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**Trabajo Fin del Máster en Enseñanza Integrada de Lengua Inglesa y
Contenidos: Educación Infantil y Primaria**

**CLIL in the Woods:
Indoor and outdoor approaches for teaching Health and
Science**

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School isn't supposed to be a polite form of incarceration, but a portal to the wider world.
(R.Louv, 2014:1)

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1. Introduction:

1.1. The 21st Century's human species:

Thanks to globalisation, developed countries in the 21st century are facing changes in economics, lifestyles and societies. The development of technology has been by far the most meaningful and the quickest one. The Technological Revolution may be compared to the Industrial Revolution in the Eighteenth century in terms of social impact.

Culture is spread rapidly across countries. We are just one click away from travelling or visiting places virtually. But it is communication that has experienced one of the biggest revolutions in this century. Millions of messages are bombarding our mobile phones every minute of every day; not to mention the wide variety of chats, videoconferences or social blogs. We are able to search and share a massive amount of information within a second, like sending or receiving pictures, and pointing at current locations. In addition to all these our lexis has been increased by new technological vocabulary (apps, password, chatting, selfies, blogger...).

According to Professor Antonio Bernal Guerrero (2011:4), *homo pantalicus*, a new human species, is emerging through these technological innovations.

El *homo pantalicus* vive inmerso en la sociedad de consumo y se desliza entre escenarios virtuales donde puede apreciarse cómo la vida se ha convertido en espectáculo de consumo de masas y la realidad tiene que pasar por el filtro de las pantallas para que se considere, paradójicamente, real.¹

Technology might be considered as a double-edged sword when used irrationally. Demolishing effects can be caused to next generations by inappropriate uses of technology. Although technology is being developed extremely fast, modern societies should be aware of its negative consequences. Among these, 21st century children are coping with an overdose of technology and a lack of nature and non-digital interactions.

¹ '*Homo pantalicus* lives immersed in a consumerist society and he flits between virtual worlds where it can be perceived that life has become a spectacle of mass consumerism and reality, paradoxically, has to be filtered through screens in order to be considered real'. Translation provided by the author.

1.2. Technological boom:

The Henry J. Kaiser Family Foundation (2004:1-2), an American organization which does research on families, had already shown two decades ago how technology was becoming a common use for children and adolescents scarcely over two decades ago in the United States.

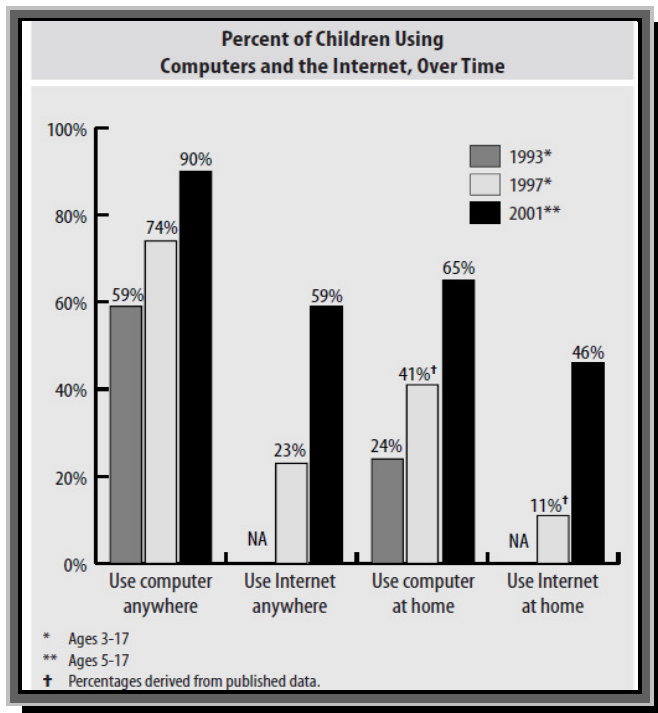


Figure 1. From The Henry J. Kaiser Family Foundation

Based on the data collected over the past decade, there is no doubt that more American children of all incomes and backgrounds are using computers and the Internet than ever before.

Laniado and Pietra (2005: 44-45) mention a similar study, of 2,000 Italian 3-10 year old children, reported by Euripes in 2000, which reveals that nearly all (92%) spent one hour or more a day watching TV. The results from the study are presented in the following table.

How many hours do children spend watching TV?	None.....	2%
	1 hour.....	29,5%
	Up to 5 hours.....	45,6%
	More than 5 hours.....	7,9%

Table 1. Translation provided by the author.

The data obtained from this table can be connected with the data in *Table 2* which shows that half as many Italian children played outdoors as indoors in 2000.

Where do children play?	At home.....	64,7%
	At friend's home.....	42,3%
	Play ground or garden.....	31,9%
	In the street.....	17,7%

Table 2. Translation provided by the author.

Based on the same datasets, videogames exercised the greatest impact on the 6-10 year-old children. 60,4% of boys and nearly 30% of girls selected them as their favourite game. Early ages were also taken into account. Almost 30% of Italian boys aged between 3 and 5 years old primarily chose videogames as their daily toys as compared to nearly 7% of girls.

What are children's favourite games?	Boys	
	<u>3-5 years old:</u>	
	Toy cars.....	78,3%
	Videogames.....	19,6%
	Symbolic games.....	10%
	<u>6-10 years old:</u>	
	Videogames.....	60,4%
	Drawing.....	20%
	Role games.....	7,2%
	Symbolic games.....	6,4%

Girls	
<u>3-5 years old:</u>	
Dolls.....	68%
Symbolic games.....	30%
Videogames.....	6,7%
<u>6-10 years old:</u>	
Symbolic games.....	30%
Drawing.....	63%
Videogames.....	28,8%
Role games.....	25%

Table 3. Translation provided by the author.

The Spanish National Statistics Institute (2013:1-3) and their figures extracted from a more recent study, based on much larger samples (Spanish population), offer more current data about technological gadgetry and its accessibility.

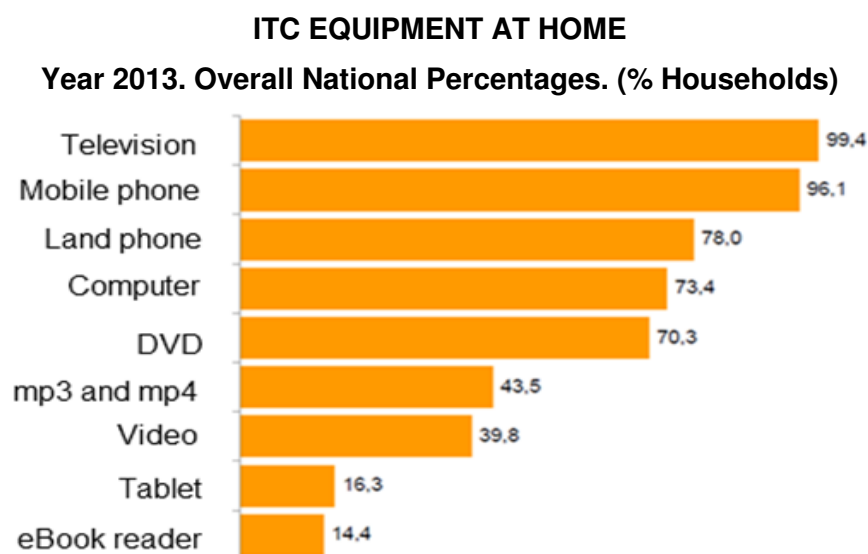


Figure 2. From Instituto Nacional de Estadística.

On the basis of the evidence currently available, it seems fair to suggest that the majority of the Spanish population can be considered well-equipped technologically. Along similar lines, the study argues that the variety of technological gadgets has certainly increased in our daily lives as compared to a decade ago.

CHILDREN USING ICT PERCENTAGE by gender and age.
Year 2013.

	Use of computer	Use of the Internet	Mobile phone availability
Total	95,2	91,8	63,0
Gender			
Men	94,1	90,7	58,8
Women	96,2	92,9	67,4
Age			
10 Years-old	92,7	86,6	26,1
11 Years-old	92,4	88,8	41,6
12 Years-old	95,2	92,1	58,8
13 Years-old	95,7	93,2	75,8
14 Years-old	98,0	95,6	84,4
15 Years-old	96,9	94,0	90,2

Figure 3. From Instituto Nacional de Estadística.

The data yielded by these studies provides convincing evidence that the access to technology has become a daily habit for adults and especially for children and teenagers in developed countries over the last decades. A closer look at the data indicates that even early-age children are beginning to choose technology as their favourite toy, such as videogames, apps... As a consequence, children's ways of spending their spare time and their styles of peer interaction are changing dramatically and it is very much in line with technology development.

Suárez Valero (2011:51-52) has fostered debate on the effects and risks of technology when he explained that Spanish children aged between 4-12 years old spend 990 hours in front of a television, a computer or a videogame console. In his studies, he claims that young generations can suffer from cognitive, attitudinal, emotional, physiological and behavioural adverse effects in both the short and the long term. Short-term cognitive effects may relate to temporal extensive or intensive learning; long-term effects may include hyperthimesia or a misunderstanding of social life when it is framed through social networks. Valero (2011:51-52) presents the effects of unsuitable online contents for children in terms of copying standards or attitudes or inappropriate behaviour. He also mentions emotional detachments as a long-term effect. Furthermore, Valero claims that the longer children use technology, the more adaptable they become to it physiologically (eyes getting used to screen vision, more highly developed index fingers, etc.). Valero also advances the claim that there are content risks to bear in mind when children use technology, such as violence, and

sexist, xenophobic, pornographic, consumerist and inappropriate language or behaviour.

Despite these risks and adverse effects, undoubtedly teaching has been enriched by the wide variety of possibilities that these technical resources (use of computers and the Internet, digital or interactive boards, tablets, etc.) offer in order to develop children's digital competences and to reinforce contents with audio-visual materials. However, along with these improvements, the technological boom has also brought limitations.

1.3. Detachment from reality and nature:

Richard Louv is one of the most important researchers about the lack of human interaction with the real world and nature nowadays. His hypothesis is based on the idea of young generations suffering the newest 21st century syndrome, which he called Natural Deficit Disorder. Louv presented this new deficit as one of the most significant negative consequences of technology affecting children and adults nowadays. His assumption is prominent in Mitten's and Freire's research, which will be mentioned afterwards. In *Last child in the woods*, Louv explains how nature contributes to increase benefits for human health and mind, by nurturing children's creativity or by attending to their spiritual necessity of nature. But, the technological omnipresence in our lives has led to the lack of contact with the "three-dimensional world" and reality. He (2005:10) stands for providing the renewed contact with nature that adults and children unconsciously require nowadays. He reveals some relevant commentaries from his interviews with children and parents about the natural deficit disorder. The following comment is one of the most telling:

I think often of a wonderful honest comment made by Paul, a fourth-grader in San Diego: "I like to play indoors better, 'cause that's where all the electrical outlets are".

Louv also lists two reasons why technology has become so dominant. These are the vertiginously increasing rates of technology use and the cultural, institutional, structural and personal or familiar hurdles in modern societies. Cultural and institutional obstacles, have led to the development of growing educational trends that limit direct experiences in nature. Structural ones are related to how urban landscapes are shaped – making it difficult to access natural environments. Personal and familiar barriers are created by fears and an excessive sense of protection.

1.4. New naturalism:

Following Louv's theory, Mitten (2009:19-21) not only concurs in highlighting the benefits of nature, but also enlarges the perspective by maintaining that there is an enlightening tendency to research connections between health, development, wellbeing and nature by many disciplines nowadays. Some of these disciplines are urban planning, leisure services; social, developmental and evolutionary psychology, education, ecopsychology, biology, psychiatry, medicine, and public health.

Focusing on the discipline of psychology, naturalism has been enriching the developmental and evolutionary psychologies over the last decade. Louv's principles are supported by Howard Gardner and his groundbreaking study of the Multiple Intelligences Theory (1983). Gardner conceptualized human intelligences as far more than a human's cognitive ability. Moreover, a broad study of his theory identifies nine intelligences, including naturalistic intelligence and existential intelligence (Gardner, 1999). This eighth intelligence has been defined as the ability to see how natural systems are connected to each other, to have a heightened sensory perception and to be able to categorize and catalogue things quickly and easily.

According to Louv (2005:72), Gardner explained:

The core of the naturalist intelligence is the human ability to recognize plants, animals, and other parts of the natural environment, like clouds and rocks (...), because our ancestors needed to be able to recognize carnivorous animals, poisonous snakes, and flavourful mushrooms.

Furthermore, the naturalistic intelligence is signalled by an affinity to connect with nature and to be outdoors, as well as being aware of subtle changes in the outdoor environment or sensing patterns in nature. Individuals gifted by naturalistic intelligence might take advantage of moving around while learning. They also stand out for their high sensitivity to nature and their nurturing tendencies. Natural environments certainly provide by far the best contexts for developing the variety of abilities connected to the naturalistic intelligence.

Goleman (Freire, 2011:117) also supports Louv's principles. Goleman mentions (1996) that natural contexts foster the development of the emotional intelligence. He discovered this intelligence when studying along similar lines to Gardner's theory.

Emotional intelligence consists in self-awareness when recognizing emotions, strengths and weaknesses; social awareness when understanding emotions, needs and concerns of other people in a group; self-regulation when controlling impulsive feelings and behaviours and social skills when developing and maintaining good relationships, communicating clearly and manage conflicts. Correspondingly, natural environments offer the possibility of observing, coexisting and interacting with other species. As children feel attracted to living things, these contexts will inspire them to confront their fears, to mould their self-confidence and to develop their sense of responsibility and self-esteem.

1.5. Naturalistic Approaches in Education:

As psychology and education have always been entwined, schools around the world are beginning to focus and base their approaches on these theories. Focusing more closely on education nowadays, the nascent educational approaches seem to be grounded on Jean-Jacques Rousseau's contribution to naturalistic educational philosophy *Émile ou d'Éducation* (1762) and on the Montessori Educational Approach. It is noteworthy that there is a slight tendency to resort to nature when a revolution is likely to change societies and lifestyles, as it already happened in the eighteenth century with the Industrial Revolution and Rousseau's Naturalism.

Louv, possibly influenced by Rousseau and Dewey, advocates a natural school reform. He argues that the concept of environment-based education is at least a century old when he refers to *The School and Society* by John Dewey (2005:203):

Experience [outside the school] has its geographical aspect, its artistic and its literacy, its scientific and its historical sides. All studies arise from aspects of the one earth and the one life lived upon it.

Louv also explains that experimental education should be at the very core of this educational theory. Besides, he remarks that while environmental education focuses on how to live correctly in the world nowadays, experiential education teaches through the senses in the natural world. Fuelled by these theories and other movements, new educational approaches are beginning to appear or reappear. For instance, the Holistic and Humanistic Approach to Pedagogy is a philosophy of education based on the premise that each individual finds identity, meaning and purpose in life through connections to the community and to the natural world.

2. Theoretical Justification:

The last few decades have been viewed as the most significant era for the development of technology, meanwhile detachment from reality and nature interactions are increasing proportionally. Consequently, the naturalistic approaches and ecomovements to mitigate the detachment from nature have been seen to increase over the last five years. Taking the naturalistic approach into the educational terrain, and bearing Louv's words (2013:1) in mind, the need arises to determine whether the natural deficit disorder is a hypothesis or a reality, especially in view of the serious impact it may have on education. This is the reason why this study attempts to explore the following matters: first it will try to ascertain the natural deficit disorder within a group of students, aged between 9 and 10 years old, in a particular school; make a teaching proposal for redressing their deficit and integrating science, nature and a foreign language when teaching and learning based on CLIL approach. The findings obtained from this research will help to determine whether benefits or disadvantages are promoted by the naturalistic approach. The data gathered from this study will be useful to uncover advantages of experimenting learning and teaching processes in a real context and in a natural environment. Additionally, this research aims to foster students' motivation and meaningful learning.

I conducted a survey (see appendix 1, p.64), which was divided into three sections, to analyse the students' natural deficit disorder, their prior knowledge and their healthy habits. The first section was intended to ascertain the natural deficit disorder within 43 students in fourth grade of primary education, who were divided into two groups (Grade 4-A: 21 students and Grade 4-B: 22 students). Moreover, in order to analyse the students' previous knowledge and misconceptions, the second section sought further information about what children knew about Health and Diet, which was the subject area selected in Science. Finally, along similar lines, the third and final section discussed students' healthy habits, as it was an object to study in the selected teaching unit and we also wanted to relate healthy habits to nature-related ones and analyse them. Another issue under scrutiny is the acquisition of new scientific contents in a second language. As a result, the selected subject area Health and Diet and the subject itself (Science) are some of the chosen areas for the implementation of CLIL.

3. CLIL Approach:

3.1. CLIL Definition and Principles:

CLIL is the acronym that stands for the term 'Content and Language Integrated Learning'. Several attempts have been made to define the integration of content and language in the learning and teaching processes. The term CLIL was first coined by David Marsh in 1994. Years later, Steve Darn (2006:2) defined CLIL as:

A practical and sensible approach to both content and language learning whilst also improving intercultural understanding, and has now been adopted as a generic term covering a number of similar approaches to bilingual education in diverse educational contexts.

As this study also attempts to combine bilingual education and natural educational environments, while integrating content learning, Darn's quote seems to be the most suitable for summarizing these aims. But it is also important to mention a newer study by D. Coyle, P. Hood and D. Marsh (2010:1) where CLIL is defined as:

Content and Language Integrated Learning is a dual-focused educational approach in which additional language is used for learning and teaching of both content and language. That is, in the teaching and learning process, there is a focus not only on the content and not only on language.

The CLIL approach is based on four principles. These are the 4C's of CLIL: content, communication, cognition and culture. Content refers to the progression in knowledge, skills and understanding related to specific elements of a defined curriculum. Communication refers to students using the target language to communicate. Cognition refers to developing thinking skills which link concept formation (abstract and concrete), understanding and language. Culture refers to the exposure to alternative perspectives and shared understandings which deepen awareness of otherness and self. (Coyle in Darn, 2006: 4).

3.2. Dimensions in CLIL:

The first time Marsh pointed out CLIL dimensions throughout CLIL/EMILE (*Enseignement d'une Matière par l'Intégration d'une Langue Etrangère*) – *The*

European dimension (2002), he related them to content and learning, language, culture and environments. These dimensions are also related closely to the 4 C's framework and the educational benefits emanating from the CLIL approach. According to Sánchez LLana (2012:28-29) the dimensions can be summarized as follows:

The content and learning dimension consists in providing opportunities to study contents and accessing subject-specific target language terminology; diversifying methods and forms of classroom practice and increasing learner motivation. The language dimension is based on improving the overall target language competence, developing oral communication skills as well as promoting good attitudes and interests towards bilingualism. Culture dimension refers to building intercultural knowledge and understanding, developing intercultural communication skills and learning about minority groups, particular regions and countries. Environment dimension consists in preparing students for internationalisation and European Union integration; and accessing international certification in order to facilitate studying or working abroad.

Marsh (2012) analyses the trajectory and the development of CLIL over the last decade around Europe. He presents the socio-political dimension as a walk through the CLIL history and how teaching agreements between European countries have been made to foster CLIL and how they should be improved. The inclusion dimension suggests alternative methods for using CLIL approach more effectively nowadays. According to Cummins in Marsh (2012:37):

Socio-constructivist approaches to learning emphasize the centrality of student experience and the importance of encouraging active student learning rather than a passive reception of knowledge.

Marsh (2012:43) also remarks the importance of taking into account learners with special and specific needs when teaching under the CLIL approach.

Effective teaching and individual planning – all learners, including those with SEN, achieve more when systematic monitoring, assessment, planning and evaluation is applied to their work. The curriculum can be geared to their needs and additional support can be introduced effectively through an Individual Educational Programme (IEP) that fits with the normal curriculum. (European Agency for Development in Special Needs Education, 2003:15).

Marsh claims the language awareness dimension for learners as well as for teachers (Marsh, 2012:65):

Researching CLIL through mechanistic means results in the risk of missing understanding... [it] is not going to capture aspects of impact on learners such as concept formation, critical thinking or motivation.

Finally, Marsh presents (2012:82-84) the emergent neuroscience dimension where he mentions neuroscience researchers, who have found differences between monolingual brain structures and bilingual ones. He also emphasizes the plasticity of the brain for adapting itself to different stimuli or learning environments.

Understanding how certain types of stimulus and learning environments impact on the brain; even in cases of small exposure to language development is of particular interest with respect to CLIL.

3.3. CLIL in Asturias:

As a result of the globalisation process and the European Union language policies, the authorities in Asturias suggested a bilingual experiment program in 2004, which consisted in the gradual implementation of the use of a second language, English in this case. This programme was based on the agreement signed between the British Council and the Ministry of Education of Spain in 1996. They established bilingual education in several schools across the Spanish territory.

The Principality of Asturias² selected two primary schools, CP Atalía in Gijón and CP Ventanielles in Oviedo, to develop the bilingual programme. The bilingual programme consisted in the integration of a foreign language in 40-45% of the curriculum. These selected areas were Science, Art and Crafts and Literacy. Afterwards, the bilingual programmes were extended to secondary schools like IES Emilio Alarcos and IES Pérez de Ayala. As the programme would be ground-breaking in Asturias, an Education and Training Action Plan was developed between 2004 and 2010. That is the reason why native teachers and foreign language assistants became a common

² Maestrolandia: Blog para Maestros y Maestras de Primaria. La enseñanza integrada de contenidos. Desarrollo del Programa Bilingüe en Asturias. A summary is available at '<http://blog.educastur.es/primaria/files/2010/02/presentacion-programa-bilingue-febrero-2010.pdf>' [Latest consultation: 4 May 2014]

figure at schools, as soon as training and teaching agreements became popular across European schools. As bilingual programmes developed and CLIL was welcome, the advantages started to arise in terms of language, proficiency (improvement of oral skills, acquisition of specific lexis, etc.), pedagogy (gaining motivation, facility to learn more languages proficiency in the mother tongue, etc.), culture (exposure to a wide variety of cultures) and employment (improvement of employability and access to information in another language).

Referring to Primary Education Schools, the bilingual programme in Asturias was instituted in 2006-2007. Every Grade 1-student could access it. Apart from English lessons, one or two areas of the curriculum were taught in English to ensure at least one session of English a day. Students could obtain an accreditation of their participation in the bilingual programme.

3.4. School and students' background:

The school where this study was conducted is located in a rural landscape surrounded by valleys and mountains. The school has its own outdoor areas where to discover, interact with and enjoy nature. It is equipped with playgrounds, basketball and football courts, green areas with trees, a weather station, a sand zone, a henhouse, a pond, etc. These areas may guarantee opportunities to develop teaching activities in order to reinforce science, art and crafts studies or any other subject area as well as environmental lessons. Nonetheless, indoor areas are more frequently chosen at this school, probably because they seem to be more comfortable than outdoor ones at first sight. Some large-sized classrooms are technologically equipped (computers, digital boards, DVD players and televisions). ICT studies are carried out in a specific room. Besides Art and Crafts or Music Education and their materials and resources are stored and displayed in different classrooms.

The organization of the school grades is based on both educational and chronological hierarchies, going from Infant to Secondary Education. The three educational stages are directed by the pedagogical department. The school follows the curriculum of the Spanish Educational System and the Community's educational regulations. It also teaches various foreign languages and its bilingual programme for teaching Science (English – Spanish) under CLIL principles and dimensions, as previously mentioned.

Students aged between 3-18 come from different parts of the autonomous community (Asturias), the national territory or even from abroad. This cultural variety creates dialectal differences or language immersions. Despite this fact, socio cultural and economic backgrounds are always similar. Students are raised under a high-level of cultural capital, resources and expectations. That is the reason why the students' background contributes to facilitate their access to technology. At the same time, it limits their interactions with nature. As a teacher, I had the chance to observe closely this fact through students' conversations in the school (Christmas or birthday presents, researching information on the Internet to do their homework, peer chats at the break times, etc.), but also through formal or informal parents' or legal guardians' tutorial interviews, who corroborated these facts by saying that their children are technologically equipped at home. Parents often explain that their children usually use a computer or a video console to play their favourite video games most of the times, instead of playing in the garden or going to the park more often. Moreover, they say that their children already have a mobile phone and use it every week for getting in contact with their friends through social applications. Thus, I believe that Louv's hypothesis could be also applied to the students at this school.

3.5. CLIL at school:

As seen above, the autonomous community's growing need of instituting bilingual programmes has favoured the school where this study has been developed. The bilingual programme was established in Primary Education in 2005. The early days of the project were mainly based on planning and experimentation. Students from Grade 1 (aged between 6 and 7 years old) started to have three Science lessons in a foreign language per week, as in other primary schools around Asturias. The subject was taught by qualified English teachers. Spanish was allowed when students required further explanations or for coping with scientific lexis. In order to scaffold students' learning in a second language, the Orientation and Psychology Department developed an action plan based on including mind maps when learning and teaching Science.

As mentioned before, the European Agency for Development in Special Needs Education suggests giving additional support to Special Educational Needs (SEN) students through Individual Educational Programmes fitting with the regular curriculum. Learning Science through a foreign language may be challenging for any student, but it could be especially difficult for certain students with SEN. This is the reason why the

Orientation and Psychology Department and the corresponding teachers have devised an action plan based on the student and their Special Educational Need (SEN).

At the beginning of this bilingual programme *Essential Science* and *New Science* books and resources from *Santillana* were used to facilitate students' learning. But as students have been gaining proficiency in a second language over the last few years, textbooks have changed to *Oxford Education* series: *Look&Think, Social and Natural Sciences (2011)*. These books are based on a CLIL project and they cover students' current learning needs more effectively. Visuals, audio files, digital resources (interactive games, videos, songs, etc.) and project suggestions provided by the publisher reinforce contents, but the lack of more geographical or historical contents as well as the detachment from nature remains. Although CLIL is constantly kept in mind when teaching Science in Primary Education, English is used as a vehicular language to communicate with students and teachers (greetings, praising, asking permission, showing manners, giving instructions, etc.) in Infant and Primary Education at this school. Two years ago, nursery students increased the amount of time used on their English sessions. As a result competence and confidence standards in the second language rose. Moreover, students from Grade 1 to Grade 6 also increased the amount of Science sessions in a week (two more than two years ago).

The bilingual programmes have always been conducted with a view to fostering bilingualism and plurilingualism in this school. English and Science are the curricular areas integrated in a second language. The school also agrees with the Language Awareness Dimension presented by Marsh. He claims that teachers as well as students should be aware of their language dimension (strength and weakness) in order to maintain or improve these aspects when teaching and learning contents in a foreign language (Marsh, 2012:65-66).

4. Healthier Science in the woods:

4.1. Methodology:

The aims of the following activities are to make an alternative teaching proposal to reduce the natural deficit disorder in young generations, to encourage students to develop natural and healthier habits and to study whether natural contexts facilitate students' learning. Science contents and a foreign language will be integrated together to be taught and learnt in a rural and natural context. The natural and rural landscapes

that surround this school seem to be excellent sceneries to develop the study in terms of compatibility, reality, proximity, accessibility, safety and economy, as seen below.

Photo 1. The school surroundings



Given the centrality of this issue to test children's lack of familiarity with farm animals bears out the theory of their detachment from nature and to research how this deficit can be redressed by adapting science curricular contents integrated in a second language, I have taken two groups of students from Grade 4 of Primary Education. Firstly, as previously mentioned, students were given a test which consists in a survey divided into three sections to measure their natural deficit disorder, natural and healthy habits and prior knowledge of the science contents (see appendix 1, p.64). Afterwards, different activities were designed for each group of students. As there is insufficient research on how well students learn through a second language in natural contexts and furthermore, there are no conclusive results on how they learn in technological ones to draw any firm conclusion about it, Grade 4-A was exposed to natural environments when developing the activities while Grade 4-B was taught through technology. Aside from this, the science teaching unit, as well as its contents, objectives, assessment criteria, language, timing and even, the teacher was the same for both groups. Finally, at the end of the unit, a survey was conducted by an identical questionnaire to the initial one was distributed. To test whether the view that one group learns in a more effective way than the other, both groups were given a mock exam to

analyze their results in order to collect evidence on this field (see appendices 1-3, pp.64-67).

4.2. Initial Survey:

Bearing in mind the variety of contexts (indoor and outdoor areas) and before having designed the questionnaire for the initial survey, I selected the science teaching unit Health and Diet, which is about nutrition and health. A healthy diet is based on the assumption that eating fruit and vegetables every day, and doing exercise regularly keep us healthy. Nature brings the opportunity to cultivate crops, like vegetables, pulses or fruit. Those are essential food items in our daily diet. In the same way, nature gives us the chance to do exercise and sports outdoors, which is healthier than doing them indoors. Some of these science teaching objectives are: 'recognise habits of healthy living', 'identify food, components, nutrients and their functions in a balanced and healthy diet', 'acquire vocabulary about food and healthy habits', etc. What I called 'sub-objectives' are added objectives to those in the unit, in order to complement and enrich it. Some of them are: 'appreciate healthy benefits of the natural environment' and 'recognise the origin of healthy food'. Afterwards, I decided to measure students' prior knowledge about the contents of this teaching unit and their nature interactions. The questions from the initial survey were linked and related to these learning objectives and contents. For instance, questions like 'have you ever been inside a greenhouse?' is related to recognising the origin of healthy food, 'does a tomato contain proteins?' is related to identifying food nutrients in a balanced and healthy diet or 'how often do you walk through a forest in a week?' is related to recognising habits of healthy living. Moreover, as mentioned above, this initial survey attempts to address the students' contact and interactions with nature, the students' previous knowledge about the Science unit they are going to learn and their natural and healthy habits.

Out of the questionnaires distributed, completed and returned, 43 answers were compiled. Each questionnaire included 30 questions divided into 3 sections (10 questions per section) to analyse their answers according to the mentioned targets. As shown below, this first part of the questionnaire attempts to compile information about the students' detachment from natural and rural contexts.

Answer the following questions. Write down a cross (X)

	QUESTIONS	YES	NO
Obj.	1 ^o) Have you ever taken a fruit from a tree?		
Sub.	2 ^o) Have you ever been to a greenhouse?		
Sub.	3 ^o) Have you ever helped to cultivate any vegetables?		
Sub.	4 ^o) Have you ever seen how a graft is being made?		
Sub.	5 ^o) Have you ever walked through a poultry pen house?		
Sub.	6 ^o) Have you ever been inside a greenhouse?		
Sub.	7 ^o) Have you ever collected tubers from the land?		
Sub.	8 ^o) Have you ever seen the leaves from a strawberry plant?		
Sub.	9 ^o) Have you ever touched a donkey?		
Obj.	10 ^o) Do you wash your hands before each meal?		

The second part addresses the students' prior knowledge about these science contents.

Answer the following questions. Write down a cross (X) when true or false

	QUESTIONS	TRUE	FALSE
Obj.	1 ^o) Eating fruits or vegetables every day is good for your health		
Sub.	2 ^o) Practicing indoor sports is healthier than outdoor sports		
Obj.	3 ^o) Tomatoes contain proteins		
Obj.	4 ^o) Lettuces contain minerals like water does		
Obj.	5 ^o) Crips are vegetables		
Sub.	6 ^o) Carrots grow inside the earth		
Sub.	7 ^o) Hens need a male to lay eggs		
Sub.	8 ^o) Bananas come from a plant		
Sub.	9 ^o) Organic fertilizers are better than chemical ones		
Obj.	10 ^o) Carbohydrates help us to prevent illness		

The third part of the survey tries to analyse the students' healthy and natural habits.

Answer the following questions using the code:

1: Never 2: Once or Twice 3: More than 3 times 4: More than 5 times

	QUESTIONS	1	2	3	4
Obj.	1 ^o) How often do you eat fruit in a week?				
Sub.	2 ^o) How often do you practise outdoor sports in a week?				
Obj.	3 ^o) How often do you drink milk in a week?				
Obj.	4 ^o) How often do you drink natural spring water in a week?				
Obj.	5 ^o) How often do you eat sweets?				
Sub.	6 ^o) How often do you see horses in a week?				
Sub.	7 ^o) How often do you walk through a forest in a week?				
Sub.	8 ^o) How often do you see fruit trees in a week?				
Sub.	9 ^o) How often do you take care of plants in a week?				
Obj.	10 ^o) How often do you eat proteins in a week?				

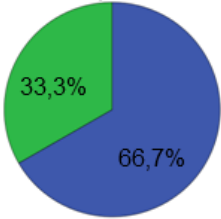
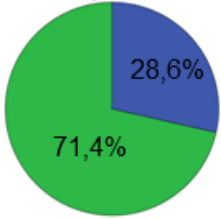
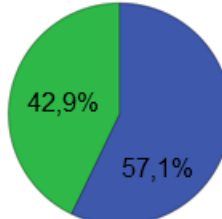
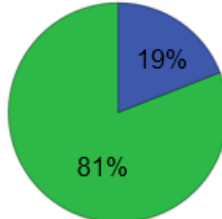
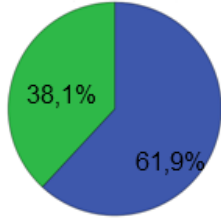
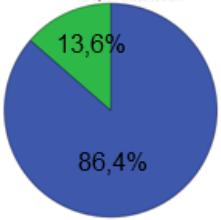
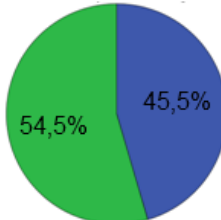
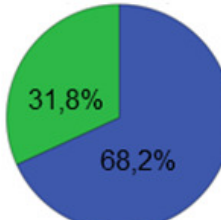
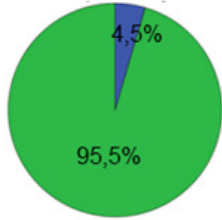
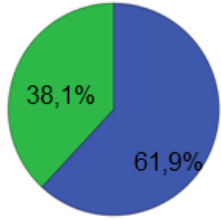
Thereby, out of 10 questions in each section, 5 of them were selected according to the activities to be carried out at the learning site. These 5 questions selected attempted to identify their exposure to natural and rural experiences, such as visiting a vegetable garden, being inside a greenhouse, touching a horse, a donkey, a rabbit or a hen, etc. Once the results were processed through the IBM SPSS Statistics 19, which is a statistic analysis software, I selected the most significant findings in terms of students' prior knowledge and their detachment from nature. Compiling information such as whether they have ever seen how a graft was being made or if they have ever lain down on the grass to watch clouds, we could establish the students' previous natural experiences. By asking them whether they had ever touched farm animals, been inside a greenhouse or smelled the inside of a poultry pen house, we could reckon approximately how many rural experiences they had and, therefore, their contact with some natural elements. On the other hand, I believe that further research in this area may include a larger sample of students and broader questions about nature experiences.

According to question 1, 66,7% of students from Group 4-A have touched a farm animal; this percentage increases to over 85% in students from Grade 4-B. Questions 3 and 5 also provided mostly affirmative answers. From the 5 questions asked, those ones related to plant cuttings or the greenhouse present the largest number of negative answers. The results obtained from the first section of the initial survey will help to uncover our named priority. The pie chart below, *Table 4*, reveals the percentages of the natural deficit disorder among the students of both groups. *Figures 4 and 9* show the percentages of students' detachment from farm animals, which is 19.7% higher in Grade 4-A. The result of the analysis presented in *Figures 5 and 10*, shows that 16.9% more of students in Grade 4-A have never been inside a greenhouse. Focusing on more natural aspects now, *Figures 6 and 11* indicate that Grade 4-B has got 11.1% more detachment from nature when they were asked if they have ever lain down on the grass to watch the clouds as a sign of their interaction and enjoyment within the natural environment. And *Figures 7 and 12* reveal that 14,5% more of Grade 4-B students has never seen how a graft is being made. Continuing with other aspects of rural areas or detachment from the environment, the graphs in *Figures 8 and 13* show no differences (38,1%) between both groups of students.

On the basis of the evidence it seems fair to suggest the students' detachment from nature is not nearly a theory as a reality, but it is less severe than I firstly thought. Some students really showed a more marked detachment from natural environments

than others, although the majority of them had access to an animal or to a field, they had not been inside a farm, and probably that is the reason why they had not visited the inside of a poultry pen house or the inside of a greenhouse.

Table 4. INITIAL SURVEY – NATURAL DEFICIT DISORDER

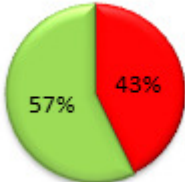

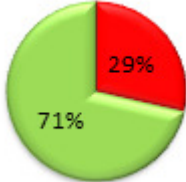
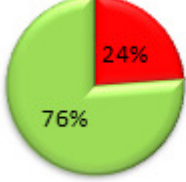

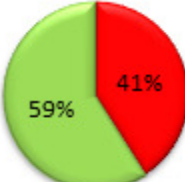

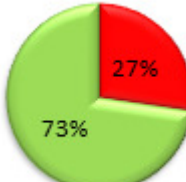
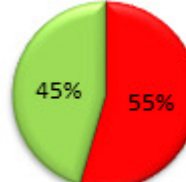
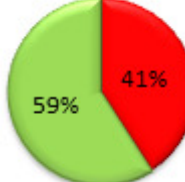
GRADE 4-A	Have you ever touched a farm animal?	Have you ever been inside a greenhouse?	Have you ever lain down on the grass to watch the clouds?	Have you ever seen how a graft is being made?	Have you ever smelled the inside of a poultry pen house?
	 <p>Figure 4</p>	 <p>Figure 5</p>	 <p>Figure 6</p>	 <p>Figure 7</p>	 <p>Figure 8</p>
GRADE 4-B	Have you ever touched a farm animal?	Have you ever been inside a greenhouse?	Have you ever lain down on the grass to watch the clouds?	Have you ever seen how a graft is being made?	Have you ever smelled the inside of a poultry pen house?
	 <p>Figure 9</p>	 <p>Figure 10</p>	 <p>Figure 11</p>	 <p>Figure 12</p>	 <p>Figure 13</p>



We will move on to look at the second section of the initial survey, which is the one designed for finding students' prior knowledge and for spotting possible misconceptions that students could present when starting to learn the new teaching unit. This section of the questionnaire was designed according to the same standards as the previous one. The only difference between the first and the second section is that questions turn into affirmations to make answering easier for the students. In this way students had to decide whether these affirmations were true or false, especially because they had to use a second language to give their answers. From 10 affirmations presented in this section, we selected 5 of them to indicate the most relevant findings when asking students about identifying and classifying components or nutrients in food items (tomatoes contain proteins, crisps are vegetables, lettuce contains minerals like water does...) and about recognizing the origin of food (bananas come from a bush, hens need a male to lay eggs...).

The result from this analysis is presented by the set of pie charts below. *Table 5*, shows some of the students' prior knowledge or misconceptions about the subject area of the unit to be studied. The data gathered in the *Figures 14, 19, 16 and 21* suggests that both groups of students present similarities in their degree of knowledge. As can be seen, *Figures 15 and 20* indicate that the percentage of misconceptions is 5% higher in 4-B students than in the other group. Additionally, *Figures 17 and 22* show a larger percentage (55%) of students who mistakenly believe that minerals can be found in this food. By contrast, the graphs in *Figures 18 and 23* show a greater degree of accuracy in students 4-B than in 4-A students. The results seem to suggest that misconceptions and errors will be brought by both groups of students when beginning to study the Health and Diet unit. This should be also taken into account when designing activities for this research. There is evidence corroborating the notion that both groups of students depart from the same point of knowledge when starting to learn about this science teaching unit.

Table 5. INITIAL SURVEY - CONTENTS

GRADE 4-A	Hens need a male to lay eggs	Tomatoes contain proteins	Crisps are vegetables	Lettuce contains minerals like water does	Bananas come from a bush
	 <p>Figure 14</p>	 <p>Figure 15</p>	 <p>Figure 16</p>	 <p>Figure 17</p>	 <p>Figure 18</p>
GRADE 4-B	 <p>Figure 19</p>	 <p>Figure 20</p>	 <p>Figure 21</p>	 <p>Figure 22</p>	 <p>Figure 23</p>



The third section of the initial survey tried to analyse the students' natural and healthy habits presented at that time. The same considerations, as explained in the other two sections, were taken into account when designing questions for this part of the questionnaire. Just as before, 10 questions were answered by students, but just 5 of them were selected following the previous selection criteria regarding the activities to be carried out at the learning site. The objectives related to the unit contents were the following: recognise habits of healthy living; appreciate healthy benefits of the natural environment and acquire vocabulary about food and healthy habits in a second language. Taking them into account, the survey addressed their healthy habits by finding out about whether they ever drank natural spring water or how often they ate sweets in a week. Furthermore, students' natural habits were analysed when asking them how often they took care of plants or walked through a forest in a week. At the same time, we analysed their natural awareness by asking them about how often they heard birds singing in a week. Another point to explain is the sample of time (one week) for measuring the frequency of their habits. I was conscious that it might be short, but the students' age was a relevant fact when designing questions they could understand and answer sincerely.

The aim of this *Table 6* is to show percentages of the healthy and natural habits each group presents. From the data obtained from *Figures 24 and 29*, we can see that students from Grade 4-A present greater frequency of hearing birds singing, as a contact with nature. Along similar lines, *Figure 26 and 31* show that 4-B Graders had fewer chances to take care of plants, in spite of having had more contact with the natural environment (6,7%) when analysing *Figures 25 and 30*. A closer look at the data indicates that students from Grade 4-B present healthier habits than the other group's students. They eat fewer sweets, although 30% more have never drunk natural spring water, as shown in *Figures 28 and 33* and, *Figures 27 and 32* respectively. The general picture seems to be that 4-B Graders present healthier habits, but not necessarily closer contact to nature than the other group.

Table 6. INITIAL SURVEY - HABITS

	How often do you hear birds singing?	How often do you walk through a forest?	How often do you take care of plants?	How often do you drink natural spring water?	How often do you eat sweets?
GRADE 4-A	<p>Figure 24</p>	<p>Figure 25</p>	<p>Figure 26</p>	<p>Figure 27</p>	<p>Figure 28</p>
GRADE 4-B	<p>Figure 29</p>	<p>Figure 30</p>	<p>Figure 31</p>	<p>Figure 32</p>	<p>Figure 33</p>

NEVER	ONCE/TWICE	THREE TO FIVE TIMES	MORE THAN FIVE TIMES	IN A WEEK
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4.3. Designed activities:

The first aim to take into account was the context where activities were about to be placed. For 4-B graders it was far easier, because they had to stay indoors where technological gadgets were. That means the school, just where they usually are. By contrast, arranging a suitable place for 4-A graders was challenging. Some activities required a vegetable garden, a greenhouse and a little farm as natural, real and convenient as possible. Finally, thanks to the hospitality of neighbours a place near the school was arranged. The fact that the vegetable garden's owner was an experienced agriculturist brought us a chance to learn more about cultivating lands and local crops. As these students had to walk through rural landscapes and woods before reaching our meeting point, we decided to take photographs of animals, plants and fungi found on the way, rural landscapes and pollution in order to review science contents previously studied.

Regardless of the approach (classroom/outdoors), the same amount of time was invested in the development of activities, which means five sessions per group. Each session lasted one hour, but they were distributed differently according to the context. As shown in *Table 7*, Grade 4-A students compressed their five science sessions within two school days, while Grade 4-B students extended them in a school week as can be seen in *Table 8* below. As regards the designed activities, the tables below attempt to summarize the lessons plan developed with each group of students.

Table 7. Lesson Plan Grade 4-A

UNIT Health and Diet

DATES 8th and 9th of April 2014

LESSON DURATION 5 hours

GROUP 4 – A

AGE RANGE 9 - 10 years old

NUMBER OF STUDENTS 21

LEVEL 4th Grade

OBJECTIVES		CONTENTS				ASSESSMENT CRITERIA
Recognise habits of healthy living. Identify food, components, nutrients and their functions in a balanced and healthy diet. Analyse personal diet.		Health and habits of healthy living. Distinguishing healthy and unhealthy food. The functions of nutrients. Identification of nutrients and their functions. Relating foods to their corresponding nutritional group of the food wheel. Making a table about personal diet.				Students must be able to recognise healthy habits and identify food, components, nutrients and their functions in a balanced and healthy diet and place them in the correct section of the food wheel.
Recognise the origin of healthy food. Appreciate healthy benefits of the natural environment.		Food composition and origin. Appreciation of some benefits of the natural environment.				Students must be able to recognise the food origin as well as the benefits of the natural environment.
Acquire vocabulary about food and healthy habits. Use of the present simple and quantifiers of frequency. Express opinions and explanations.		Use of a foreign language to communicate.				Students must be able to use a foreign language to communicate.
TIMING	LESSON DEVELOPMENT	BASIC COMPETENCE	INTER-ACTION	ACTIVITY		MATERIALS- AV AIDS
				STUDENT	TEACHER	
25 minutes	a) Let's Think: reflection about healthy and unhealthy habits.	Speaking, thinking and writing.	Whole group discussion.	Shares opinions and information about their habits.	Monitors the discussion.	Natural objects and paper sheets and pencils.
25 minutes	b) Trekking the map: planning of a trekking route in the woods around the school using <i>Google Earth</i> .	Using ICTs, reading a map.	Small groups.	Locates starting and finishing point, charts route.	Provides explanations, monitors the groups' progress, lends technical assistance.	Classroom computer / map on paper sheets and markers.
45 minutes	c) Shooting Cameras: taking photos of nature.	Observing reality.	Small groups.	Observe and make decision of taking photos.	Provides suggestions.	Digital cameras and natural environment.
40 minutes	d) Old McDonald had a vegetable garden:	Listening,	Whole group.	Observe, touch or	Shares opinions and	Vegetable garden, greenhouse and a little farm.

40 minutes	introducing vegetable garden, greenhouse and a little farm. Discussing about growing crops and taking care of animals. e) Green Gymkhana: finding food items and portions of the food wheel by following clues.	observing and asking questions. Reading, thinking and finding.	Small groups.	smell plants and animals. Locates food origin.	information about crops and animals. Observes.	Clues on paper sheets, envelopes, food items and portions of the food wheel.
30 minutes	f) Food wheel: place found items in the food wheel.	Listening, thinking and speaking.	Small groups.	Shares information and places food items in the correct section.	Provides explanations, responses to doubts and monitors the groups' progress.	Food items, food wheel card and food group patterns.
30 minutes	g) Whatever will be, will be....: students take turns blindfolding themselves, guessing food items provided by group partners.	Asking questions. Recognising foods items by smell and touch.	In pairs.	Recognises food items.	Provides food items and monitors the group's progress.	Food items, a lace to blindfold, food group patterns and an answer sheet.
15 minutes	h) My diet: students think and analyse their diet in order to classify it into healthy or unhealthy.	Thinking and analysing personal diet.	Individually.	Thinks and reflects about personal diet.	Provides information and shares opinions and responses to doubts.	Healthy diet patterns, food group patterns and food wheel.
45 minutes	i) Frame it and paste it: students make science projects with photos taken in the trekking route.	Treating, synthesising and writing data.	Small groups.	Analyses, interprets and communicates information.	Monitors projects and ask questions to guide students.	Printed photos, paper sheets, cards, markers, crayons and pens, textbook and workbook.

Table 8. Lesson Plan Grade 4-B

UNIT Health and Diet

DATES 2nd, 3rd, 4th, 7th and 8th of April 2014

LESSON DURATION 5 hours

GROUP 4 – B

AGE RANGE 9 -10 years old

NUMBER OF STUDENTS 22

LEVEL 4th Grade

OBJECTIVES		CONTENTS				ASSESSMENT CRITERIA
<p>Recognise habits of healthy living. Identify food, components, nutrients and their functions in a balanced and healthy diet. Analyse personal diet.</p> <p>Recognise the origin of healthy food. Appreciate healthy benefits of the natural environment.</p> <p>Acquire vocabulary about food and healthy habits. Use of the present simple and quantifiers of frequency. Express opinions and explanations.</p>		<p>Health and habits of healthy living. Distinguishing healthy and unhealthy food. The functions of nutrients. Identification of nutrients and their functions. Relating foods to their corresponding nutritional group of the food wheel. Making a table about personal diet.</p> <p>Food composition and origin. Appreciation of some benefits of the natural environment.</p> <p>Use of a foreign language to communicate.</p>				<p>Students must be able to recognise healthy habits and identify food, components, nutrients and their functions in a balanced and healthy diet and place them in the correct section of the food wheel.</p> <p>Students must be able to recognise the food origin as well as the benefits of the natural environment.</p> <p>Students must be able to use a foreign language to communicate.</p>
TIMING	LESSON DEVELOPMENT	BASIC COMPETENCE	INTER-ACTION	ACTIVITY		MATERIALS- AV AIDS
				STUDENT	TEACHER	
60 minutes	a) Healthy or Unhealthy?: reflection about healthy and unhealthy habits.	Speaking, thinking and writing.	Whole group discussion.	Shares opinions and information about their habits.	Monitors the discussion.	Classroom computer, PowerPoint presentation, worksheets and pencils.
40 minutes	b) Food Alphabet: students list food items starting by a given letter to classify them and their food images into plant or animal origin.	Thinking, listing, classifying and writing.	Small groups.	Lists words and classify food images into their origin.	Monitors the groups' progress.	Cards, picture dictionaries, supermarket publicity, scissors, glue and pencils.
20 minutes	c) Nutrient Chant: student read the lyrics chant with gaps. They listen to it and they write the missing words. Finally they sing it along.	Reading, listening, writing and speaking.	Individually.	Reads, listens, writes and speaks.	Provides instructions during the activity.	Classroom computer, chant audio, worksheets and pencils.
60 minutes	d) Food Wheel: students distribute and paste food cuttings around the food wheel.	Observing, listening and	Small groups.	Observers and classifies food into	Shares information monitors the groups'	Classroom computer, textbook, textbook digital resource, food wheel card, supermarket publicity,

40 minutes	e) I spy with my little eye: students listen to new information about functions of nutrients in order to play a game by asking and answering questions.	classifying. Listening, treating data, thinking and speaking.	Small groups.	the component groups. Listens, thinks, asks and answers questions.	progress and responds doubts. Monitors the presentation and guides the game.	scissors and glue. Classroom computer and PowerPoint presentation.
20 minutes	f) The spin wheel game food: students reinforce their knowledge (nutrients and their functions, components in food...) by playing this game.	Reading, thinking and speaking.	Small groups.	Calls prior knowledge and shares information.	Guides the game.	Classroom computer and Internet connection.
60 minutes	g) My diet: students think and analyse their diet in order to classify it into healthy or unhealthy.	Thinking and analysing personal diet.	Individually.	Thinks and reflects about personal diet.	Provides information and shares opinions.	Healthy diet patterns, food group patterns and food wheel.

Activities for Grade 4-A: this group of students carried out all the activities outdoors, using the natural and rural environment that surrounds this school. We used a classroom pet and a chant on our way to and from the learning site to encourage students through learning (see appendices 4 and 5, pp.68-69).

a) Let's think!: at school, students were taken outside the classroom. We were sitting on the grass in a whole-class circle. Two objects representing healthy and unhealthy habits were placed in the middle of the circle (a nest: made from natural elements and a box: made from man-made elements). Outside the circle, another box was filled up with pieces of paper containing sentences with healthy and unhealthy habits. Each student took a piece of paper to read it out. Then, they were asked to offer opinions (e.g.: I think/I don't think/It is healthy/unhealthy because...) before they placed the paper into the right container. Finally, they were asked to write similar sentences to fill the containers by working in pairs or in groups of three (see appendix 6, p.70).

b) Trekking the map!: still at school, the trekking activity was explained to students in advance. Then, in groups of 5-6 students located the route from the school to the vegetable garden, which is 3,7 kilometres long. Each group was given a paper map where to draw the route by consulting Google Earth Maps on a digital board in the classroom. Once it was done, we talked about the importance of doing outdoor exercise, the benefits of nature for our health (fresh air, relaxing atmosphere, etc.) and how important it is not to pollute the environment, as we had non-organic products (food wrappers) that should be thrown in the available containers around the place we visited (see appendix 7, p.71).

c) Shooting Cameras: taking the opportunity of trekking through the forest and the rural landscape, each group formed in the previous activity was asked to take photos of different science areas that should call their attention (e.g.: Animals, Plants and Fungi, Rural Landscapes and Pollution). After having selected the best photographs, they would have to include them in their projects to be exhibited in the classroom.

d) Old McDonald had a vegetable garden!: the vegetable garden's owner introduced students to the areas that they were going to visit. He explained how to cultivate crops in a vegetable garden and in a greenhouse, how to grow them and how to raise some farm animals.

e) Green Gymkhana: students were regrouped into three groups randomly.³ They were given an envelope containing clues to find certain products across the green garden, the greenhouse and the poultry pen house. Each product was linked to the next one. At the end of the itinerary, each group found a cardboard section of the Food Wheel to complete it, which was used for the next activity (see appendix 8, pp.72-73).

f) Food Wheel: students used their sections to build up the Food Wheel. Then, we talked about the components that can be found in food as well as their functions. Next, children were given some printed charts with a classification of the different food items into body builders, energy providers and regulators. Finally, they had to classify the products they found in the Food Wheel (see appendix 9, p.74).

g) Whatever will be, will be: some students were blindfolded while others offered them the previously collected products to be recognized by smelling and touching them. Four attempts were allowed by following specific clues. Once products were guessed, we asked student to think and talk about the frequency with which they ate some products. We talked about the amount of servings recommended within a day. Finally, we analyzed our own diet for a day and we decided whether it is balanced or not (see appendix 10, p.75).

h) Frame it and paste it!: back to school, students selected the photographs they had taken during our trip in order to include them in their projects (see appendix 11, pp.76-79).

Activities for Grade 4-B: we used a classroom pet and a chant to encourage students (see appendices 12 and 5, pp.80 and 69).

a) Healthy or Unhealthy?: students' previous knowledge and possible misconceptions were checked by asking them what they understood by healthy or unhealthy habits. They were encouraged to provide examples. Afterwards, students were shown images through a PowerPoint Presentation and they had to give their opinion (healthy/unhealthy habit) about them individually. Then, students had to complete a worksheet about their own healthy or unhealthy habits individually. Finally, five students were chosen to present their habits (see appendices 13 and 14, pp.81 and 82).

³ Students were grouped together according to the object they had drawn out of a bag.

b) Food alphabet: they were asked to pick up a lid⁴ (containing a letter of the alphabet). Then, they had to think of as many food products as they could, starting by this letter. Once they had listed all the products, they had to classify them into two groups (animal origin or plant origin). Students were able to use supermarket publicity, picture dictionaries, etc. to brainstorm ideas.

c) Nutrient Chant: students listened once to a chant about nutrients. Then, they were given a worksheet to find out some of the words from the chant, they listened to it again and they had to be able to complete some gap in the lyrics. Finally, students were given the lyrics of the chant to read and sing along (see appendix 15, p.83).

d) Food Wheel: we introduced the three groups of components (body builders, energy providers and regulators) to our students by using *Look&Think Science 4 – Oxford Education* digital resources. They had the chance to see how a food wheel was being formed and how food and nutrients were being distributed. Then, students were divided into four groups randomly. They had to distribute food (images from supermarket publicity) around the cardboard wheel (see appendices 16 and 17, pp.84 and 85).

e) I spy with my little eye: students learnt about functions of nutrients and they reviewed previous learning on a PowerPoint Presentation. Then, students were able to play the game, using instructions and expressions previously given in the presentation (see appendix 18, pp.86-87).

f) The Spin Wheel Game Food: students reviewed the unit contents through a digital game called: 'The Spin Wheel Game Food'⁵.

g) Rehearsing the Nutrient Chant: students rehearsed the previously mentioned chant. They worked on intonation, phonics and tune.

h) My diet: students were asked to complete a worksheet and then, we corrected it. Students thought about every meal they had eaten the day before and made a list. After that, students were given an example of a healthy menu and they had to compare

⁴ Students were grouped together according to the object they had drawn out of a bag.

⁵ The Spin Wheel Game Food, at the ESL Games World website. Available at <http://www.eslgamesworld.com/members/games/ClassroomGames/SpinOff/Food%20Spin%20-%20Fruits,%20Veggies,%20Actions,%20Food/play.html> [Latest consultation: 5th May 2014].

it to their own. Afterwards, we had to think and talked about the frequency we eat proteins, carbohydrates, fats, vitamins and minerals in a single day (see appendices 19 and 20, pp.88 and 89).

4.4. Lesson development:

Lesson development for Grade 4-A:

Although some studies have been devoted to investigating the benefits of nature in humans beings and how natural environments are being used by many disciplines and organizations, little is still know about how nature creates beneficial stimuli for learning and for acquiring new contents in a specific area of the curriculum. This section is concerned with this idea and it tries to provide an explanation of how these activities were being developed, how students reacted to them and to the natural stimuli.

- Discipline and students' behaviour: these students are used to be disciplined and are used to showing manners wherever they are. However, on this occasion they showed an even greater degree of discipline. They respected turns to speak, they listened to instructions carefully, they asked questions politely and they followed every rule that we had previously agreed on. Thus, all the activities were carried out according to schedule.
- Implications: once we set foot outside the school, students were aware of every natural object. The shooting cameras activity and the natural environment led toward this attitude. When we arrived at the arranged place, students were focused on the information provided and their targets. Their motivation and involvement helped them to complete the activities extremely quickly, and we finished ahead of the estimated time in activities like the 'Green Gymkhana' or the 'Food Wheel'. The remaining minutes gave us the opportunity to solve doubts or to correct misconceptions, as well as to reinforce new contents.
- Team work and cooperative activities: most of the activities were designed to foster collaborative and cooperative tasks in order to engage students into group activities. Activities like 'Trekking the Map', 'Shooting Cameras', 'Green Gymkhana' and 'Food Wheel' encouraged team work and mutual support as well as helping students to develop their problem solving abilities and reasoning skills. In my opinion, these tasks combined with the natural and rural contexts

made them think deeply because the answers were not supplied by a textbook or the Internet. This fact probably motivated students to strive harder for themselves. These cooperative activities gave them the chance to develop their peer learning skills (some students were explaining contents to one another, others were translating words or expressions for those with difficulties to understand some new contents in a second language, etc.) and peer assessment skills (students showed involvement and responsibility, they played different roles during each process, they produced relevant feedback as well as developing their judgment skills, when they had to correct their classmates or admit they were wrong).

According to Gardner's theory, some aspects of the interpersonal intelligence are being good at communicating verbally or non-verbally, creating positive relationships with others, being good at solving conflicts in groups, etc. During the development of these activities, I could observe how some students showed a few of these skills. Some of them showed remarkable initiative at taking and communicating decisions in the group, others negotiated role positions and assigned tasks, and others managed to solve team work conflicts. Referring to the same theory, it is said that intrapersonal intelligence involves self-motivation, ability to reflect on one's own strengths and weaknesses, communicate feelings, convey a sense of justice and fairness, etc. Although we had rules arranged for working in groups, students had the freedom to make task assignments in their groups. I could observe how some students showed abilities to examine their own strengths and weaknesses, as well as a high sense of justice when distributing their tasks.

- Motivation and enjoyment: since the first time we talked about the idea of learning Science in a natural and rural environment, excitement was visible. Students started to think about it and they were curious to know more about the activities and the possibilities of bringing objects. It was decided to bring Junior, a growing seed and our classroom pet. Once we were in the arranged place, during the development of the activities, I could observe how students showed self-motivation and group motivation towards the achievement of each activity's goals. They were delighted to interact with each other and with the natural environment, especially when they had to collect clues around the vegetable garden, the greenhouse and the poultry pen house. These teaching games, which were enriched by the contexts, led to the appearance of responses like

self-awareness when students started to recognize their strengths and weaknesses or to understand their peer's emotions and needs (some students provided emotional support to their classmates when working together), students also managed to control their impulsive feelings and behaviour to maintain a good relationship within the group. As has been said before, according to Freire (quoted in Goleman 2011:117) natural environments foster the development of the emotional intelligence. I could observe how thanks to this natural and rural context, students had the chance to train their self-regulation skills by confronting their fears when interacting with various animal species (touching horses, donkeys, dogs, rabbits, hens, chicks, etc.). Regarding emotions and enjoyment, I can truly say that enthusiasm, curiosity, joy and happiness accompanied us during these two days including the whole trek, by students' smiling faces, body language, peer interactions and their comments. They enjoyed every single task, especially the activities 'Old McDonald had a vegetable garden', 'Green Gymkhana' and 'Whatever will be, will be...'.

- Environmental education: when Gardner's eighth intelligence was previously presented, it was said that natural contexts facilitated the development of natural intelligence skills. From my point of view, some students showed abilities to recognize plants and animals. Many of them showed affinity with nature, especially with farm animals. Others were favoured by the context when moving around while learning and some were encouraged to learn kinaesthetically by interacting with nature.

Special Educational Needs (SEN) students with Attention Deficit Hyperactivity Disorder (ADHD) are some of the most favoured by natural contexts as a variety of stimuli are being offered (visual, auditory, kinaesthetic and tactile, olfactory and taste stimuli) in a relaxed atmosphere, where learning rhythms and natural rhythms are combined, Louv and Freire (2005:10 and 2011:40-41 respectively). For these students nature provide a range of natural tools to interact and experience with, such as plants, trees, animals, etc., where they kinaesthetic needs are attended to. This group included one of these students, who began to show more confidence with nature and a high affinity to this environment, as the awareness of the conservation values. I could observe this reaction when the student asked to take Junior (classroom pet) with us and we decided to transplant it and leave it in the vegetable garden, where the agriculturist would take good care of it.

- Assimilation of unit contents: students seemed to acquire the new information effectively at first sight, as well as asking questions any time they had doubts and asked for further explanations when they were curious about something. To provide broader, fairer and more reliable information about how effectively they assimilated these science contents using natural environments, students took a mock exam and their results from this exam will be analysed in the assessment section of this study.
- Safety: when doing any outdoors activity, safety must be a priority and preventive actions must be considered. Bearing in mind the old Scandinavian saying: “there is no bad weather, just bad clothing”, students and their parents received a letter containing a suggestion list of appropriate clothes and shoes for the expected weather conditions a few days before the outdoor activity. There were no significant risks attached to our itinerary, we arranged rules for each activity as well as for the whole trek (each student in a group is responsible for the others; nobody is left behind, etc.) and finally, we carried a first-aid kit in case of having small injuries, as well as we asked another teacher and an assistant to accompany us.

Lesson development for Grade 4-B:

Nowadays, technology is shaping our lives to the extent that we have become dependent on it for many daily tasks (communicating with each other, playing videogames, searching for information, etc.). This section demonstrates how technology shaped our way of learning new contents in this science teaching unit and how indoor activities influenced our learning in this case. We will move on to look at how students reacted to indoor contexts and technology stimuli.

- Discipline and students’ behaviour: as we already know the students at this school are used to being polite and disciplined. Classroom rules are agreed on from the first day of school. Although specific rules and instructions towards the success of the activities were agreed, they did not always respect them; they failed to take turns to speak, did not listen carefully to explanations or instructions before doing their tasks, etc. Thus, we had to stop the development of the activities to restore order in the classroom. That was the reason why reinforcement activities, like the ‘Spin Wheel Game Food’ or ‘Rehearsing the Nutrient Chant’ could not be carried out.

- Implications: when students were told about these activities, they showed interest and motivation, but little enthusiasm. It is important to take into account that they are accustomed to the use of technology at home and at school, so it is no longer a novelty for them.
- Team work and cooperative activities: most of the activities were designed to engage students into cooperative or collaborative tasks. Activities like 'Food alphabet', 'Food wheel', 'I spy with my little eye' and 'My diet' fostered team work. In spite of providing sufficient tools (collaborative contexts, digital resources, materials, etc.) to develop their interpersonal skills, students did not manage to create positive relationships with others at first or to solve conflicts effectively in some groups, and sometimes I had to intervene to provide suggestions. They showed less autonomy when working in groups than the other group of students. Finally, they managed to improve their verbal and non-verbal communications when solving problems. Referring to Gardner once more, intrapersonal skills were being observed when students started to show their self-motivation and determination to develop activities like 'Food alphabet' or 'Food wheel'. Some students showed capacity for self-assessment when they needed to examine their own strengths and weaknesses. Peer learning skills were involved when students explained contents or translated words or expressions to those classmates who presented difficulties to understand new science context in a foreign language. Peer assessment resulted in positive feedback and fair judgments in most of the groups' students.
- Motivation and enjoyment: although being indoors, learning new contents through games (I spy with my little eye activity, in this case) is always motivating and enjoyable. This familiar classroom did not encourage particular enthusiasm in these students, but they seemed to enjoy every activity. Probably, the excitement of the games in an indoor area was the reason why they did not succeed in controlling their impulsive feelings or emotions (the winners were sometimes too noisy and second runners-up started to complain about the winner having cheated).
- Environmental education: this aspect was addressed by having meaningful conversations with students about the relevance of taking good care of the environment and how important and beneficial it is for us to preserve nature.

- Assimilation of unit contents: during the development of these different activities, students seemed to acquire new science contents effectively, as they asked questions to solve their doubts or when they needed further explanations. Apart from these mere observations when students were doing and assessing their tasks, their written activities were also collected for further observations. With the exception of some mistakes made when spelling words or using grammar structures, science contents seemed to be acquired effectively. In order to present a broader study about the assimilation in indoor contexts and through the use of technology, students took a mock exam (same students of the other group). The results are analysed below.
- Safety: when doing indoors activities, safety is not a large issue. However, preventive actions must be considered. That is the reason why classroom rules must be followed by students in order to avoid accidents.
- Dealing with technological failure: when working with technology, it is relevant to check that computers and digital boards are connected and work properly. Internet connections might be checked to avoid problems. Even though it was not the case, having alternative designed activities may help when everything fails at the time.

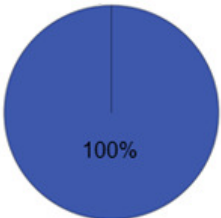
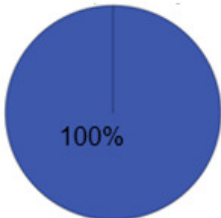
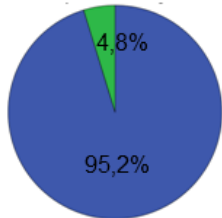
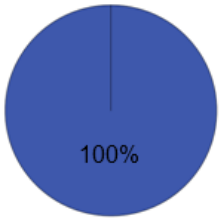
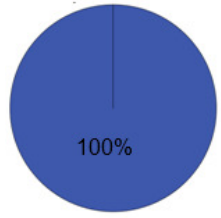
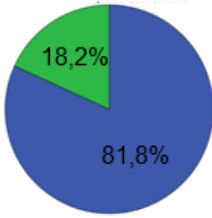
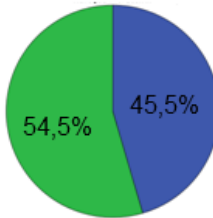
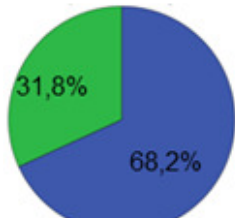
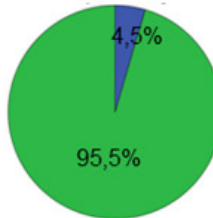
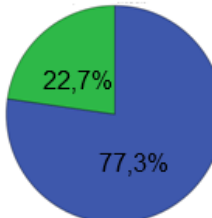
4.5. Final Survey:

In order to carry out a final analysis, once students had their five science sessions, they were given a final survey based on the same aims as the initial one. As briefly mentioned in the methodology section, this survey was divided into three parts in order to draw an analysis and a conclusion for each of them. The first part of the survey, which is shown in *Table 9* below, was conducted to conclude whether the suggested natural deficit disorder (as could be seen in the initial survey) presented in these two groups of students, could be reduced by adapting science contents in a foreign language. As *Figures 34, 35, 37 and 38* show, the deficit had been reduced in Grade 4-A about having experiences like touching farm animals, visiting a greenhouse or relaxing in a natural environment. On the other hand, natural and rural contexts contributed to it.

According to the result graphs for group 4-B, it can be clearly seen that the natural deficit disorder percentage has not been meaningfully reduced – just 4,6% less

compared to the initial survey's result- as shows *Figure 43*. In fact, it has been slightly increased (4,6%) as it can be seen in *Figure 39*. These diverging results suggest various readings: we can conclude that students have not been sincere or have not understood the questions properly. For further information *Tables 12 and 13* can be consulted at the end of the present synopsis.

Table 9. FINAL SURVEY - NATURAL DEFICIT DISORDER

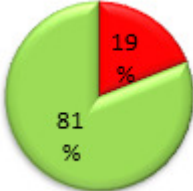
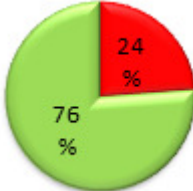
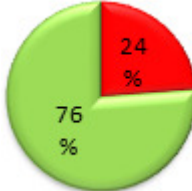
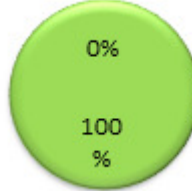
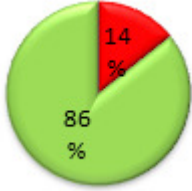
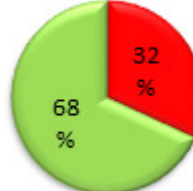

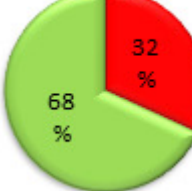
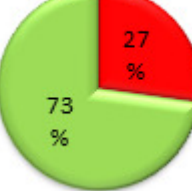
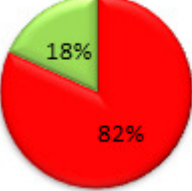
GRADE 4-A	Have you ever touched a farm animal?	Have you ever been inside a greenhouse?	Have you ever lain down on the grass to watch the clouds?	Have you ever seen how a graft is being made?	Have you ever smelled the inside of a poultry pen house?
	 <p>100%</p> <p><i>Figure 34</i></p>	 <p>100%</p> <p><i>Figure 35</i></p>	 <p>95,2%</p> <p>4,8%</p> <p><i>Figure 36</i></p>	 <p>100%</p> <p><i>Figure 37</i></p>	 <p>100%</p> <p><i>Figure 38</i></p>
GRADE 4-B	 <p>81,8%</p> <p>18,2%</p> <p><i>Figure 39</i></p>	 <p>45,5%</p> <p>54,5%</p> <p><i>Figure 40</i></p>	 <p>68,2%</p> <p>31,8%</p> <p><i>Figure 41</i></p>	 <p>95,5%</p> <p>4,5%</p> <p><i>Figure 42</i></p>	 <p>77,3%</p> <p>22,7%</p> <p><i>Figure 43</i></p>



Data yield in *Table 10*, shown below, attempts to assess the assimilation of the science contents developed in the two sets of activities. The balance leans towards 4-A Graders. The graphs show that their learning process has been more effective than in Grade 4-B students. The most meaningful differences appear on *Figures 45 and 50*, *Figures 48 and 53* or even *Figures 47 and 52*. They show, 62%, 68% and 27% respectively, greater accuracy as compared to Grade 4-A students.

Following that, from the data obtained from graphs showed in *Figures 44 and 49* as well as *Figures 46 and 51*, we can see fewer differences in terms of achieving goals when acquiring contents from this teaching unit. The results from the analysis are presented in the table below 13% and 8% of fewer errors respectively; however, Grade 4-A students have obtained better results overall (see *Tables 14 and 15*).

Table 10. FINAL SURVEY - CONTENTS

	Hens need a male to lay eggs	Tomatoes contain proteins	Crisps are vegetables	Lettuce contains minerals like water does	Bananas come from a bush
GRADE 4-A	 <p><i>Figure 44</i></p>	 <p><i>Figure 45</i></p>	 <p><i>Figure 46</i></p>	 <p><i>Figure 47</i></p>	 <p><i>Figure 48</i></p>
GRADE 4-B	 <p><i>Figure 49</i></p>	 <p><i>Figure 50</i></p>	 <p><i>Figure 51</i></p>	 <p><i>Figure 52</i></p>	 <p><i>Figure 53</i></p>



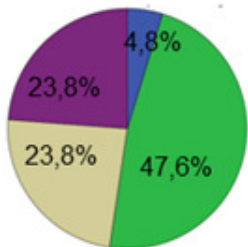
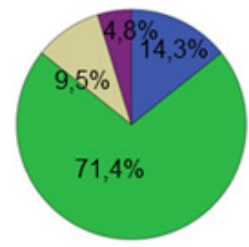
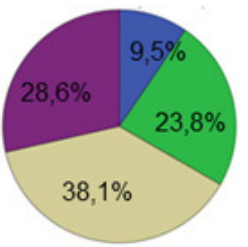
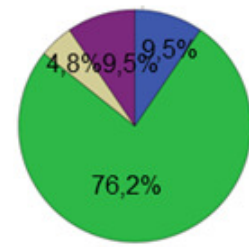
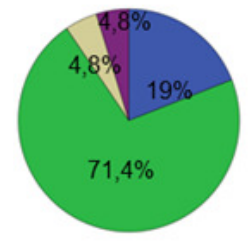
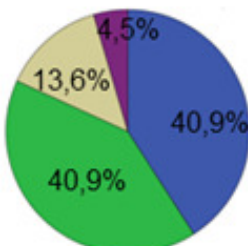
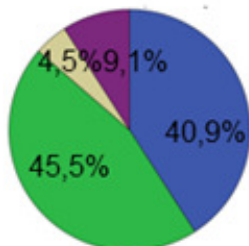
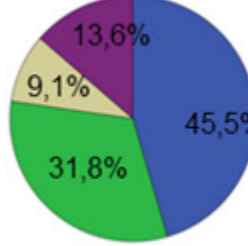
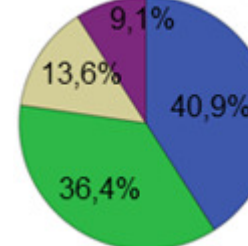
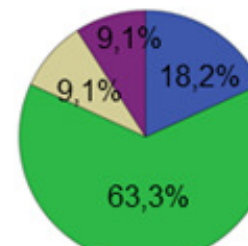
The pie chart (*Table 11*) reveals that students from Grade 4-A show less natural deficit disorder according to their nature habits. It cannot be said that they have developed any healthy or unhealthy habits after a week, because the time allowed is not enough to develop any. But at least, they are exposed to and aware of the nature-based experiences.

Figure 60 shows the percentage (40,9%) of 4-B Graders that have not even had any contact with nature within a week compared with 14,3% shown in *Figure 55* from 4-A Graders presenting less nature detachment. The graph in *Figure 56* shows that 9,5% did not take care of plants within a week as compared with 45,5% from students in Grade 4-B shown in *Figure 61*. As can be seen in *Figures 54 and 59*, 4,8% of Grade 4-A students as compared with 40,9% from the other group of students present lack of nature awareness.

Afterwards, based on *Figures 57 and 58*, we can see that students from Grade 4-A have shown healthier habits within a week. Although the time sample cannot guarantee that these habits are being developed through time, we can say that the results obtained present a successful initial approach to nature. Students from Grade 4-A have been showing healthier habits during that week. It is fair to mention that students from this group have been more frequently exposed to drinking natural spring water and they have been eating fewer sweets during that week than Grade 4-B students, as can be seen in *Figures 62 and 63*. For further information, consult *Tables 16 and 17*.

According to most of the questions, 40,9% of students from Group 4-B were not aware of hearing birds singing, they did not walk through a forest or did not drink natural spring water in a week or they did not take care of plants. This percentage is significantly reduced when asking students from Group 4-A, less than 15% of students said that they were not aware of hearing birds, they did not walk through a forest or did not drink natural spring water in a week. Students from Grade 4-A showed healthier habits during that week than the other group, but Grade 4-A students were exposed to natural environment and experiences longer than the other students. Question 5 provided almost the same information from these two groups of students when admitting not having eaten sweets during that week.

Table 11. FINAL SURVEY - HABITS

	How often do you hear birds singing?	How often do you walk through a forest?	How often do you take care of plants?	How often do you drink natural spring water?	How often do you eat sweets?
GRADE 4-A	 <p>Figure 54</p>	 <p>Figure 55</p>	 <p>Figure 56</p>	 <p>Figure 57</p>	 <p>Figure 58</p>
GRADE 4-B	 <p>Figure 59</p>	 <p>Figure 60</p>	 <p>Figure 61</p>	 <p>Figure 62</p>	 <p>Figure 63</p>

NEVER	ONCE/TWICE	THREE TO FIVE TIMES	MORE THAN FIVE TIMES	IN A WEEK
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As we have seen, *Tables 4 – 11* presented above show the comparison of these two groups of students at different periods of this study. The pie charts show the results obtained from the analysis of three sections: natural deficit disorder, contents of the science teaching unit and healthy and natural habits, when analysing data gathered in the initial and final survey.

In order to broaden the understanding of the results obtained, we consider that they may be observed under another perspective. For this reason, the following tables (*Tables 12 - 17*) are an elaboration of the same graphs shown above, but the results obtained by each group's students during the development of this study and according to its chronological development, that is, presenting the results as the facts were happening. As consequence, the same commented graphs are presented following the same order and structure as before. The organizations of sections remain the same: natural deficit disorder, contents and habits. According to this perspective the evolution of each group of students is clearly presented.

A comparison of the results shown in *Tables 12 and 13* reveals that Students from Grade 4-A obtained closely 100% of affirmative responses when they were asked about having nature interactions and experiences like touching a farm animal, being inside of a greenhouse, having lain down on the grass to see the clouds, etc. at the end of the study against Grade 4-B responses, which did not vary significantly at the end of this study. Based on the findings obtained from *Tables 14 and 15*, we can clearly see that students in Grade 4-A showed more success in providing right answers (deciding whether the affirmation was true or false) to sentences like: hens need a male to lay eggs, tomatoes contain proteins, crisps are vegetables, etc. than students from Grade 4-B at the end of the study. Evaluating the findings in *Tables 17 and 18*, it can be understood that healthy and natural habits were not clearly and significantly developed in either students from Grade 4-A or students from Grade 4-B at the end of this study.

Table 12. GRADE 4 A – NATURAL DEFICIT DISORDER

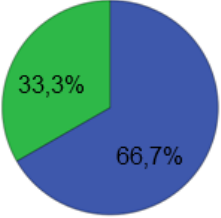
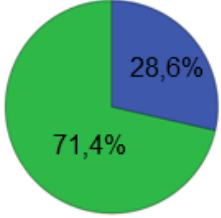
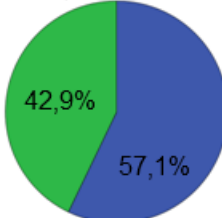
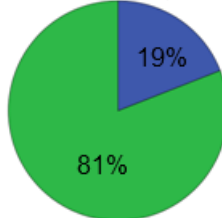
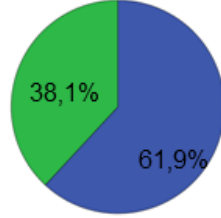
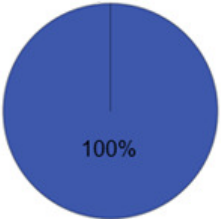
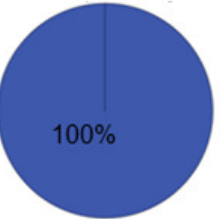
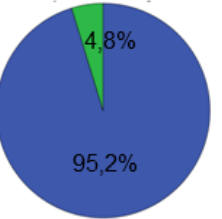
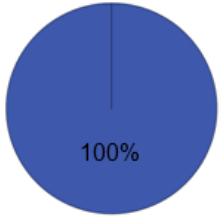
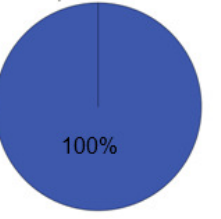
INITIAL SURVEY	Have you ever touched a farm animal?	Have you ever been inside a greenhouse?	Have you ever lain down on the grass to watch the clouds?	Have you ever seen how a graft is being made?	Have you ever smelled the inside of a poultry pen house?
	 <p>Figure 4</p>	 <p>Figure 5</p>	 <p>Figure 6</p>	 <p>Figure 7</p>	 <p>Figure 8</p>
FINAL SURVEY	 <p>Figure 34</p>	 <p>Figure 35</p>	 <p>Figure 36</p>	 <p>Figure 37</p>	 <p>Figure 38</p>



Table 13. GRADE 4 B – NATURAL DEFICIT DISORDER

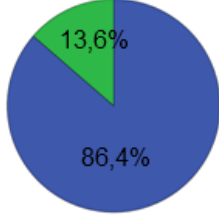
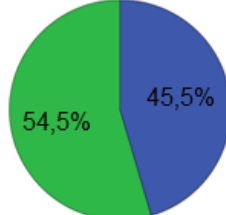
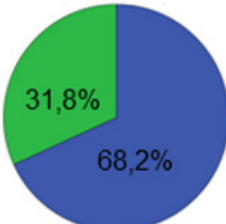
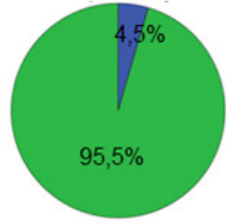
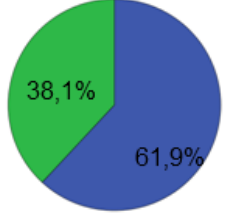
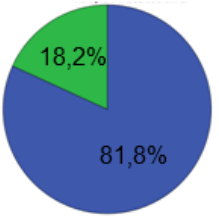
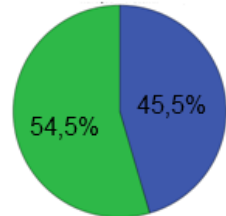
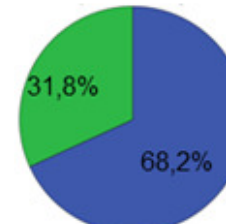
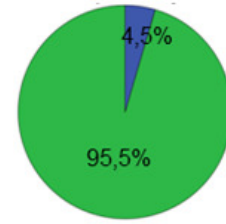
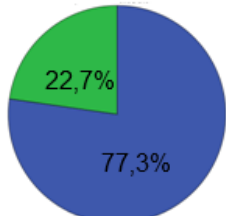
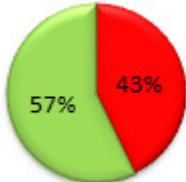

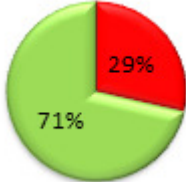
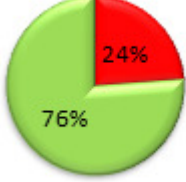

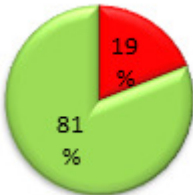
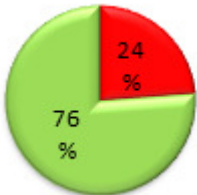
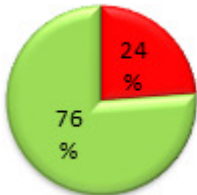
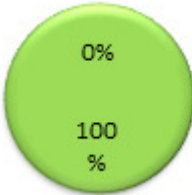
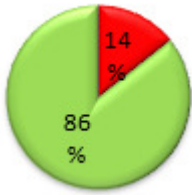
INITIAL SURVEY	Have you ever touched a farm animal?	Have you ever been inside a greenhouse?	Have you ever lain down on the grass to watch the clouds?	Have you ever seen how a graft is being made?	Have you ever smelled the inside of a poultry pen house?
	 <p>Figure 9</p>	 <p>Figure 10</p>	 <p>Figure 11</p>	 <p>Figure 12</p>	 <p>Figure 13</p>
FINAL SURVEY	 <p>Figure 39</p>	 <p>Figure 40</p>	 <p>Figure 41</p>	 <p>Figure 42</p>	 <p>Figure 43</p>



Table 14. GRADE 4 A - CONTENTS

INITIAL SURVEY	Hens need a male to lay eggs	Tomatoes contain proteins	Crisps are vegetables	Lettuce contains minerals like water does	Bananas come from a bush
	 <p>Figure 14</p>	 <p>Figure 15</p>	 <p>Figure 16</p>	 <p>Figure 17</p>	 <p>Figure 18</p>
FINAL SURVEY	 <p>Figure 44</p>	 <p>Figure 45</p>	 <p>Figure 46</p>	 <p>Figure 47</p>	 <p>Figure 48</p>

INCORRECT	CORRECT
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Table 15. GRADE 4 B - CONTENTS

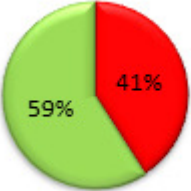

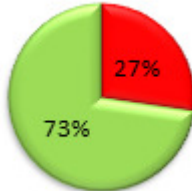
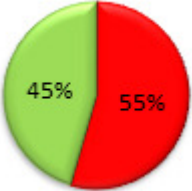
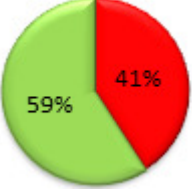
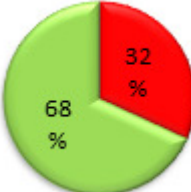

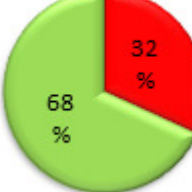
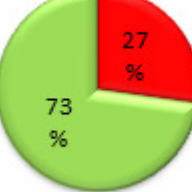
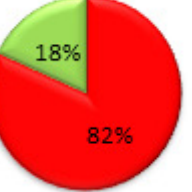
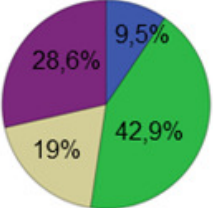
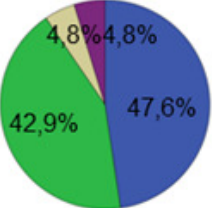
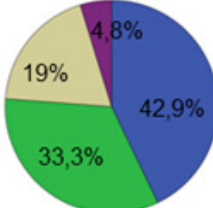
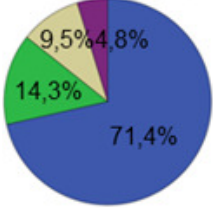
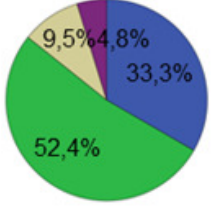
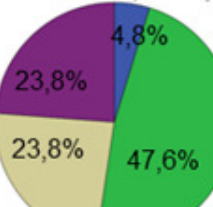
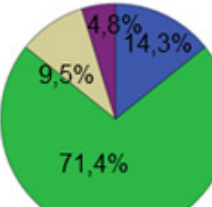
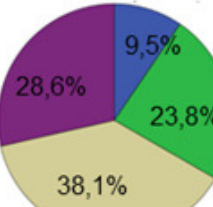
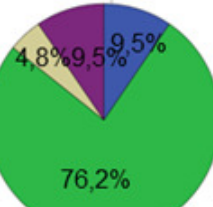
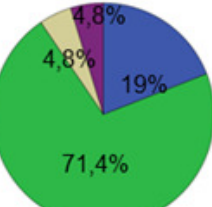
INITIAL SURVEY	Hens need a male to lay eggs	Tomatoes contain proteins	Crisps are vegetables	Lettuce contains minerals like water does	Bananas come from a bush
	 <p>Figure 19</p>	 <p>Figure 20</p>	 <p>Figure 21</p>	 <p>Figure 22</p>	 <p>Figure 23</p>
FINAL SURVEY	 <p>Figure 49</p>	 <p>Figure 50</p>	 <p>Figure 51</p>	 <p>Figure 52</p>	 <p>Figure 53</p>

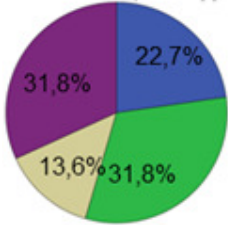
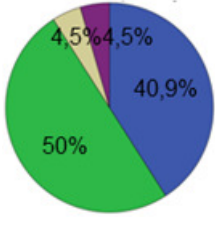
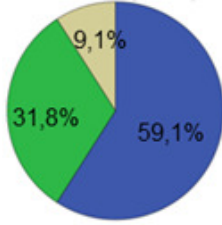
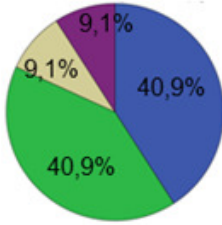
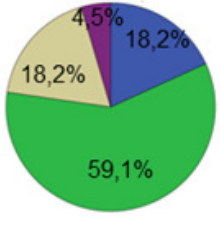
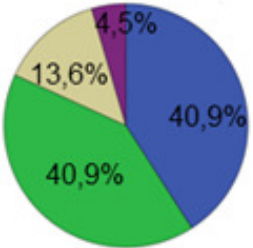
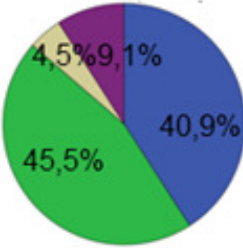
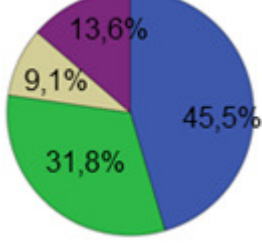
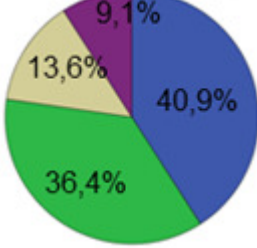
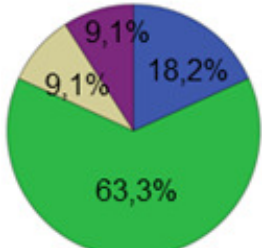


Table 16. GRADE 4 A – HABITS

	How often do you hear birds singing?	How often do you walk through a forest?	How often do you take care of plants?	How often do you drink natural spring water?	How often do you eat sweets?
INITIAL SURVEY	 <p>Figure 24</p>	 <p>Figure 25</p>	 <p>Figure 26</p>	 <p>Figure 27</p>	 <p>Figure 28</p>
FINAL SURVEY	 <p>Figure 54</p>	 <p>Figure 55</p>	 <p>Figure 56</p>	 <p>Figure 57</p>	 <p>Figure 58</p>

NEVER	ONCE/TWICE	THREE TO FIVE TIMES	MORE THAN FIVE TIMES	IN A WEEK
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Table 17. GRADE 4 B – HABITS

	How often do you hear birds singing?	How often do you walk through a forest?	How often do you take care of plants?	How often do you drink natural spring water?	How often do you eat sweets?
INITIAL SURVEY	 <p><i>Figure 29</i></p>	 <p><i>Figure 30</i></p>	 <p><i>Figure 31</i></p>	 <p><i>Figure 32</i></p>	 <p><i>Figure 33</i></p>
FINAL SURVEY	 <p><i>Figure 59</i></p>	 <p><i>Figure 60</i></p>	 <p><i>Figure 61</i></p>	 <p><i>Figure 62</i></p>	 <p><i>Figure 63</i></p>

NEVER	ONCE/TWICE	THREE TO FIVE TIMES	MORE THAN FIVE TIMES	IN A WEEK
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4.6. Assessment:

This study draws on research conducted by Richard Louv and his nature deficit disorder theory. Although there has been relatively little research on how effectively students learn in natural environments, we wanted to analyse if outdoor and indoor contexts conditioned these students' assimilation of these science contents. Accordingly, students were given a mock exam based on the contents learnt to assess their acquisition through these two different contexts.

This exam consisted of five questions. The second language was used when formulating the questions and it was also required to give answers. The first one consisted in spotting unhealthy habits by presenting three pictures of three children demonstrating unhealthy and healthy habits. Once this part of the exercise was done, students had to write why they thought those habits were unhealthy. The maximum score for that question was three points out of ten. The second question was about matching three different parts of a sentence to form four correct statements about nutrients in food items and their functions in our body. The maximum score for that question was 2 points out of 10. The third question asked them to complete sentences about food components by analysing the food wheel. Once again the maximum score for that question was 3 points out of 10. Question number four consisted in answering questions about whether food items were derived from animals or plants. This time the maximum score for this question was 1 point out of 10. Finally, the last questions asked students to think about their last breakfast, morning snack, lunch, afternoon snack and dinner for reflecting on and explaining why it was healthy or unhealthy. The maximum score for the final question was 1 point out of 10.

The results gathered from the mock exam were classified according to a marking scale in order to determine and compare the findings obtained by the students of these two groups. The marking scale is explained as follows:

- Mark E: if students scored from 0 to 3,99 points out of 10.
- Mark D: if students scored from 4 to 4,99 points out of 10.
- Mark C: if students scored from 5 to 6,99 points out of 10.
- Mark B: if students scored from 7 to 8,99 points out of 10.
- Mark A: if students scored from 9 to 10 points out of 10.

To begin with, the data generated by the forty-three mock exams collected is reported in *Table 18*. From twenty-one students in Grade 4-A, seven of them failed the exam by obtaining less than 4 points out of 10. One of them scored between 4 and 4,99 points out of 10. Four of them scored between 5 and 6,99 points out of 10. Eight of them scored between 7 and 8,99 points out of 10. One of them scored between 9 and 10 points out of 10. In conclusion, students from Grade 4-A obtained 6,23 points out of 10 as a grade point average.

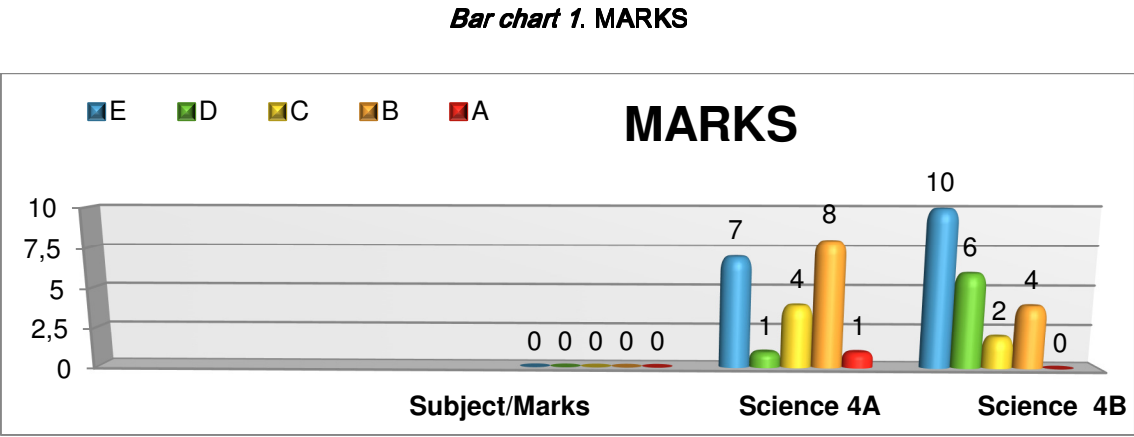
Subsequently, the data yielded by the twenty-two students in Grade 4-B provides the following information: ten of them failed the exam by scoring less than 4 points out of 10. Six of them scored between 4 and 4,99 points out of 10. Two of them obtained between 5 and 6,99 points out of 10. Four of them scored between 7 and 8,99 points out of 10. Finally, none of them reached between 9 and 10 points out of 10. As a result of the data gathered, students from Grade 4-B achieved 5,18 points out of 10 as a grade point average. Exactly, 1,05 points below the average of students from the other group. From these findings, the results obtained by Grade 4-A are better than those obtained by the other group. Students from Grade 4-A learnt new contents by living new experiences, they learnt by doing in the natural and rural environments. They learnt by being stimulated in different ways, not just appealing to their visual or auditory senses as students from Grade 4-B did.

On the basis of the evidence, it seems fair to suggest that students from Grade 4-A acquired new science contents more effectively than students from Grade 4-B. Thus, the results seem to corroborate the notion that outdoor and natural contexts influenced positively the assimilation of these science contents for the students of these groups. For further analysis, *Table 18* can be consulted below.

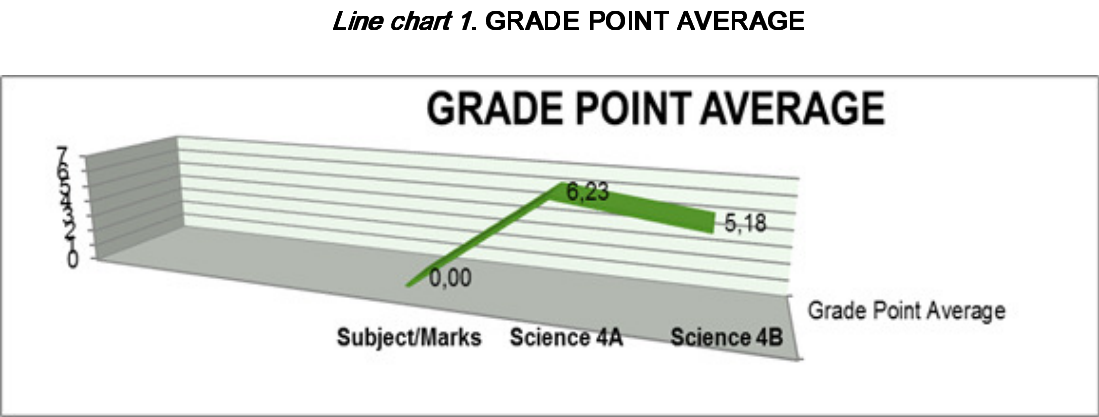
Table 18. MOCK EXAM RESULTS

Mock Exam Results						
Education	Grade	Students	Term	Teacher		
Primary	4	21/22	2nd	CLIL teacher in Science		
Marks	0-3,99 out of 10	4-4,99 out of 10	5-6,99 out of 10	7-8,99 out of 10	9-10 out of 10	
Marks	E	D	C	B	A	
E = 0-3,99 out of 10 points / D = 4-4,99 out of 10 points / C = 5-6,99 out of 10 points / B = 7-8,99 out of 10 points / A = 9-10 out of 10 points						
Subject: Marks:	E	D	C	B	A	Grade Point Average
Science 4A (21 students)	7	1	4	8	1	6,23
Science 4B (22 students)	10	6	2	4	0	5,18
RESULTS	17	7	6	12	1	5,71

The marks obtained by the students of these two groups in the mock exam are represented by the bar chart (*Bar chart 1*) below:



The grade point averages extracted from the marks obtained by the students of these two groups in the mock exam about science contents learnt are represented by the following line chart (*Line chart 1*) below:



5. Conclusions:

As mentioned in the first chapters, technology seems to be one powerful impediment for students to enjoy and play in the natural environments. Therefore, it is likely that there is a connection between the facts that children are playing longer indoors than outdoors throughout the year and their efficiency when learning contents related to nature. There are similarities between children's detachment from nature expressed by Louv in this particular study and those described by Freire (2011) as it has been mentioned above.

One of the aims of this study was to verify whether the natural deficit disorder was a reality or a hypothesis. From the data discussed earlier it cannot be generally concluded that the natural deficit disorder exists in children of the 21st century. Instead, the findings suggested that a detachment from nature exists in the students of two groups who are studying the Grade 4 of Primary Education in a private school located in the north of Spain. There is a possibility that their social backgrounds favoured the access to technology outside the school, and therefore it could be a combination of these two facts. However, these students had the chance to enjoy some natural environments in the school, but these interactions are limited in time and in terms of freedom as some school rules do not allow them to interact with nature every time they want.

During the development of the activities both groups showed interest and motivation, but students from Grade 4-A were noteworthy in terms of enthusiasm and concentration when carrying out the different activities. The natural and rural environments were a novelty for them. These contexts fostered their motivation and brought out the best in them in terms of respect, discipline, cooperation and collaboration. Another significant finding when observing students from Grade 4-A carrying out their activities was how well they managed their emotions and how well they trained their social skills. It is likely that nature influenced them in all these ways. Above all some naturalistic skills were shown by some students, but respect and care for natural elements (living things or non-living things) were shown by every student from Grade 4-A. From my observations, natural education environments seemed particularly beneficial for the student presenting SEN and, especially Attention Deficit Hyperactivity Disorder (ADHD). I could see how nature and rural contexts calmed one of the students presenting ADHD. Although ADHD students usually enjoy kinaesthetic activities, this student was especially calmed, quiet and focused on the development of

each activity. I believe that nature provides the best context for them to interact with. Nature offers a wide variety of stimuli that can hardly be emulated by technology. Natural elements also offered the opportunity of learning by doing or experimenting while interacting with the environment.

Meanwhile, students from Grade 4-B carried out the science activities indoors by using technology resources. Their stimuli were limited to visual, auditory and kinaesthetic ones. As technology was no longer a novelty for them, they showed interest but their enthusiasm was also limited by their previous experiences. The indoor contexts did not offer a relaxed atmosphere, as we had other classrooms around; sometimes outside noises disrupted the lesson. They showed discipline, although their eagerness did not allow them to follow some of the rules – and as a consequence, they could not carry out all the designed activities. Thus, they showed weaknesses when attempting to control their emotional responses or impulses when working in groups. They were not able to solve their problems autonomously. They did not strive enough to develop intrapersonal and interpersonal skills.

Later, based on the findings, the results gathered from the final survey seem to be consistent with having reduced the detachment from nature in students from Grade 4-A after giving them the chance to experience nature and interact with this environment, which is free and it is available for all of us. Students from Grade 4-B presented the same detachment from nature as was shown in the initial survey.

Since the time and scope were limited, this study has not attempted to demonstrate that healthy and natural habits generally have been developed by the influence of these different contexts when learning the science teaching unit, but I can say through my observation and interactions with these two groups of students afterwards that students from Grade 4-A were more aware of natural elements in the school. During their break times, they showed me beetles and ladybugs they had collected from the trees, they used their imagination to compare the height of trees at school to the height of Junior (our classroom pet and the plant they helped to transplant in the agriculturist's vegetable garden) at that time, they regularly asked me if we were going back to see our plant again, they showed me a nest that had fallen from one of the trees at school and asked me questions about it, among many more anecdotes linked to nature. Although students from Grade 4-B shared the same playgrounds and timetable as the other students, they did not show any interest in these natural facts. Further research in this area may include a wider sample of students and a longer period of time.

On the other hand, the results on students' healthy habits do not seem to suggest that the activity helped them to develop any. However, as a rebuttal to this point, it might be convincingly argued that these students learnt, acquired and assimilated these science contents more effectively using natural and rural (outdoor) contexts than using indoor ones.

All in all, if technology was rapidly integrated in the Spanish Educational System attending to its advantages when learning curricular contents in a second language, taking these findings into account, I believe that the natural environment could also enrich the learning process when learning contents in a foreign language and in many other ways as it has been shown above. As these contexts have favoured the students of one group more than those of the other in reducing the detachment from nature, it is certain to think that schools have the necessary tool to assist the growing need for nature that springs out in the 21th century childhood. Even if schools are located in urban areas, teachers can find nature environments surrounding any city, like parks, meadows, etc. or rural environments in towns or villages close to the city. As teachers, we have to be aware of these natural experiences as a part of an effective educational experience that helps students to acquire and assimilate new science contents in a foreign language, and not just as a school trip where just to enjoy ourselves.

6. Appendices:

Appendix 1

INITIAL SURVEY - SCIENCE 4th Grade - Primary Education.

DATE : _____. AGE: _____.

Answer the following questions. Write down a cross (X)

	QUESTIONS	YES	NO
Obj.	1 ^o) Have you ever taken a fruit from a tree?		
Sub.	2 ^o) Have you ever been to a greenhouse?		
Sub.	3 ^o) Have you ever helped to cultivate any vegetables?		
Sub.	4 ^o) Have you ever seen how a graft is being made?		
Sub.	5 ^o) Have you ever walked through a poultry pen house?		
Sub.	6 ^o) Have you ever been inside a greenhouse?		
Sub.	7 ^o) Have you ever collected tubers from the land?		
Sub.	8 ^o) Have you ever seen the leaves from a strawberry plant?		
Sub.	9 ^o) Have you ever touched a donkey?		
Obj.	10 ^o) Do you wash your hands before each meal?		

If any of these answers have been YES, write about it:

Answer the following questions. Write down a cross (X) when true or false

	QUESTIONS	TRUE	FALSE
Obj.	1 ^o) Eating fruits or vegetables every day is good for your health		
Sub.	2 ^o) Practicing indoor sports is healthier than outdoor sports		
Obj.	3 ^o) Tomatoes contain proteins		
Obj.	4 ^o) Lettuces contain minerals like water does		
Obj.	5 ^o) Crips are vegetables		
Sub.	6 ^o) Carrots grow inside the earth		
Sub.	7 ^o) Hens need a male to lay eggs		
Sub.	8 ^o) Bananas come from a plant		
Sub.	9 ^o) Organic fertilizers are better than chemical ones		
Obj.	10 ^o) Carbohydrates help us to prevent illness		

Answer the following questions using the code:

1: Never 2: Once or Twice 3: More than 3 times 4: More than 5 times

	QUESTIONS	1	2	3	4
Obj.	1 ^o) How often do you eat fruit in a week?				
Sub.	2 ^o) How often do you practise outdoor sports in a week?				
Obj.	3 ^o) How often do you drink milk in a week?				
Obj.	4 ^o) How often do you drink natural spring water in a week?				
Obj.	5 ^o) How often do you eat sweets?				
Sub.	6 ^o) How often do you see horses in a week?				
Sub.	7 ^o) How often do you walk through a forest in a week?				
Sub.	8 ^o) How often do you see fruit trees in a week?				
Sub.	9 ^o) How often do you take care of plants in a week?				
Obj.	10 ^o) How often do you eat proteins in a week?				

Appendix 2

FINAL SURVEY - SCIENCE 4th Grade - Primary Education.

DATE : _____. **AGE:** _____.

Answer the following questions. Write down a cross (X)

	QUESTIONS	YES	NO
Obj.	1 ^o) Have you ever taken fruit from a tree?		
Sub.	2 ^o) Have you ever been inside a greenhouse?		
Sub.	3 ^o) Have you ever helped to cultivate vegetables?		
Sub.	4 ^o) Have you ever seen how a graft is being made?		
Sub.	5 ^o) Have you ever smelled the inside of a poultry pen house?		
Sub.	6 ^o) Have you ever lain down on the grass to watch the clouds?		
Sub.	7 ^o) Have you ever collected tubers from the soil?		
Sub.	8 ^o) Have you ever had a picnic in a forest?		
Sub.	9 ^o) Have you ever touched a farm animal?		
Obj.	10 ^o) Have your ever checked if your diet is balanced?		

If any of these answers have been YES, write about it:

Answer the following questions. Write down a cross (X) when true or false

	QUESTIONS	TRUE	FALSE
Obj.	1 ^o) Eating fruits or vegetables every day is good for your health		
Obj.	2 ^o) Practising indoor sports is healthier than outdoor sports		
Obj.	3 ^o) Tomatoes contain proteins		
Obj.	4 ^o) Lettuces contain minerals like water does		
Obj.	5 ^o) Crisps are vegetables		
Sub.	6 ^o) Carrots grow inside the earth		
Sub.	7 ^o) Hens need a male to lay eggs		
Sub.	8 ^o) Bananas come from a bush		
Sub.	9 ^o) Organic fertilizers are healthier than chemical ones		
Obj.	10 ^o) Carbohydrates help us to prevent illness		

Answer the following questions using the code:

1: Never in a week

2: Once or Twice a week

3: Three to five times a week

4: More than 5 times a week

	QUESTIONS	1	2	3	4
Obj.	1 ^o) How often do you eat fruit?				
Obj.	2 ^o) How often do you practise outdoor sports?				
Obj.	3 ^o) How often do you have a shower or a bath?				
Sub.	4 ^o) How often do you drink natural spring water?				
Obj.	5 ^o) How often do you eat sweets?				
Sub.	6 ^o) How often do you see a farm animal?				
Sub.	7 ^o) How often do you walk through a forest?				
Sub.	8 ^o) How often do you take care of plants?				
Sub.	9 ^o) How often do you pick up flowers or plants?				
Obj.	10 ^o) How often do you eat proteins?				

Appendix 3

SCIENCE - MOCK EXAM. UNIT 11. Date : _____. Age : _____.

Name and Surnames : _____. Grade 4 _____. Primary Education.

1ª) Cross out the children who are not taking care of their health. Complete the sentences using *hygiene, prevention, eyes and ears, diet, rest or exercise*. (3 points: 1 point each):

A



B



C



- In picture _____ the girl is not taking care of _____.
- In picture _____ the boy is not taking care of his _____.

2ª) Match the sentences (2 points: 0,5 point each):

Carbohydrates	in eggs	repair body structures.
Fats	in vegetables	build a store of extra energy.
Minerals and vitamins	in pasta	provide energy.
Proteins	in butter	make the body work properly.

3ª) Look at the food wheel and complete the sentences (3 points: 0,5 each):



- Write the name of 2 foods that are regulators:
_____ and _____.
- Write the name of 2 foods that are body builders:
_____ and _____.
- Should you eat bread or croissants more often?
_____.
- How do you know?
Because the picture of bread is _____.

4º) Answer the following questions (1 point: 0,25 each):

a) Where does a potato grow? A potato _____
_____.

b) Where can you find hens and chicks? I can _____
_____.

c) Is it an artichoke coming from a plant or an animal? _____
_____.

d) Is it meat coming from a plant or an animal? _____
_____.

**5º) Think about your *breakfast, morning snack, lunch, afternoon snack* and *dinner*.
Now explain why do you think is a healthy or an unhealthy diet (1 point: 0,2 each):**

Breakfast:

_____.

Morning snack:

_____.

Lunch: _____

_____.

Afternoon snack:

_____.

Dinner: _____

_____.

Appendix 4



Appendix 5

The nutrients chant

We are the nutrients.
Our total is five.
Eat us every day.
We'll keep you alive.

Proteins, the body builders
Make you strong.
Carbohydrates give energy
To move you all day long.

Fats provide energy
For you to store.
But don't eat too many!
A little and no more!

Vitamins are regulators.
Minerals as well.
Eat lots of fruit and vegetables,
And you'll feel well.

We are the nutrients.
Our total is five.
Eat us every day.
We'll keep you alive.


Appendix 6

Healthy Habits	Unhealthy Habits
We relax and think about our day before we go to sleep.	We sleep less than 9 hours every day.
We limit sweets, cakes and fizzy drinks.	We don't drink enough water.
She eats a varied diet.	He plays video games.
She does exercise every day.	We don't visit the doctor regularly.
You wash your hands before you eat.	They watch TV all day long.
We have 5 meals a day: breakfast, morning snack, lunch, afternoon snack and dinner.	You chat with friends using computers or tablets.
They play outside with their friends.	We work on the computer all day long.
He wears glasses if he needs them.	He doesn't have a shower or bath every day.
He eats fruit and vegetables every day.	They eat ten eggs in a week.
We ride on a bike once a week.	They don't brush their teeth every day.
They listen to music to a reasonable volume.	We shout instead of talk.
We cover our mouth when we cough or we sneeze.	He bites his nails.
<i>Space to write your opinion</i>	<i>Space to write your opinion</i>
<i>Space to write your opinion</i>	<i>Space to write your opinion</i>
<i>Space to write your opinion</i>	<i>Space to write your opinion</i>
<i>Space to write your opinion</i>	<i>Space to write your opinion</i>
<i>Space to write your opinion</i>	<i>Space to write your opinion</i>

Appendix 7

Attachment 7: Trekking the map! Group: _____

Names: _____



Appendix 8

Green Gymkhana

Group 1: _____.

Welcome to the Green Gymkhana and good luck!

Here you have your first clue:

I'm solid and rounded. I've got plenty of Vitamin C and my home is
a tree...
What am I?

Congratulations! Let's go for the second one:

I'm full of proteins. When I was alive I couldn't sing, but I laid eggs
without my male's help.
What am I?

Well done! Get the third one:

I'm yellow and white. Plenty of vitamins and potassium. My home is
not a tree, but a bush is.
What am I?

Ace! ... and the last one is...

I'm green and healthy. You can find me in a salad or in a
greenhouse.
What am I?

Group 2: _____.

Welcome to the Green Gymkhana and good luck!

Try hard to get the first clue right!

I'm red and I've got seeds on my skin. I've got plenty of vitamins.
Please, find me inside a greenhouse.
What am I?

Superb! Second one is...

I need my father to be born as a chick. If I am not, I am very tasty

and I am full of proteins and vitamins.

What am I?

EGGcellent! Get the third one...

I'm solid and rounded. I've got plenty of vitamins and minerals. I live in a green garden. Sometimes I'm sweet and sometimes I'm spicy.

What am I?

Impressive! Let's finish with...

I'm a tuber growing inside the earth. I'm solid and brown. I've got plenty of carbohydrates.

What am I?

Group 3: _____.

Welcome to the Green Gymkhana and good luck!

Get the first clue right!:

I'm green and I'm growing on a green garden. I've got lots of vitamins. My home is a weird plant.

What am I?

Good job! Go for the second one...

I'm rounded and red. I'm a fruit growing from a plant. I jump to your plate in any shape and state (solid, liquid...)

What am I?

Amazing! The third one...

I'm white and spicy. I am a vegetable full of minerals and vitamins. My home is a plant and my sister is an onion.

What am I?

Great! Last but not least...

I grow in a tree. I can be red, green and yellow. I've got lots of vitamins and I'm a healthy example.

What am I?

Appendix 9



Appendix 10

Just 4 clues are allowed:

Clue number 1:

It contains _____ and _____.(carbohydrates/proteins/vitamins/minerals/fats).

Clue number 2:

It is a _____ (regulator/body builder/energy provider).

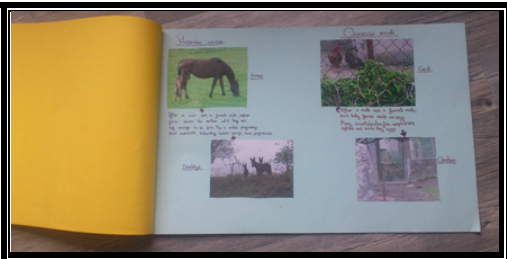
Clue number 3:

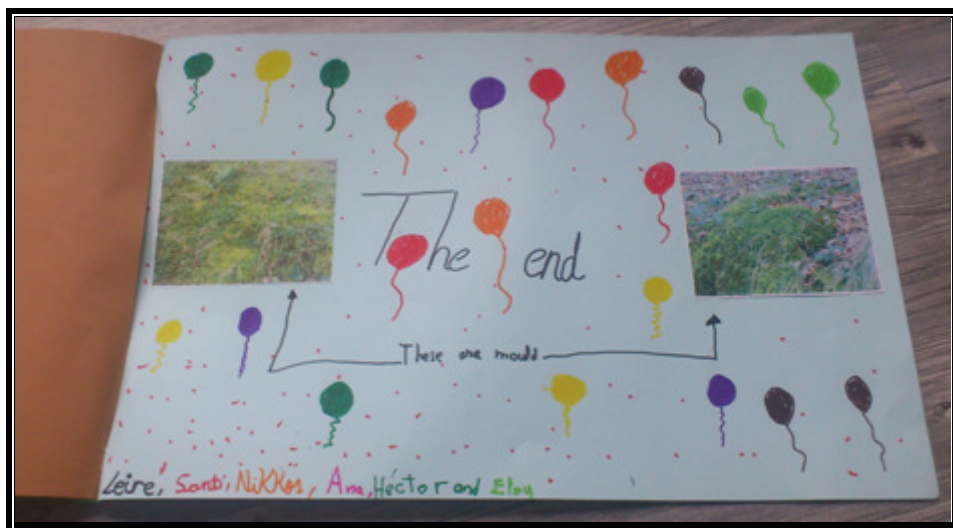
Our body needs it to _____ (get energy/grow and repair body structures/work properly).

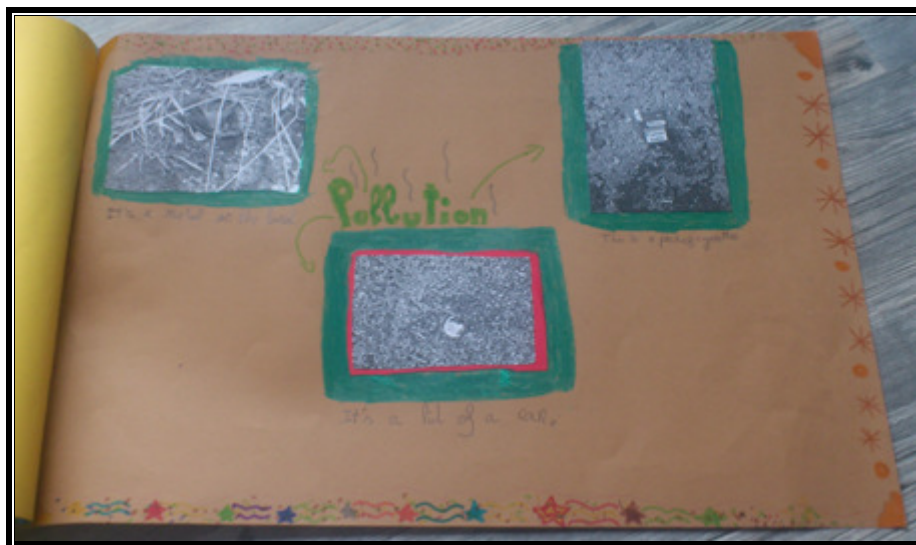
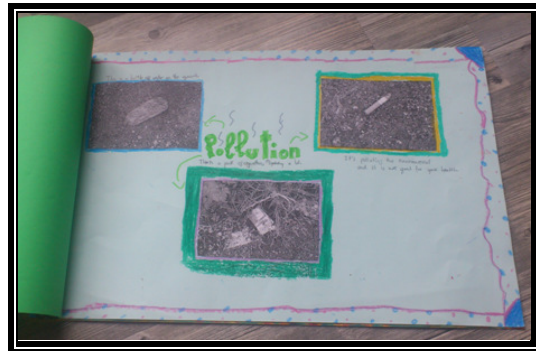
Clue number 4:

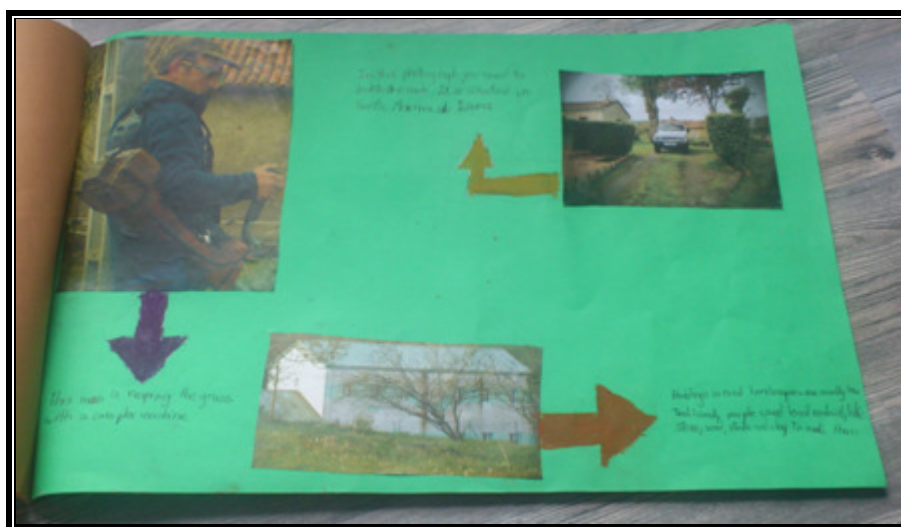
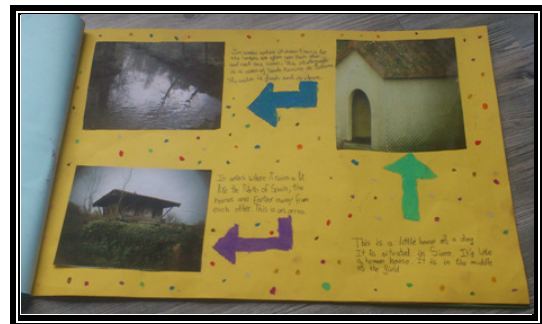
You can eat it _____ (once a day/twice a day/three times a day/four times a day/five times a day).

Appendix 11









Appendix 12



Appendix 13



What do you think...?

- You are about to see images showing some healthy or unhealthy habits.
- Please, use the following expressions to give your opinion:
I think it is a ... because...
I don't think it is a ... because...



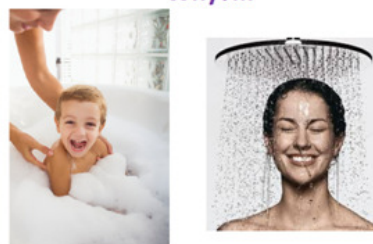
I think... because...



I don't think... because...



What is the best thing to do?...
Why?...



Outdoor sports vs. Indoor sports



Physical Activity



Appendix 14

Health and diet

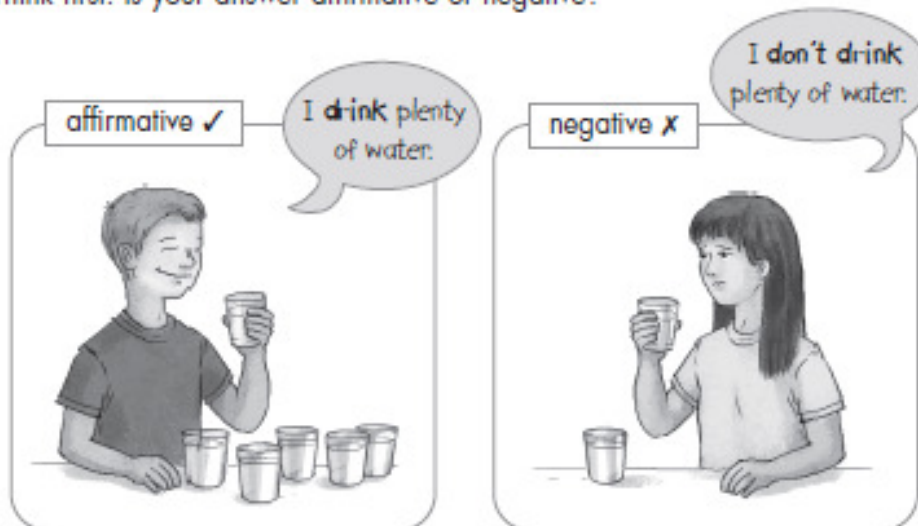
Worksheet 11.1

Word and structure practice

1. In each line circle the word that is not a verb.

brush	lunch	eat	listen	clean
wash	go	follow	cover	teeth
glasses	sit	wear	relax	do

2. Use some of the verbs from activity 1 to complete the sentences about yourself.
Think first: is your answer affirmative or negative?



- I _____ a varied diet.
- I _____ to bed at a reasonable time.
- I _____ before I go to sleep.
- I _____ glasses to watch the television.
- I _____ to music at a reasonable volume.
- I _____ exercise every day.
- I _____ my hands before I eat.
- I _____ my mouth when I cough.
- I _____ my teeth after every meal.

Appendix 15

Health and diet

Worksheet 11.2

The nutrients chant

1. Circle the hidden words related to nutrition.

rifatspo alcarbohydratesnumt jaspenergylt beaspproteinsl
 torpomineralsf blovegetablesamin clanutrientstst
 prefruity mumbodybuilderser renrovitamins

2. Use the words above to complete the chant. One word is repeated.

We are the _____.

_____ provide _____

Our total is five.

For you to store.

Eat us every day.

But don't eat too many!

We'll keep you alive.

A little and no more!

_____, the _____,

_____ are regulators,

Make you strong.

_____ as well.

_____ give _____

Eat lots of _____ and _____,

To move you all day long.

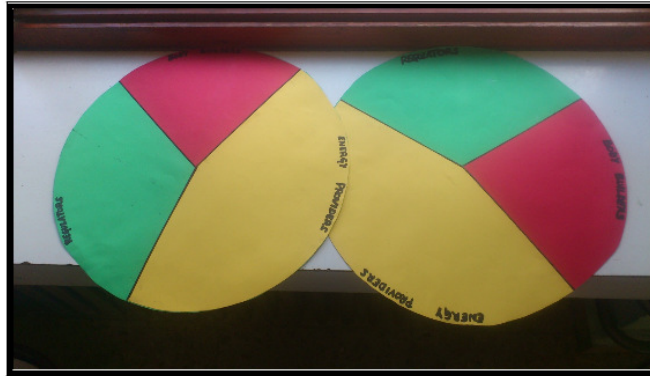
And you'll feel well.



Appendix 16



Appendix 17



Appendix 18



Functions of nutrients

CARBOHYDRATES:

- Our body uses them to get energy.
- They are in cereals, like wheat, rice and corn, pulses, potatoes and fruit.



Functions of nutrients.

PROTEINS:

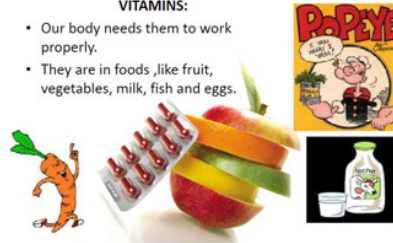
- Our body uses them to grow and repair body structures.
- They are in meat, fish, eggs, milk products, nuts and pulses.



Functions of nutrients.

VITAMINS:

- Our body needs them to work properly.
- They are in foods, like fruit, vegetables, milk, fish and eggs.



Functions of nutrients.

MINERALS:

- Our body needs them to work properly.
- Calcium is one of the most important. It is in milk products, pulses and some vegetables.

• FLUORIDE • CALCIUM



• PHOSPHORUS • IRON



VARIED AND BALANCED DIET



Natural products coming from the earth



Cereals
Potatoes
Pulses
Fruits
Vegetables



EAT MORE FRUITS AND VEGETABLES



THE HEALTHY TRAFFIC LIGHT



BODY BUILDERS
Limit them...

ENERGY PROVIDERS
A few...

REGULATORS
A lot!



How should we eat?



We should eat slowly
We should chew food properly
We should sit down properly
We should eat with our family
We shouldn't watch TV



HEALTHY EATING FAMILIES



Let's play!



with my little eye...



- It's something _____ (say a colour).
- Our body needs _____ to work properly.
- It's a _____ (regulator/body builder/energy provider).
- Its shape is _____ (rounded/straight/pointed).



Health and diet

Extension worksheet

Name: _____ Date: _____

1. Read the information about the breakfast cereals and answer the questions.

A

CORNFLAKES

nutritional information
(per 100 grams)

→ Proteins	8,0 g
→ Carbohydrates	87,0 g
→ Fats	0,5 g

B

CHOCOLATE COATED
CORNFLAKESnutritional information
(per 100 grams)

→ Proteins	9,7 g
→ Carbohydrates	69,0 g
→ Fats	14,0 g

- Which breakfast cereal has ...
 - ... more proteins? ____
 - ... more carbohydrates? ____
 - ... more fats? ____
- Which cereal do you think is healthier? ____ Why? _____

2. Tick the meal and dessert you think is healthier. Explain why.

1






hamburger and chips
chocolate cake






2

chicken and salad
baked apple

- Meal ____ is healthier because _____
- Dessert ____ is healthier because it contains less _____ and _____.

Appendix 20

5 Meals a day	Choices / options
Breakfast	 <u>First Choice:</u> 1 cup of milk or hot chocolate. 4-5 biscuits/1-2 muffins or cookies.  <u>Second Choice:</u> 1 bowl of cereals with milk. 1 piece of fruit (apple/orange/banana/kiwi...)
Morning Snack	 <u>First Choice:</u> 1 loaf of bread with some cheese/ham.  <u>Second Choice:</u> 1 piece of fruit (clementine/plum/strawberries...).
Lunch	 <u>First Choice:</u> 1 plate of pasta with tomato sauce. 1 chicken breast with vegetables (carrots/peas...). 1 piece of fruit.

	 <u>Second Choice:</u> 1 plate of lentils stew with potatoes and carrots. 1 portion of tuna fish with lettuce and tomato. 1 piece of fruit.
Afternoon Snack	 <u>First Choice:</u> 1 yoghurt.  <u>Second Choice:</u> 2-3 biscuits/ 1 muffin.
Dinner	 <u>First Choice:</u> 1 omelette. Some salad (lettuce/tomatoes...). 1 yoghurt.  <u>Second Choice:</u> 1 ham and cheese sandwich. 1 piece of fruit.

	Menú semanal de						
	LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO	DOMINGO
Desayuno							
Comida							
Merienda							
Cena							

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