne teachers are not specifically trained</td>
<td>• There is not a selection and link of relevant</td>
</tr>
<tr>
<td>science teachers and therefore find it</td>
<td>content with components of the science</td>
</tr>
<tr>
<td>difficult to balance content and language teaching.</td>
<td>language.</td>
</tr>
<tr>
<td>• Difficulty in the recognition of specific</td>
<td>• There is not always a selection and adaptation of</td>
</tr>
<tr>
<td>language features in the syllabus and materials.</td>
<td>material directed to the understanding of all the</td>
</tr>
<tr>
<td></td>
<td>students. It is more focused on students with special</td>
</tr>
<tr>
<td></td>
<td>needs.</td>
</tr>
<tr>
<td><strong>Methodologies</strong></td>
<td><strong>Methodologies</strong></td>
</tr>
<tr>
<td>• Teachers find it difficult to predict the</td>
<td>• Teachers have some problems to take into</td>
</tr>
<tr>
<td>output generated by the students.</td>
<td>account scientific vocabulary when they</td>
</tr>
<tr>
<td></td>
<td>plan a lesson.</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td><strong>Language</strong></td>
</tr>
<tr>
<td>• Difficulty in the selection of vocabulary</td>
<td>• There is not an adaptation of specific-content</td>
</tr>
<tr>
<td>related to language needed to carry out a</td>
<td>language to help students understand the content.</td>
</tr>
<tr>
<td>science class properly.</td>
<td></td>
</tr>
<tr>
<td>• Teachers have problems to plan to teach</td>
<td></td>
</tr>
<tr>
<td>language in a science class.</td>
<td></td>
</tr>
<tr>
<td>• Teachers do not plan and practice specific</td>
<td></td>
</tr>
<tr>
<td>vocabulary 100% of the time.</td>
<td></td>
</tr>
</tbody>
</table>
Content

- Sometimes there is a difficulty on the recognition of students' previous knowledge, so it is difficult to balance it with the new content.

Table 4

The results about common points between teachers from a bilingual school and teachers from a subsidized school are described in the following chart:

<table>
<thead>
<tr>
<th>Teacher's role</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Teachers select and combine content and language teaching strategies in a science class.</td>
</tr>
<tr>
<td>- Teachers recognize the language features and can make it fit with relevant language components.</td>
</tr>
<tr>
<td>- Teachers plan the class in order to develop the cognitive and language skills required in the science class.</td>
</tr>
<tr>
<td>- Teacher provides adapted materials to help students understand the content of the subject.</td>
</tr>
</tbody>
</table>
### Methodologies

- In the class there are activities that activate prior knowledge.
- The input is planned previously; taking into account the group of the class is directed. (whole class, a group or individual student)

### Language

- The vocabulary specific for content is reinforced in class.

### Learning outcomes and objective

- Previous knowledge is well developed during the class using it as the basis to construct the new knowledge.
- The class reflects a clear view about the tasks students are able to do at the end of the class.
- The class reflects the developing of the skills and attitudes required for the science class.
- The class is planned and developed based on what students can achieve.
### Content

- In the class there is an appropriate development of prior knowledge and new content providing time to revisiting prior knowledge, presenting and working the new knowledge.

- The class reflects a good link of prior and new knowledge working on scaffolding: build new content with the previous one.

### Assessment

- There is a summative assessment that evaluates the skills and the contents achieved in the learning process.

From the information obtained in the previous table it is possible to provide some guidelines as a proposal for implementing a science program under CLIL approach for first graders. In order to provide more graphic examples it is included some pictures taken from Interactive Science 1, teacher edition (digital version.) (2010)
The first dimension: The teacher's role

It is very important for teachers that intent to implement CLIL, take into account that the combination of language strategies and content strategies to teach the content and language is the characteristic of the CLIL approach, so it is necessary to incorporate teaching strategies to work with the language as well as teaching strategies for content, because students must acquire abilities and knowledge for both.

Example:

1. Strategies to implement in each lesson for teachers.
The second dimension: Methodologies

Here it is important to manage the way previous knowledge is incorporated planning activities to activate it. The second suggestion is that the activities must work basing the learning on the prior knowledge and connecting with the new knowledge.

The input for students must to be planned in order to get all the students' attention and motivates them to work in groups or individual and taking into account provide students the opportunity to work in pairs, groups or individually.

Example:

1. Activity to develop in groups. (collaborative work)

2. Activity to work individually.
3. Activity to work with the whole class and individually.

4. Technique to face understanding.

5. Technique to clarify common misconceptions.
The third dimension: Language

In order to implement a science program under a CLIL approach, it is important to incorporate a set of specific vocabulary for content and reinforce as much as possible. At the same time, even though the specific language vocabulary items is not named in the chart, is essential to know and select previously a set of words related to language that students need to reinforce in order to learn the content and the language in integration.

Example:

1. Set of vocabulary for content.
2. Set specific language vocabulary.

- Grow
- Change
- Young
- Move
- Teddy bear
- Drum

Fourth dimension: Learning outcomes and objectives

The prior knowledge needs to be well developed during the class because all the new knowledge is going to be constructing based on the prior knowledge students can activate.

The skill required to develop in a science program for first graders are: to explore, experimenting, observe, communicate and compare ideas. So the skills need to be worked based on the background the student have, in combination with language skills that let students to experimenting and communicate their findings.

Example:

1. Activation of prior knowledge in the first part of the lesson.
2. Activation of prior knowledge and connect it with new content.
Fifth Dimension: Content

The basis to incorporate a development of content in a science class under a CLIL approach is the prior knowledge, in content as well as the language. It is necessary to begin the teaching by activating prior knowledge in both components and revisiting to make sure that it is internalized. The other suggestion is to incorporate content that is suitable to work with the scientific abilities: Observing and questioning, Experimenting, Analyzing evidence and communicating.

For first grade, it is suitable to incorporate the exploration of nature from the senses, because for children it is necessary to experience from themselves and senses are the elements that allow them to interact with the environment surround them.

Students need to explore, experiment and manipulate but as they are in the concrete stadium it is compulsory to make it through their senses.

From their experiencing the elements of the environment they can communicate and compare ideas, observations and experiences with others, in oral and written forms giving the preference to activities that involves games.
Example:

1. Activity based on scientific abilities.
Sixth dimension: Assessment

Because one of the requirements for science a program is to develop different instances for experimenting, the assessment needs to be focused on the performance of each student in different moments, working in groups, individually or in pairs. The assessment needs to be formative, because students are working with abilities so in order to noticing the achievement of different skills the focus is on the performance students have in the different moments.

The focus of the assessment need to be on the following components:

- Demonstration of knowledge of content and language.
- Ability to communicate ideas.
- Cognitive abilities
- And the presence of attitudinal skills.

It is important as well as develops a formative performance, to establish a summative assessment that demonstrates in numbers the percentage of acquisition of the abilities and content required.
Example:

1. Activity to review the lesson.

---

"Words to Know"

| living |

1. Please read the word "living" and circle it.

2. List three things that are hoth and does.

---

**Explored**

A...

B...

---

4. Circle the way these things are the same.

---

**Apply Concepts**

5. Look at the picture. Color each living thing in the desert.
DISCUSSION

After carrying out this research it is possible to mention that the implementation of a CLIL approach is not achieved a hundred percent perfect as intents to be. Investigations demonstrate that is necessary to provide specific teacher training to implement and work under CLIL approach.

In bilingual schools teachers that work teaching a subject such as science are, most of the time, language teachers. They have more proficiency in the language features but they fail in the incorporation of the features of content they need to manage in order to make a perfect combination of both and make CLIL a dual-focused approach as it definition says. Teachers that are experts in content, for this study, primary teachers are not as good as a language teacher, recognizing and developing the language components properly.

When a teacher intends to work with CLIL, he/she needs to plan taking into account the elements previously stated and anticipate any possible problems that could happen. It is necessary to select components as content vocabulary, language vocabulary required to carry out the unit, the input he/she is going to provide, taking into account the output that the teacher expects to obtain from the student in order to guide the class to the achievement of the objectives set in both: language and content.

The base of CLIL is to provide students with more opportunities for exposure to the language. For this, schools need to provide opportunities to develop other subjects such as science, using a CLIL approach. In addition to this, studies of the Chilean results from SIMCE Ingles 2010, state that the earlier the student is exposed to a second language, their performance and language learning is going to be better than students who are exposed to the language learning later.
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Appendix 1: Science Lesson Survey

English versión.
Science lesson survey

The following survey intends to obtain information about the frequency you can see the elements that compound a science class.

There is a set of question that involves certain components from a science class divided in six dimensions.

The frequency is measured by from 1 to 5, where the number 5 is 100% of the time and 1 is the event does not occur ever.

Please select by putting a cross next to each question, the number that best reflects the frequency that the elements are in a science class.

<table>
<thead>
<tr>
<th>Dimension 1: Teachers' role</th>
<th>5 (100%)</th>
<th>4 (75%)</th>
<th>3 (50%)</th>
<th>2 (25%)</th>
<th>1 (0%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The teacher selects and combines content and language teaching strategies in a science class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The teacher selects relevant content and can make it fit with relevant language components.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The teacher recognizes the language features in a syllabus and identifies them in the materials.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The teacher recognizes when and how the communication occurs and provides the instances to make communication happen between students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The teacher plans the class in order to develop the cognitive and language skills required in the science class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The teacher provides adapted materials to help students understand the content of the subject.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 (100%)</td>
<td>4 (75%)</td>
<td>3 (50%)</td>
<td>2 (25%)</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>----------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>8</td>
<td>There are activities that activate prior knowledge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>The input is planned previously, taking into account the group of the class is directed (whole class, a group or individual student)</td>
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<td>10</td>
<td>The teacher predicts the learners’ output preparing reinforcement for their answers and directed the way students are going to communicate their findings.</td>
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<td>11</td>
<td>The teacher lets enough time for students to process the information in the L2.</td>
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<td>12</td>
<td>The class provides activities to develop collaborative and personal work.</td>
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<td>13</td>
<td>The class has a set of vocabulary provided by the teacher in order to help them to understand and process the information.</td>
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<td>14</td>
<td>The class incorporates activities that develops low arder skills (LOTS) and high arder skills (HOTS)</td>
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<td>Dimension 3: Language</td>
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<tr>
<td>1. There is a selection of specific vocabulary connected to the content that is worked in the class.</td>
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<tr>
<td>2. There is a selection of specific language vocabulary worked in the class.</td>
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<td>3. The vocabulary specific for content is reinforced in class.</td>
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<td>4. The class is taught in English all the time.</td>
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<td>5. Students can develop ideas and answers in English.</td>
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<td>6. Students understand the content taught in the second language. They can explain concepts and ideas in both languages.</td>
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<td>7. The teacher adapts the specific-content vocabulary for students understanding.</td>
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<td>8. The teacher adapts and provides tools to help students to use the English properly.</td>
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### Dimension 4: Learning outcomes and objectives

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<tr>
<td>5. Previous knowledge is well developed during the class using it as the basis to construct the new knowledge.</td>
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<td>6. The class reflects a clear view about the tasks students are able to do at the end of the class.</td>
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<td>7. The class reflects the developing of the skills and attitudes required for the science class.</td>
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<td>8. The class is planned and developed based on what students can achieve.</td>
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### Dimension 5: Content

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<tbody>
<tr>
<td>1. In the class there is an appropriate development of prior knowledge and new content, giving a time to revisiting the first one and present and work the second one.</td>
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<td>2. The class reflects a good link of prior and new knowledge working on scaffolding: build new content with the previous one.</td>
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<td>3. There is a good use of specific content language to develop the concept properly and familiarize them with the subject content.</td>
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<td>Dimension 6: Assessment</td>
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<td>5. There is formative assessment in different moments of the unit.</td>
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<td>6. The formative assessment evaluates individual and collaborative work.</td>
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<td>7. The formative assessment evaluates students’ ability to demonstrate:</td>
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<tr>
<td>i) Knowledge of content and language.</td>
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<td>j) Communicative ability.</td>
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<td>k) Cognitive abilities.</td>
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<td>l) Attitudinal performance.</td>
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<td>8. There is a summative assessment that evaluates the skills and the contents achieved in the learning process.</td>
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Appendix 2: Encuesta sobre clase de ciencias

Spanish Version
La siguiente encuesta intenta obtener información sobre la frecuencia que usted profesor puede ver elementos que componen una clase de ciencias.

Hay un set de preguntas que involucran ciertos componentes de una clase de ciencias. Éstas están divididas en seis dimensiones.

La frecuencia está medida de 1 a 5, donde el número 5 representa el 100% de las veces y 1 quiere decir que no hay presencia del elemento en la clase de ciencias.

Por favor seleccione escribiendo una cruz (x) al lado de cada pregunta, el número que mejor refleja la frecuencia con que cada elemento se presenta en una clase de ciencias.

<table>
<thead>
<tr>
<th>Dimensión 1: Rol del profesor.</th>
<th>5 (100%)</th>
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<tbody>
<tr>
<td>1. El profesor selecciona y combina estrategias de enseñanza de contenido y lenguaje específico en una clase de ciencias.</td>
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<td>2. El profesor selecciona contenido relevante puede hacerlo calzar con componentes relevantes del lenguaje.</td>
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<td>3. El profesor reconoce elementos del lenguaje en el programa y los identifica en los materiales.</td>
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<td>4. El profesor reconoce cuándo y cómo ocurre la comunicación y provee de instancias para que la comunicación pase entre los estudiantes.</td>
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<td>5. El profesor planea la clase de modo que puede desarrollar las habilidades cognitivas y de lenguaje requeridas para la clase.</td>
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<td>6. El profesor provee de material adaptado para ayudar a los estudiantes a entender el contenido del subsector.</td>
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<td>Dimensión 2: Metodología</td>
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<tr>
<td>1. En la clase hay actividades que activan el conocimiento previo.</td>
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<tr>
<td>2. Los elementos a enseñar son planeados previamente, tomando en cuenta el grupo de la clase al cual se dirige. (Toda la clase, a grupos o individual.)</td>
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<td>3. El profesor predice las conductas de salida de los estudiantes, preparando refuerzo para sus respuestas y dirigiendo la manera en la cual los estudiantes van a comunicar sus hallazgos.</td>
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<td>4. El profesor da suficiente tiempo para que los estudiantes procesen la información.</td>
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<td>5. La clase provee actividades para desarrollar trabajo colaborativo.</td>
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<tr>
<td>6. La clase tiene un set de vocabulario provisto por el profesor para ayudarlos a entender y procesar la información.</td>
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<tr>
<td>7. La clase incorpora actividades que desarrollan habilidades de bajo orden (elementales) y habilidades de alto orden. (Elevadas)</td>
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<td>Dimensión 3: Lenguaje</td>
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<tr>
<td>1. Hay una selección de vocabulario específico conectado con el contenido que se trabaja en la clase.</td>
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<td>2. Hay una selección de lenguaje específico trabajado en clase.</td>
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<td>3. El vocabulario específico para los contenidos es reforzado en clases.</td>
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<td>4. La clase es enseñada completamente en inglés.</td>
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<tr>
<td>5. Los estudiantes pueden desarrollar ideas y respuestas en inglés.</td>
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<tr>
<td>7. El profesor adapta el vocabulario específico de contenido para el entendimiento de los estudiantes.</td>
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<td>8. El profesor adapta y provee herramientas para ayudar a los estudiantes a usar el idioma inglés apropiadamente.</td>
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### Dimensión 4: Aprendizajes y objetivos

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<tr>
<td>1.</td>
<td>El conocimiento previo es bien desarrollado durante la clase, usándolo como base para la construcción del nuevo conocimiento.</td>
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<td>2.</td>
<td>La clase refleja una clara visión sobre las tareas que los estudiantes son capaces de hacer al final de la clase.</td>
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<td>3.</td>
<td>La clase refleja el desarrollo de las habilidades y actitudes requeridas para una clase de ciencias.</td>
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<td>4.</td>
<td>La clase es planeada y desarrollada en base a lo que los estudiantes pueden alcanzar.</td>
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### Dimensión 5: Contenido

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<tbody>
<tr>
<td>1.</td>
<td>En la clase hay un apropiado desarrollo del conocimiento previo y el nuevo conocimiento dando un tiempo para revisar nuevamente el primero además de presentar y trabajar el segundo.</td>
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<td>2.</td>
<td>La clase refleja una buena conexión entre conocimiento previo y nuevo conocimiento, trabajando en &quot;andamiaje&quot;: construcción de nuevo contenido con el nuevo contenido.</td>
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<td>3.</td>
<td>Hay un buen uso del lenguaje específico de contenido, para desarrollar el concepto apropiadamente y familiarizarlos con el contenido del subsector.</td>
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<td>Dimensión 6: Evaluación</td>
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<td>4. Hay una evaluación formativa en diferentes momentos de la unidad.</td>
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<tr>
<td>5. La evaluación formativa evalúa trabajo individual y colaborativo.</td>
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<tr>
<td>6. La evaluación formativa evalúa las habilidades del estudiante para demostrar:</td>
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<tr>
<td>i) Conocimiento del contenido y el lenguaje.</td>
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<td>j) Habilidades comunicativas.</td>
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<td>k) Habilidades cognitivas.</td>
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<td>l) Presentación de actitudes.</td>
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<td>7. Hay una evaluación sumativa que evalúa las habilidades y los contenidos alcanzados en el proceso de aprendizaje.</td>
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Appendix 3: Lesson Plan and pages of chapter three Book Interactive Science 1
Lesson 1  What are nonliving and living things?

Lesson Plan

Engage

1. Engage!! Have children draw an object that can be found in a fish tank and identify the object as a fish. Have them write the object's name. Time: 5 min.
2. myscienceonline.com | Envision It! Time: 10 min.
3. Use Vocabulary Smart Cards to introduce lesson vocabulary, pp. 105–108. Time: 10 min.

Explore

2. Explore It! Which is a living thing?, p. 76, blackline master TE p. 79a. Time: 15 min.

Explain

1. Use the I will know... statement in order to help them understand. Time: 5 min.
2. Have children read Nonliving Things and Living Things and answer the questions on pp. 77–79. Time: 10 min.
3. myscienceonline.com | I WILL KNOW... Time: 5 min.
4. At-Home Lab: Living and Nonliving Children make a chart of living and nonliving things and tell why each thing is living or nonliving, p. 79. Time: 10 min.

Elaborate

1. Science Notebook: Children name places where they have seen living things and then draw and write about the living things they saw, TE p. 78. Time: 10 min.

Evaluate

1. Use Vocabulary Smart Cards to review lesson vocabulary, pp. 105–108. Time: 10 min.
2. Reviewing science facts: All living things have little living things inside. Use H.O.T.E.S. to help students determine master to determine. Time: 10 min.
3. Quiz Time: 10 min.
What are nonliving and living things?

Objective: Students will observe a living thing and a nonliving thing and draw conclusions about their differences.

Explore

Which is a living thing?

Materials:
- Seeds
- Gravel
- Clips
- A fish tank
- Fish
- Water

Daily Observations:
- Day 1: The seeds are placed in the gravel and covered with water.
- Day 2: The seeds begin to sprout.
- Day 3: The sprouts grow in the gravel.
- Day 4: The plants grow in the gravel.

Explore It!

Which is a living thing?

Materials:
- Rocks
- A fish tank
- Fish
- Water

Daily Observations:
- Day 1: The rocks are placed in the fish tank.
- Day 2: The water is added to the fish tank.
- Day 3: The fish swim in the water.
- Day 4: The fish continue to swim in the water.

Lab Support

- Grouping

- Time

Formative Assessment

- Exit Ticket

- Self Check

- Peer Check

- Teacher Check
Nonliving Things

Nonliving things do not grow.

Nonliving things do not eat. 

Nonliving things do not think.

Nonliving things do not feel.

Nonliving things do not make new things.

Words to Know

living

living

Nonliving Things

NLQin\Livins things do not grow.

Nonliving things do not eat.

Nonliving things do not think.

Nonliving things do not feel.

Nonliving things do not make new things.

Explain

Have children read the information on living things and follow the instructions in their books.

Evaluate

Water moves from the sun to the earth. Is it living? How do you know? (It is living because it does not have young or grow.)

Go to mysciencetools.com and click on:

Envision It!

Find out what children already know. Allow simple questions for the class.

I Will Know...

Get to the heart of the lesson content. "I Will Know" interactively geared to each child’s level.

Explore It!

Click-and-play activities illustrate key concepts in a unique virtual setting.


**Explain**

_**Teach with Visuals**_ Have children study the photograph on these pages and read the information provided. Then have them answer the questions.

**Identify** What living things did you see on your way to school today? (Possible answers: People, birds, dogs, plants)

**Compare** ferns and plants: _are_ ferns living things? *try* giraffe and dimme - *are_ bofu living things?

ta fet: *does_ living hpl 00 ? flh: on

dial: *psr ffl o...k hgt dun fluf.

---

**Science ↔ Math**

Have children sort, count, and compare nonliving things. Start by having children count all the chairs in the classroom. Then have them count another group of nonliving things in the room. Provide children with a mixed group of nonliving objects, such as pencils and crayons, and have them sort and count each group. Then have children choose the group that has more or fewer objects.

---

**Elaborate**

_**Science Notebook**_ Ask children to name different places they have visited where they have seen living things. Have them choose a location and draw and write about the living things they saw in their Science Notebook.

---

**Common Misconception**

**Are dead things nonliving?**

- Children may confuse dead things with nonliving things. Living things die but are still considered living rather than nonliving. Emphasize to children that nonliving things, such as computers, were never alive. Things that have died were once alive.

- Clarify for children that health naturally had things come from something that was alive. Yig fr. taile, a wooden flutter. "Nw... n... nw... wh... y... fr... a little..."
At-Home Lab

Living and Nonliving
- Materials: none
- Ask children to bring their charts to school. Allow them to name things from the chart and tell how they know if each is living or nonliving. They should mention that living things grow, change, have young, and sometimes move on their own.

Evaluate
- Ask volunteers to answer the lesson question, What are nonliving and living things?, in their own words. Develop a class answer and write it on the board.
- Lesson Check Use the Lesson Check blackline master to assess children’s understanding of lesson content.

RTI Response to Intervention
If... children are having difficulty understanding that plants are living things, then... have children compare a plant to a nonliving thing, such as a book. Ask questions such as: Does a book change or grow? [No] Does a plant change or grow? [Yes] Help children understand that because it grows and changes, the plant is alive.

Content Refresher

Plant Tropisms
Like animals, plants are living things that respond to stimuli in the environment. The stimuli are light, gravity, water, and touch. The responses are called tropisms. Tropisms can be positive, toward the stimulus, or negative, away from the stimulus. When a plant grows toward the light, this is a positive light tropism. When a root grows down, this is a positive gravity tropism and a negative light tropism. The growth of a stem shows a positive light tropism and a negative gravity tropism. Most plants show positive water tropisms.
Inquiry  Explore It!

Whch is a nonv dling?

1. Pt'll put dndas on thlll gravel. "Sorrelly citi' the gravel. It 'Naier.

2. Rite down your observations.

Daily Observations

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
</tr>
</thead>
</table>

Explain Your Results

3. Infer. Which is living? Explain.

Ex 1026.

Where: in arilale - ahu's ad an illis octP - f; on ot fill

Chpv' j r:fl. ft'......p ...VEH|arV ...&. j mJ lPirig; ...rTJ'
Words: to Know

Write the vocabulary word to complete each sentence:

<table>
<thead>
<tr>
<th>environment</th>
<th>prairie</th>
<th>forest</th>
<th>desert</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ___________</td>
<td>41Hvød:</td>
<td></td>
<td>lbGril `ing m', d. e. plaze</td>
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<tr>
<td>2. ___________</td>
<td>t, dltat po:rey y</td>
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<tr>
<td>3. ___________</td>
<td>:) E! !iz(8.11.81) aLrE t : :) plHmta:</td>
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<td></td>
</tr>
<tr>
<td>4. ___________</td>
<td>l, dltat i z y, siti dE:</td>
<td></td>
<td></td>
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</tbody>
</table>

Explain

AnEw=Ell'thæq. L 11S10th b!-as Delow. 
:5. Giv>o:Bm e m,amamsths s i w aldj.f€St. 

6. Give an example of an animal that lives in a prairie. 

Ap

7. le<6 stl'f W W11at:1:100>cyi! u112H iz thl:|f
Vh:et e z oc i!!rta h eaihB¿ahm? 
C11.4Y. se en?: amuim:ill mHl¿vori! Eldm, sit is. 
`fr'roa... theE: e i sn.t. 

A_________________ lives in the ________________________

It