FACULTAD DE EDUCACIÓN DE PALENCIA

UNIVERSIDAD DE VALLADOLID

EXPERIENCING PHYSICS IN PRIMARY EDUCATION:

A Science approach in an Integrated British – Spanish curriculum School

TRABAJO FIN DE GRADO

MAESTRO/MAESTRA EN EDUCACIÓN PRIMARIA – MENCIÓN INGLÉS

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Palencia

29-07-14

RESUMEN

Cuando hablamos de Ciencias Naturales, nos suelen venir a la cabeza contenidos teóricos, complejos y en la mayoría de los casos, aburridos. Sin embargo, con la introducción del bilingüismo y la actual importancia de la tecnología y avances científicos en nuestra sociedad, en muchas de nuestras escuelas las cosas han cambiado.
La aplicación de una propuesta en base a un currículo integrado en el que se persigue el desarrollo de habilidades de pensamiento, conocimiento y actitudes reflexivas, en definitiva, de de construcción del propio aprendizaje, hace que sea necesario que adoptemos un nuevo papel en la enseñanza de las ciencias en la escuela.

PALABRAS CLAVE

Aprendizaje integrado, amplitud de contextos, competencia comunicativa, uso real del inglés, currículo integrado, método científico, habilidades de investigación, experimentación.

ABSTRACT

When we talk about natural sciences, one of the first things that come to our mind is the theoretical content, complex and, most of the times, boring. However, with the introduction of bilingualism and the current importance of technology and scientific advances in our society, many things have changed in our schools.

The implementation of a proposal based on an integrated curriculum in which we pursue the development of thinking skills, knowledge and a reflective attitude, in conclusion, building the own knowledge, makes necessary to adopt a new role in Science teaching in school.

KEY WORDS

Integrated learning, range of contexts, communicative competence, real use of English, integrated curriculum, scientific method, enquiry skills, experimentation.

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1. INTRODUCTION

The present research is based on the project I developed throughout my internship period in 2013. The project consists on the design and application of a Science unit in Tello Téllez, a bilingual school in Palencia. It was implemented in k-stage 2, in 4th year classroom. My mentor for this process was the teacher in charge of teaching them Science and, at the same time, the tutor of the class. This allowed me to work with students in a closer way, getting to know them, their characteristics, capacities and interests much better.

The experience also gave me the chance to work according to an integrated curriculum, core element in a bilingual school, which implied the application of a very specific guidelines and an approach to Science totally different from any other I had seen before, giving practice a main role and trying to get something more than theory and concepts knowledge from students.

2. JUSTIFICATION

This study proves the acquisition of specific competences developed during the internship and during the Primary Education Degree. It reflects the way I see myself as a teacher from the dual perspective of Primary Education and Foreign Language teacher.

When going to a school, we always play a determined role; in this case I had to face this project because my mentor teacher was responsible of the area. This process was conditioned by different constraints which made the experience a challenge.

The First constrain included the development of a project according to a specific human and spatial/material context. A second one its specific features as a Science teacher, due to the compulsory program implementing an Integrated Curriculum, Science and

History should follow the premises and guidelines of the British Curriculum, which is something general along our internship, but also at the same time embracing my Mentor´s perspective and knowledge of students' characteristics and capacities. Besides, we are being required to take our own decisions, mainly in respect to activities and resources used for our own project.

A third constrain was a personal one, as it was my first experience as a Science teacher and even more challenging for me since, I had to apply a knowledge I barely had, in the Science area, in a foreign language, in a type of school I had never been in and with a class of 25 students. The only previous experience I had in teaching was in a village with groups of 9-10 students. So, the whole experience was new for me. It definitely implied a change in the way I understood Natural Science teaching in respect to Physics.

3. OBJECTIVES

Since this study is based on the Science practice I experienced during my internship period, the main purposes were stablished according to the project I carried out and the results I wanted children to achieve.

As for this study specifically, my goals are to relate theory to practice in respect to Science education and to show how scientific method is applied successfully in Science school lessons, corresponding to a British way of approaching to Science. Furthermore, as the project is put into practice in a specific context, one of the objectives is to adapt British Council-MEC curriculum and CLIL premises to my school/students´ characteristics.

My main goals for the project implemented at school are there following:

- Design an appropriated project, according to students´ previous knowledge and their capacities and interests.
- Promote children´s awareness of what they are learning.
- Relate "Matter" concepts to kids´ daily life experiences.
- Allow kids to see, touch, feel and experience the concepts they are being taught.
- Motivate children to participate in Science lessons.

4. COMPETENCES THAT I PROVE TO HAVE ACQUIRED IN THIS DEGREE

As a teacher, there are certain competences required in order to ensure a successful teaching. These competences have been developed through the entire degree and they have been mainly put into practice during the internship periods.
In this research I prove to have acquired and applied some specific competences, focusing on the ones related to practice in the foreign language and science fields, since my point of view it has been not only from the perspective of a Primary School teacher but from a foreign language teacher.

These competences, established by our University for Primary Education Degree, are the following:

- Approaching, participating and reflecting on practical school life, learning to collaborate with the different sectors involved:

  - Being able to relate theory and practice with the reality of the classroom and school.

- Approaching to elementary education students 'characteristics and their social/motivational context characteristics.

- Identifying learning difficulties, cooperating with its solution.

- Designing and evaluating different projects, applying active methodological strategies and a wide range of resources:

  - Applying strategies which enhance active and participative methodologies, especially those which include collaborative work, diversity of resources and a proper use of spaces, timing and grouping.

- Selecting and using Information and communication technologies that contribute to the students' learning.
- Being able to plan what is going to be taught and evaluated in the foreign language area as well as selecting and developing teaching strategies, activities and resources. This competence implies:

  - Promoting both oral and writing production.
  - Knowing Primary Education curriculum in the development of foreign language area.
  - Being able to encourage positive attitudes towards linguistic and cultural diversity in the classroom.
  - Developing gradually the communicative competence through the integrated practice of speaking, writing, listening and reading skills in the foreign language.
- Communicating orally and written in a foreign language according to level B2 in Common European Framework of Reference for Languages.

- Applying scientific knowledge to understand the world that surrounds us, developing at the same time skills and attitudes that enhance exploring and discovering natural phenomenon:
  - Understanding the basic principles and laws of experimental sciences.
  - Recognising the curriculum associated to experimental sciences.
  - Developing and assessing contents through appropriated resources and promoting the acquisition of basic competences.

In addition, and as a foreign language teacher in a Content and Language Integrated Learning (CLIL) context, there are some more specific competences which I would like to underline since they have been fundamental to develop my practice. "Teacher´s competences grid" offers a reference for teachers about the skills they need to command for a good performance in CLIL methodology.

"A successful CLIL teacher is not expected to have all of these competences. S/he may be able to compensate a lack of knowledge in one area with high levels of expertise in another" (Bertaux, Coonan, Frigols-Martín and Mehisto, 2010).

AREAS OF COMPETENCE	COMPETENCES	INDICATORS OF COMPETENCE
CLIL Policy /...	Adapting CLIL to the local context	Can contextualise CLIL teaching with regard to the school curriculum. Can link programme parameters and the needs of a particular class of students.
	Integrating CLIL into the curriculum	Can describe how CLIL links to the national or regional curriculum. Can design and apply evaluation and assessment tools (tests, stakeholder surveys, portfolios, rubrics, etc.).
	Articulating quality assurance measures for CLIL	Can interpret data from evaluations, and take related measures for programme improvement.
Target language competences for teaching CLIL /...	Using the language of classroom management	Can use target language in: - group management - time management - classroom noise management - giving instructions - managing interaction - managing co-operative work - enhancing communication
	Using the language of teaching	Can use own oral language production as a tool for teaching, through varying: - registers of speech - cadence - tone and volume

	Using the language of learning activities	Can use the target language to: - explain - present information - give instructions - clarify and check understanding - check level of perception of difficulty
Course development	Designing a course	Can integrate the language and subject curricula so that subject curricula support language learning and vice versa. Can plan for the incorporation of other CLIL core features and driving principles into course outlines and into lesson planning, including: - scaffolding language, content and learning skills development - continuous growth in language, content and learning skills development - learner autonomy - fostering critical and creative thinking Can select learning materials, structuring them or otherwise adapting them as needed. Can select the language needed to ensure: - student comprehension - rich language and content input - rich student language and content output - efficient classroom management
Partnerships in supporting student learning	Building constructive relationships with students	Believes in each student's capacity to learn and avoids labelling students. Can create a reassuring and enriching learning environment. Can adapt materials and strategies to students' needs.

Implementation	Lesson planning	Can design tasks that support planned learning outcomes. Can design tasks that involve students using several learning styles. Can find and adapt authentic material which speaks to student interests and learning needs.
	Translating plans into action	Can select, design and make judicious use of visual, auditory and multimodal support materials, and realia.
	Fostering outcome attainment	Can provide rich opportunities for linking previous and new knowledge. Can provide rich input and experiences, approaching a topic from different perspectives. Can create opportunities for and support students in researching topics independently and through cooperation with peers. Can adapt course content to language and subject curricula. Can guide students in developing productive cognitive habits. Can forge links with other fields of learning.
Second Language Acquisition (SLA)	Applying SLA knowledge in lesson preparation	Can identify words, terms, idioms and discourse structures that are new for the students in text, audio or audiovisual materials, and support comprehension. Can identify the language components needed by the learners for oral or written

		comprehension and produce support material. Can identify the language components needed by the learners for complex oral or written production and produce adapted resources.
Lifelong learning & Innovative teaching and learning approaches	Using ICT as a teaching resource	Can search for and download authentic material for use in the classroom. Can guide students in using ICT in ways that are new for them and that enhance learning.

Figure 1: CLIL Competences Grid

5. THEORETICAL FOUNDATION

In order to support the decisions I have made and this type of approach to Science education in our Primary schools I will refer to constructivist authors and to thinking skills.

First of all, the project implemented was designed for a determined public. Consequently, we have to deal with specific cognitive characteristics; the ones of 4th year, meaning this their age is around 9-10.

According to Inhelder and Piaget (1958) kids between 9 and 11 are in the called "concrete operations stage"[1] in which kids´ rational thought becomes hypothetical-deductive, giving the child new mental possibilities.

Piaget´s assimilation and accommodation theory takes also a relevant part in this learning process. When kids are learning something new, they must be able to connect it to something they already know. "They must construct personal meaning of the new material, either by assimilating it into existing schemata or by accommodating it through forming new schemata that are connected to existing ones" (Jerner Martin, 2012). [2]

In 2009, Martín Bravo and Navarro Guzmán pointed that Piaget underlined children learn better if they have an active role and search solutions by their own. The conclusion we can draw from this idea is that students learn better if they carry on findings, reflect and discuss them, instead of just copying the teacher or doing everything by heart. Therefore, we must appeal to experiences kids can recall, daily experiences which for sure they can relate to the new concepts and knowledge.
Teacher´s position in this teaching model is guidance, allowing kids to solve their problems and explore options while directing classroom environment and offering them models whenever it is needed.

In the same line of constructivism we find Vygotsky´s theories. His most important contribution is the zone of proximal development (ZPD) which is defined as "the

[1] Piaget distinguished four stages of cognitive development, which included thought, judgment and knowledge, from childhood to adulthood.

[2] Piaget viewed the mind as a collection of cognitive structures called schemata. There are two fundamental processes in the mental activity: assimilation and accommodation. Taking in new information and fitting it into existing schemata is called assimilation. When the schemata are too filled with information or there is no existing schemata appropriate for certain information, new one can be opened or old one may split into two to include a wider range of experience. This is called accommodation.

distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978). For most children, the transition from assisted learning to independent learning requires a great deal of assistance and time until no assistance is needed. To facilitate this transition, a teacher needs to scaffold[3] students providing assistance at the appropriate times. These theories also lead us to a very important point to have into consideration. The fact of teaching kids something that implies a challenge or difficulties, since they have to try to achieve the learning by their own, motivates them, which will make the process more successful.

Continuing with the constructivism approach, I need to refer to discovery learning, included in Bruner´s theory. This concept implies that students construct their own knowledge by themselves. Teacher will design lessons that help student discover the relationship between different pieces of information.

Bruner (1961) stands the following:

> Our aim as teachers is to give our student as firm a grasp of a subject as we can, and to make him as autonomous and self-propelled a thinker as we can—one who will go along on his own after formal schooling has ended.

As it can be seen, Bruner´s ideas of what education must be and teacher´s role fit perfectly with the methodology applied in Science. In fact, we can find how Bruner had a very important role in the curriculum related to this area.

C. Mills (2006) points that:

> Jerome Bruner's connection with the National Science Foundation curriculum development projects of the 1960s and 1970s was instrumental in formulating discovery approaches to science learning. Bruner believed that the goal of education should be intellectual development and that the science curriculum should foster the development of problem-solving skills through inquiry and discovery. Discovery

[3] Although scaffolding comes from Vygotsky´s concept of supporting a learner, the term was introduced by Bruner in the 50s.

learning encourages students to actively use their intuition, imagination, and creativity.

Bruner himself expressed his view about the way Science should be taught: "the schoolboy learning physics is a physicist, and it is easier for him to learn physics behaving like a physicist than doing something else" (Bruner, 1960).
Finally, it is necessary to include thinking skills[4], which take a fundamental role in Science, since one of the main objectives, not only in this area but in education in general, is that kids develop their ability to reflect, to solve problems, to be critical and independent.

All these skills can be developed through Science teaching, considering it involves processes such as sequencing, grouping, classifying, analysing, comparing (noting similarities/differences), making predictions/formulating hypotheses, drawing conclusions, giving reasons, formulating own points of view, taking multiple perspectives/seeing other points of view.

6. METHODOLOGY

Corresponding to the theories which support the approach taken in Science and to the current relevance of English in education and every other context, curricula are designed according to a methodology which I will proceed to explain.
First of all, bilingual education is set under the premises of Content and Language Integrated Learning (CLIL), where a subject is taught through the medium of a second language. This methodology is a growing trend in all levels of education the world and

[4] Thinking skills are specifically included in the Northern Ireland Curriculum and they are taken into consideration in an increasing number of schools. In order to learn more about them, you can check http://www.nicurriculum.org.uk/tspc/what_are_tspc/.

it is used as the base for the Bilingual Sections and Bilingual Schools having a lot to do in curriculums´ development.

The importance of this methodology is the focus on the relevance of language instead of paying a greater attention in the contents, as it has usually been done.

"Content teaching needs to guide students' progressive use of the full functional range of language, and to support their understanding of how language form is related to meaning in subject area material" (Swain, 1998, p. 68).

The Common European Framework of Reference (CEFR) [5](2001) sets a very clear line about the teaching of a language, establishing that the approach adopted is an "action oriented" one and considering that the command in a language is proved though performance in different tasks and different contexts.

Taken into consideration all these premises, it is clear that language will play an essential role that cannot be ignored when we plan the teaching of a subject, Science in this case. European Language Policy Division offers teachers a wide variety of documents in order to approach to an appropriated integration of language and learning. Vollmer (2009) expresses these guidelines in a very clear way:

> …language education does not stop with language as subject. Education in the language(s) of schooling is equally necessary in all other subjects, which are sometimes falsely considered as "non-linguistic" subjects (…). The learning of subject-specific knowledge as in physics, geography or mathematics cannot happen without linguistic mediation. It is only possible with the help of appropriate skills of language comprehension and use, which have to be acquired or activated simultaneously with subject learning (…). Language competence, therefore, is an integral part of subject competence.

Without an adequate language competence, students will not follow the content being taught and will not be able to communicate with others about it. Since one of the main lines of scientific method is giving reasons, sharing conclusions and points of view, the

[5] CEFR provides a common basis for the elaboration of language syllabuses, curriculum guidelines, examinations, textbook, etc. across Europe.

necessity of speaking with others is undeniable. “Learning science does not only involve new concepts, explanations and arguments, but also new ways of making meaning and of interacting with others using these concepts, explanations and arguments” (Vollmer, 2010).

Consequently, there is a specific language used in the Science area, which teacher has to encourage, going associated to the content learning, and which students have to integrate as proper language.
As I said before, we are offered some precise language items necessary for learning/teaching sciences in these European Policy documents. In 2010, Vollmer states that some of those language items which should be used in the experimentation-enquiry processes are the following:

A statement of plan:

- I am about to speak of/examine/deal with the question/the issue of...
- I shall talk about...
- My topic is…
- The purpose of the experiment was
- In the experiment I looked at...

Connectors:

- First of all, first, to begin with, etc.
- Next, then, as the second point
- The following point
- As a result…

Announcement of the end:

- Lastly, to conclude, to finish, in conclusion
- So, the experiment was…
- The experiment showed that…
- To conclude, to finish, in conclusion…

Besides, children will not be only developing a specific vocabulary needed in order to communicate their findings, but any other communicative skill required to make themselves get understood, persuade their classmates about the logic of their findings, etc.

Children's competence in communicating, speaking and listening is emphasized in the English curriculum. As well as in Spanish one, the main line is providing and encouraging kids to use these skills in different situation and for a range of purposes. This clearly lays in the reference set by CEFR, as it has been mentioned above. I will now refer to main lines in respect to communicative competence and Science area in both British and Spanish education curricula since, as we will see later, both guidelines are taken into account to elaborate the specific curriculum used in British Council schools.

The National Curriculum in England (1999) stablishes:

> The importance of science stimulates and excites pupils' curiosity about phenomena and events in the world around them. Because science links direct practical experience with ideas, it can engage learners at many levels. Scientific method is about developing and evaluating explanations through experimental evidence and modelling. This is a spur to critical and creative thought.

About Science in Key Stage 2, it makes a reference to both investigative skills and specific skills to develop in the teaching of Matter subject. Some of those Investigative skills are:

- Planning (asking questions, predicting)
- Obtaining and presenting evidence (use simple equipment and materials, make systematic observations and measurements, use a wide range of methods)
- Considering evidence and evaluating (make comparisons, identify simple patterns or associations, use observations, measurements or other data to draw conclusions, use their scientific knowledge and understanding to explain observations)

Specifically for the topic carried out in the project, "Matter" it underlines some objectives that I have taken as reference:

- Grouping and classifying materials (compare everyday materials and objects on the basis of their material properties, and to relate these properties to everyday uses of the materials, to recognise differences between different states).
- Changing materials (to describe changes that occur when materials are mixed, or their temperature is changed, differentiate between reversible and non-reversible changes).
- Separating mixtures of materials (how to separate solid particles of different sizes, that some solids dissolve, how to separate insoluble solids from liquids by filtering).

Some years later, the same curriculum (2013) in its Science programme underlines how pupils should be encouraged to try to explain what is occurring, predict how things will behave, and analyse causes, building up an extended specialist vocabulary and using a variety of approaches to answer relevant scientific questions (observing, classifying and grouping, analysing and presenting data). The differences between two curricula from so different years and are so small that it shows the guidelines stablished are really appropriated and successful in the teaching of this subject.

British Council Schools are set under the premises of CLIL and taking a rather British educational approach. However, the curriculum applied in these schools is created in coordination of British Council and Spanish Ministry. This bilingual program in agreement of main British-Spanish education elements is being developed since 1996. Although this program was stablished when LOGSE Education law was valid, its premises met the ones reflected in the following law, LOE.[6]

Despite the fact that it focuses on the interaction of children with their surrounding world and the importance of environment, it also refers to some of the most important procedures used in the area, such as observation, search of information, its organization and exchange of conclusions. Nevertheless, there is no clear reference to the application

[6] Ley Orgánica 2/2006, de 3 de mayo, de Educación.

of scientific method or practical experiments in the classroom, unlike British approach which is totally based on this.

With the new Spanish Education law which will be introduced next school year, Spain finally adopts this way of teaching Science, giving a greater meaning to the agreement. LOMCE[7] stablishes that scientific work is approached through natural sciences and this is why we need to make sure every child gets to know the basis of a scientific education.

Therefore, scientific skills have been included in the basic curriculum, such as the capacity of asking questions, identifying problems, formulating hypothesis, planning and carrying on activities, observing, collecting data, organizing the information, analyzing results and sharing them.

What are the main differences between the Spanish and the British approaches to Science, Geography and History?	
The Spanish curriculum contains a broader content of information to be learnt. The Science contents relate more to Biology than to Physics or Chemistry. In the Spanish system there is a greater emphasis upon knowledge and study skills.	In the British curricula, more importance is given to basic Physics and Chemistry. The British system puts the emphasis more on investigation and understanding through personal discovery. The children are taught the concept of a fair test and they learnt to devise their own experiments and to draw conclusions. Oral work is very important in the planning and reporting of tasks.

Figure 2: Guidelines for the development of the integrated curriculum between MEC and British Council

[7] Ley Orgánica 8/2013, de 9 de diciembre, para la mejora de la calidad educativa.

Since the school in which applied my project during the internship is a British Council one, the guidelines offered by the integrated curriculum were the first ones I took as a reference when designing my intervention, not only to check the general measures but to make sure the objectives and activities purposed for "Matter" unit were appropriated.

Most Science topics lead to practical experiments. We should use these opportunities to develop scientific skills. The experiments usually come from the study in science area of:

- Human body and health
- Living beings
- Materials and their properties
- Physical processes

How do we plan, carry out and report on experiments?
To teach children to investigate through experiments we have to provide them the opportunities for practical experiences. However, it is essential that we carefully structure our teaching to allow them to discover things for themselves. The objective of practical activities is that the children learn by doing, so they should not be told the results of the conclusions before they start.

Figure 3: Experiments in the project. Guidelines for the development of the integrated curriculum between MEC and British Council

MEC-British Council curriculum also underlines the importance of developing a group of enquiry and scientific skills in order to carry on experiments and to get in touch with the basic physics concepts. These skills are needed to think, investigate, formulate questions and discover the world.

- Research: Looking for information, reading, selecting and summarizing.

- Analysing and reasoning: Analyse information, establishing links, causes and consequences.
- Observation: The correct use of the senses to describe, sort and classify.
- Exploration: Try and see activities.
- Illustration: Whole class demonstrations.
- Investigation: Children design experiments. They ask questions, predict outcomes, plan, test and communicate findings.
- Classifying and identifying.
- Evaluation: Checking results, confirming information, showing understanding.

These skills and the corresponding subject objectives are precisely adapted for each of the stages; therefore, I will just underline the ones related to Second Cycle, since the kids I was working with belong to this cycle. Also, as I have said before, when I started designing the unit, my first reference when taking any kind of decision was these guidelines.

Scientific skills targets	**Second cycle**
<u>Preparing for tasks.</u> Understanding the task and planning a practical activity. Predicting. Undertaking fair test	Pupils will be able to: - Ask questions and suggest ways of answering them with experiments. - Make predictions and recognize when a test is unfair.
<u>Carrying out tasks</u> Observing and measuring. Recording fining in a variety of ways.	- Follow simple instructions. - Use equipment and techniques to make observations and measurements. - Record findings in a range of ways: drawings, pictograms, block graphs and tables.

Reviewing and reporting on tasks Reporting and presenting. Interpreting and evaluating results and processes.	- Do guided writing to report investigations. - Answer simple questions, make comparisons and recognize simple relationships. Draw conclusions.

Figure 4: Scientific skills targets. Guidelines for the development of the integrated curriculum between MEC and British Council

Science content targets	**Second cycle**

Materials and their properties Developing an understanding of different materials, their properties and uses	Understand the basic properties of materials: - Classify materials and objects according to their similarities and differences. - Classify materials according to their origin, natural or manufactured. - Relate properties of materials and uses. - Investigate basic properties of solids, liquids and gases as exemplified by water. Understand the basic changes in materials: - Investigate which everyday substances dissolve in water. - Recognise that materials can change in a desirable or an undesirable way. - Investigate how everyday materials can change by heating or cooling. - Understand that when new materials are formed, the change is permanent.

Figure 5: Science content targets. Guidelines for the development of the integrated curriculum

According to scientific skills and content targets there are three bands of attainment suggested so teachers find easier to evaluate their students. However, these bands were not really used for children´s assessment in my classroom. In my opinion, it is very hard to position a student just in one band, since some of them prove they can achieve targets from different targets and it is something that depends on many other circumstances.

7. MY DESIGN

My internship period was performed in CEIP Tello Téllez[8] in Palencia in 2013, where I had the opportunity to experience the way British Council Schools work and to implement a design of a topic which allowed me to enhance an active learning based on the scientific method.

7.1. CONTEXT

7.1.1. School context

Tello Téllez School is located in San Antonio´s neighborhood, in the North of the town of Palencia, where most of the children come from. The number of pupils was around 434 (23 "acnees") last year, but there are many families who want to register their kids. Most of the families have medium-low socio-economic level. There are also, although is a minority, some gipsy families.

In the last years the neighborhood has suffered many changes, including the build of many new houses. These changes have incremented the number of students in the school. This evolution has also been caused by the application of different innovations in the educational system, such as the "Integration Program" for students with special education needs and the Bilingual program between the Spanish teaching ministry and the British Council.

In Tello Téllez School, it establishes the teaching 30% of the curriculum in English in the second cycle of I.E. and 40% in the three cycles of P.E.

The main aims of the program are:

- Encourage the acquisition and learning of both languages through an integrated curriculum based on contents.
- Make students aware of the diversity of both cultures.
- Provide exchanges between students and teachers.
- Enhance the use of new technologies for the foreign language learning.

Through this program, teachers work mainly for student´s acquisition and improvement of vocabulary, comprehension, language structures, communicative skills, basic

[8] http://ceiptellotellez.centros.educa.jcyl.es/sitio/

sentences, pronunciation and English culture. English is used in every single moment, being helped by body language, tone, intonation and all kind of linguistic and non linguistic strategies. Language is applied in real communicative situations, in the suitable context, to enhance children´s motivation.

The school also counts with a solid ITC program, being compulsory the use of the audiovisual room in every unit. There is a computers room and an English laboratory too.

First day at school, all the students having our internship there were given some of the guidelines the school offer for the new teachers in the project, so we could adapt to its methodology and understand teachers´ performance better. In respect to Science area, these were the guidelines:

- Try to start the units taking into account the knowledge they already have. Ask them collectively to organize the contents (content maps, diagrams….).
- Use the game as a natural way for children to get the knowledge.
- Try to practice before any writing activity making simple experiments. In Second Cycle they can start with the scientific method of prediction, hypothesis, deduction and conclusion in every simple experiment.
- Ask the students for a final task at the end of the unit. A booklet is a good option as a final task but there are other ways like a Power Point presentation in Third Cycle, an oral presentation, a poster, diagrams…
- Plan to have the visit of an expert (parents) once or twice a year to enrich the contents.
- Let students know the goal at the beginning of the lesson or topic (what am I learning today).

So, as it can be seen, school underlines the importance of enquiring and scientific skills, giving students the chance of reaching an awareness of their learning. All these advices given and having the previous references, specially the ones set by MEC-British Council, taking decisions for my project design was not a hard task.

7.1.2. Group description

The class I was working with was year 4ºB and its tutor, María, was the teacher in charge of Science subject and my mentor during the internship. This class had 25 students, although one of them was usually out of the classroom during the English lessons, so actually the lessons were given to 24 students.

They were all between 9 and 10 years old, with different backgrounds, since some of them belong to families which come from other countries. There were 3 clear levels of attainment between them, being the most common the students in the intermediate one. Although some students needed extra explanations and reinforcement on some concepts, all of them could follow the lessons. They got on well with each other, but there were some special cases of students who did not have many friends, or seem to be really shy, not even participating in the lessons at all, when like a 85% of the students usually offered themselves as volunteers to participate.

The total amount of time assigned to the Science area was 4 hours and 45 minutes per week, being one of these hours used for computers work.

7.1.3. Classroom context

The classroom was placed in the second floor of the building. It was not very big, but the space for tables, cupboards and shelves was enough. Students were sitting along with another partner, and this, changed every month.

On the left side there were three cupboards, in which students kept their portfolios. There were also some old projects and teacher´s stuff. At the back, the coat hangers were placed and the so called "computer area". There was one computer, which was used to check some information or to play in groups by turns.

Around the classroom we could find different displays, such as the classroom rules, o others related to previous units: posters of animals, food pyramid, language spelling rules, etc.

7.2. UNIT[9]

[9] The complete unit has been added in the Appendix, since it includes extensive information about the objectives, outcomes, lessons and activities.

The Unit carried out during the training period was "Matter". This was the 8th unit in the schedule set by the teacher, corresponding to the students' book.

7.2.1 Timing

It was divided into 9 lessons, adding an extra one for the exam (being the last two ones almost fully dedicated to review). The first lesson was given on the 5th of March and the unit (exam included) was finished on the 21st of March.

7.2.2. Process design

The mentor teacher, María, suggested choosing "Matter" as the Unit to work with, since it was the last unit in which it was possible to work with many practical experiments and activities.

The Unit was mainly developed through the book (MacMillan Science book), so it was taken as a main reference in order to establish a sequence of lessons and ordering the different contents through 9 lessons. The lessons were not fully developed and planned at the beginning; the contents were just divided so it was possible to have a general view of the unit in order to check in which lessons the experiments, the review, etc, would be carried on.

The main objectives for Matter unit are the following:

1. Recognize the characteristics of the three states of matter.
2. Differentiate between physical and chemical changes.
3. Classify mixtures as heterogeneous or homogeneous.
4. Identify some properties of materials.

In order to develop these concepts and to help students in the acquisition of the knowledge of this Physics topic, these were the experiments designed in correspondence to the objectives.

These experiments were carried out after explaining the "theory" concepts, and students were able to touch the materials and even being part of the experiment as volunteers. There was also a method followed which implies the use of an experiment sheet, which will be explained and showed later on.

1. States of matter- experiment: solid, liquid and gas. This experiment was carried using a balloon, water and an orange, as representative of the three states of matter (liquid, solid and gas). With the help of these materials we could appreciate the differences in their shape, volume, weighs and placing the objects in different containers and eventually, differentiate the properties of the three states.
2. Physical/chemical changes experiment: With different materials (plasticine, butter and coffee) we observed the changes in their position, shape or temperature. Then, with an apple and a toast we could appreciate than burning or exposing some elements to air leads to the creation of a new substance.
3. Mixtures experiment: In order to differentiate heterogeneous and homogeneous mixtures we mixed different materials with water. Then, we observed what kind of mixture was formed and if it was possible to separate the substances. This led to another experiment, which purpose was being able to separate the elements of a heterogeneous mixture with the use of specific tools (a filter in this case).
4. Properties of materials experiments: This time though an online game-exploring activity we could investigate about the resistance, transparency, impermeability and flexibility of different materials (paper, glass, rubber, fabric, metal) and relating these properties to the use we give to some objects. Associated to this, we carried on a team enquiring experiment. Kids had to discover why pans are usually made of metal but their handle is made of wood or plastic.
The key language which was used throughout the unit and specially for the experiments was introduced during the lessons and reinforced with the practical activities and the Word-bank activity.

- Vocabulary: shape, volume, mass, volume, substance, physical/chemical change, mixture, heterogeneous, homogeneous, expand, burn, freeze, heat, bend, squash, stretch, twist, dissolve, elastic, rigid, flexible, resistant, fragile, conductor, insulator, transparent, opaque, waterproof, manufactured, natural.

- Structures: give opinion, describe an object, experiment…

  - First, next, after, finally…
  - I can see…I think… Have/has, don´t have/doesn´t have…

- Why…? Because…
- It´s made of… It comes from…
- It´s possible / It´s not possible…

7.2.3. Resources used in the unit

- BBC Games[10]: These activities were carried on in the audiovisual room. Since not always is possible to bring experiments into our classroom, we can also experience Science with the help of technology. These animations were used to associate different materials with their characteristics. Every kid tried it at least once and had to predict what would happen before interacting with the materials.

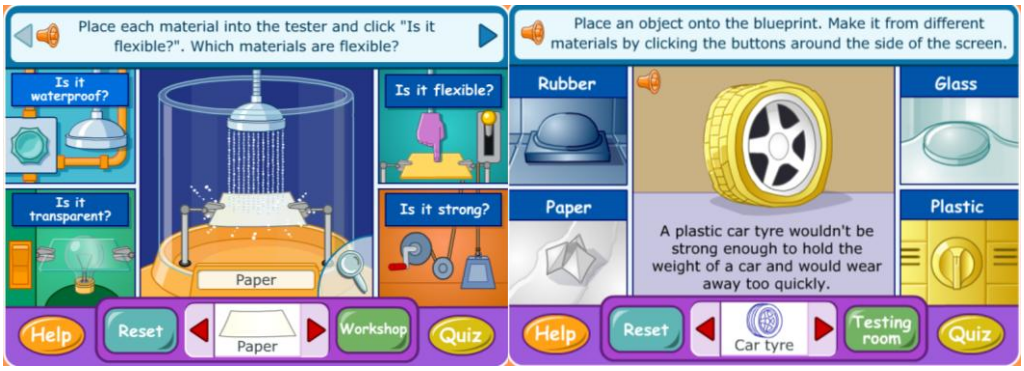

Figure 6: BBC Science materials flash games

- Physical/chemical changes sheet:

Since the concept of chemical change was not very clear, even after the experiments done in which will help them to discover new

[10] BE
scient
http:/ cs_materials_fs.shtml

class, I tried to reinforce it with this sheet. Students, by their own, had to create their diagram of physical/chemical changes associating these changes with the actions in the pictures.

Figure 7: Change in matter activity sheet

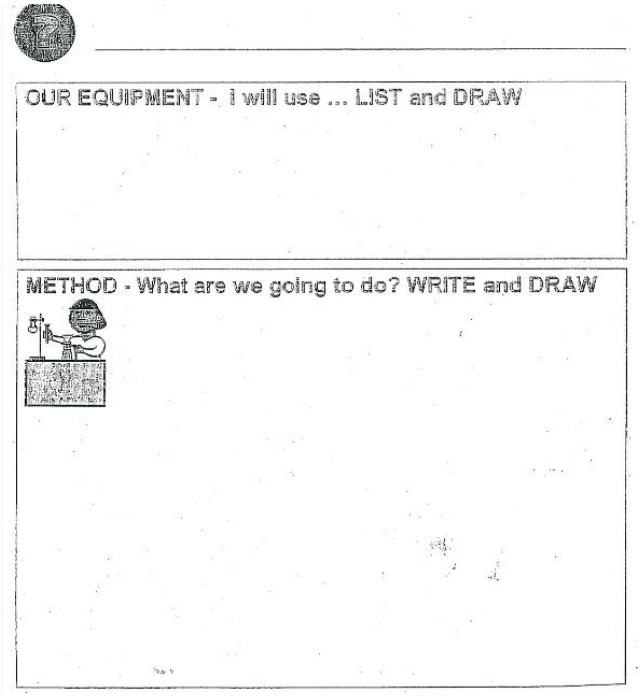

Figure 8: Experiments sheet

- Experiments sheet:

This was the most important resource used in the classroom for the development of experiments. Children had been working with it for months, so they were already used to it. Every experiment should start with a question, something we want to know. This question had to be written at the beginning of the sheet. Once we had the question, we could start observing.

The elements used in the experiments, drawing and naming them. The final task was to go through the different steps of the experiment, describing them in a simple way and adding a picture of each step (most of the pictures included the previous pictures of the equipment used). This sheet was never written before the experiment was performed, and even though kids were supposed to fill them by their own, to reflect on what they had seen, the enquiry question had to be provided by me and it was necessary to offer them guidance, specially in the method description.

- Show and tell: It is purposed as one of the most effective ways to deal with different skills in the classrooms, especially with the oral ones, in which pupils are often in need of more support. According to a given topic, or not, pupils

carry out a kind of project, in which they will explain something to the rest of the classroom. This is the main objective of this task, to be able to perform an oral presentation in front of others, in which kids can share their work, exposing themselves to the opinions and questions of their classmates. It also promotes their investigation and planning skills, in order to find information, organize it and present it by their own.

In Tello Téllez, students are used to perform Show & tell in Literacy, but this time the idea of combining a Science project with this activity seemed totally logic. The project they were given was to choose an object they had at their homes or something they used daily, and to explain the materials that composed it and their characteristics.

- Language Portfolio[11]: It is a document brought by European Council, in which those who are learning or have learned one or more languages - whether at school or outside school - can record and reflect on their language learning and intercultural experiences.

It consists of three parts, but the students in this classroom were using just the "dossier". The dossier is the specific place to keep all kind of projects, audio, videos, slides, etc that the producer is proud to show.

Personally, I found "Language Portfolio" as one of the most useful tools used in the classroom, since its usage reports many benefits. First of all, students are able to keep their written projects in a specific place, under specific "rules" set by the teacher, or the teacher and the students all in common (for example, every project kept in the portfolio must be written in a clear way, using some of the structures, vocabulary, topics of the unit). Then, we can associate these written tasks with oral activities, as students did in this unit, in which students show their projects to their partners, and they give their opinion about the topic, the

[11] http://elp-implementation.ecml.at/

composition, and even if the project is good enough to be included in their portfolio (kids will work hard to improve their work and they will be able to use several skills). Moreover, students can see that their effort is appreciated by the whole classroom and feel proud of their work.

- Quiz: The quiz, which was prepared with the objective of being an assessment tool to track the progress of the students with problems, ended being one of the activities kids enjoyed the most. It was presented under the format of "Who wants to be millionaire" show. We did the quiz in the audiovisual room. Each student had a piece of paper in which they had to write the answers. After doing this, we all checked the answers.

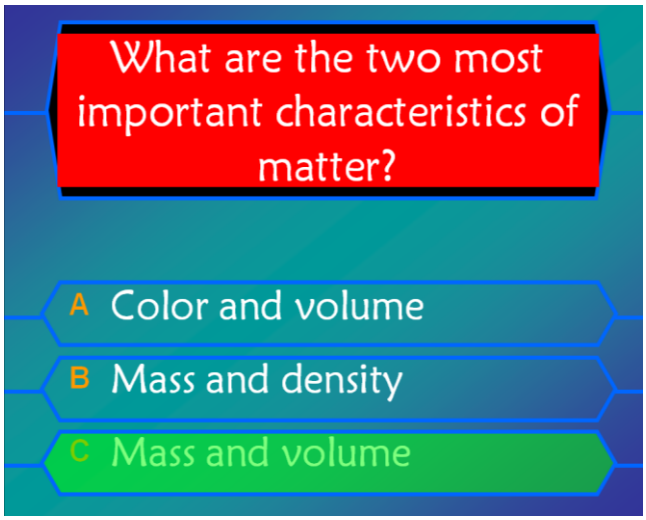

Figure 9: Who wants to be a millionaire? Quiz

They got really excited with this activity and participated offering their answers which were right most of the times.

- Wordbank: This activity consists on a dictation of 10 words that imply a difficulty in their spelling but that they have been working with throughout the unit. It is mainly used to evaluate them but also to give them the chance to learn from everyone´s mistakes, since the words are reviewed all together in the blackboard. The words for this Unit´s wordbak were the following:

- Stretch
- Physical change
- Freeze

- *Substances*
- *Heterogeneous*
- *Recycle*
- *Manufactured*
- *Waterproof*
- *Clay*
- *Steam*

- Exam[12]: Even when the evaluation is done according to the performance of the students in the quiz, wordbank, daily questions and homework, there is a necessity of a fair exam, mainly because the parents want to see specific results. The design of the exam was done in base to the activities of the unit and the concepts that were worked and repeated daily.

8. SCIENCE REFERENCES

These are some of the main online references available for Science teaching for both teachers and students, including resources, guidelines and even complete units fully developed. The support they can offer, specially for beginner teachers, makes them an important source of information and reference for our work.

- BBC for key stage 2 Sciences http://www.bbc.co.uk/bitesize/ks2/science/
- Fossweb – research based curriculum: http://www.fossweb.com/home

[12] The exam is included in the Appendix.

- Standards site: http://webarchive.nationalarchives.gov.uk/20090608182316/standards.dfes.gov.uk/schemes3/

- School videos: http://www.schoolsworld.tv/

9. CONCLUSIONS

9.1. CONCLUSIONS ABOUT MY PERFORMANCE

General Feedback (given by Mentor teacher after the lessons):

- The "movement" activities are good because children focus their attention and participate more but we have to pay a lot of attention to the pupils with special educational needs or otherwise they can be left apart.

- Whenever there´s a text that has to be read, it has to be done it by teacher, first, or later, in order to correct the possible pronunciation mistakes that could appear.
- In the activities related to vocabulary, when there are new words which may be difficult, we can rather ask the old ones which all students should know to students who show some learning problems at the unit.
- A very important thing is thanking the students when they participate and answer to questions and also motivated them (well done! very good!) which is something we have to do always.
- After 10 minutes working on the same activity kids almost didn´t pay attention, so I learnt that there must be a continuous change in the activities, and also they must be different (alternating speaking and writing) so kids keep on working without getting tired.

Lesson 1:

- The CD was not searched at the beginning of the lesson, so I changed the order of 2 activities, having then some time to check it while kids were busy. Even when I should have prepared the CD before, it was actually a lucky mistake because the fact of changing the activities made children to calm down (since they first were doing a relaxed activity, coloring and creating) and then, when they had the listening, they were ready to pay attention.
- The explanations I gave should have been a bit longer; at the end of the lesson there were 5 remaining minutes. And anyway, when explaining something for the first time, we need to repeat as many times as possible, because even when kids say they all understood, there are for sure several who did not.

Lesson 2:

- At these first two lessons, the biggest problem was the "pace" of the lesson. Both were fast, and in this one again, the review from the previous day should have lasted longer. After the 3rd lesson, I think it was easier to adapt to the correct pace and there was no time left or missing time and I felt also like the explanations took the right time.

So at this lesson:

- The review was too fast.
- I realized it is necessary to follow a good order or follow some pattern to control that every single kid touches the things related to experiments, sometimes just going table by table is not enough, and also takes a lot of time.

Lesson 4:

There was a new element included in this lesson: the "visit" to the audiovisual room. Adding this element made me realize that when you include different activities from the common ones that students are used to do, you really need to prepare every single detail very well, and also control students so they do not get over-excited.

- In the audiovisual room there was too much noise and excitement from the students which did not help to manage the activity in a correct way. It was very hard to make all the students be quiet and take the activity in a serious way, because it was planned as a kind of game in order to make it more interesting for them.

- There must be also a “huge” control before going to audiovisual room and after, since we had to move to a different floor, and if all students talk or run in the corridors we will bother the other classrooms. Until everyone was quiet and in a queue, we could not go back to class.

- In this lesson I also learnt that if we want kids to correct something they have done (in this case, the little quiz at audiovisual room) we always need to ask them to swap their papers, notebooks (whatever they have use) with their partners, otherwise, they try to “cheat” and we won´t get clear information about how are they doing. (This was also applied later, at the Word bank before the exam; since we need to register their punctuations and a true result is required).

Lesson 5:

After having the feedback from this lesson, I realized that even when you think you have everything “under control”, that is almost impossible. There are many things which have to be taken into account when teaching; sometimes it seems impossible that a teacher can have so many things internalized, managing a classroom without skipping any important thing.

- The lesson was well planned and organized, but children are used to make each experiment in a specific experiment sheet, and we mixed two different experiments in one, since they had pretty much to do with each other. There was a confusing moment when they did not know which page in the book they had to be looking at to follow the steps of the experiment. I forgot to explain them at the beginning that they were doing two experiments in one. This was a big mistake.

Lesson 6:

At this point, I had the chance to apply several advises and “tricks” learnt from previous lessons. We used again the audiovisual room, and this time there was a big improve, and also at the “corridor” moments before and after going there.

- When kids read, we have to pay a lot of attention to the pronunciation, if one mistake is skipped, after some days half of the classroom is having the same mistake. So correcting the pupils whenever they are mistaken is necessary (also checking all the

“difficult “words before teaching, since we can also make mistakes, especially with weird or new vocabulary).

- A continuous attention is needed at audiovisual room so there is never a high volume and nobody complains. This time was much easier to control the noise and in general, kids´ behavior and the time needed to make the queue to go downstairs back to our classroom.

Lesson 7:

This lesson was not the only one in which I had to make some changes based on the lack of time (because of external reasons), so after several rearrangements it is not difficult to prepare some exercises per lesson that we can use in case there is extra time, or omit/give as homework if no time left for more things.

- In this lesson, the review took very long, around 15 minutes. Normally, reviews do not last that long, but this time, since exam was coming not far (and based on the results of the quiz we had at the audiovisual room) I really wanted to check if the students who got lower points were really studying for the future test.

As a general reflection, I think children, and even I enjoyed many of the activities proposed. Especially the ones which were planned with the intention of being appealing, like the BBC games or the quiz at the audiovisual room. I also tried to alternate the type of activities, and include some group ones.

Not all the activities from the book were done; some of them were left apart, because I didn´t find them useful enough. Although it presented the contents in a clear way, offering the chance to carry out different experiments, images, mind map at the end of the unit, a project for their portfolio, etc., not all the activities were suitable, so those repetitive ones were skipped.

Also some contents were explained on a different way, with many more examples to make sure all the students understood everything. The unit in general took longer than expected, like 2 lessons more, because of the review that was necessary had to add.

For experiments (which were the best part of the unit) it was necessary to prepare many materials, some of them were provided by school canteen, like glasses or ice. Many things were planned, but not all of them were always used: in one of my lessons I forgot to include two elements in the explanation of the changes of state, after having prepared the materials. So, in my opinion, a good use of resources was not done 100%.

9.2. CONCLUSIONS OF THE PROJECT

There are not many studies or statistics with clear results in concern to bilingualism although the feedback offered by institutions, teachers, students and families is in general very positive, supporting the continuity of these kind of programs in primary education schools. Therefore I will just reflect the conclusions I got from my own experience.

Measuring the results just in numbers, it could be said that project was successful. Out of 24 students, just 4 failed the exam, one of those being really close to pass. More than half of the students obtained good results in the test and 6 of them were outstanding. In their daily performance I would say that a 90% of the students were at least in second band of attainment, this meaning that most of the objectives were achieved.

In general terms, their attitude was exceptional, showing a great interest and enthusiasm in every task and with every material. The use of realia, technologies and things they could touch and see, made them pay more attention. Thanks to the experiments, which they love, they could relate them to the concepts being taught. In fact it's a way of teaching in a "subliminal" way, they do not even realise they are being taught things because they are really enjoying the activities. Some students had wrong ideas about Physics phenomenon and when they saw the experiments they could not even believe what was happening and they got really impressed and more curious. One of the strongest points of the project was the presence of a wide variety of materials and examples when carrying the activities, which helped students to understand everything easier.

If I could apply the project again adding some changes according to the results of this experience, I would definitely give them more freedom to carry on experiments by their own or just by participating more actively. However, spaces and, mainly, time limitations make sometimes things impossible to be applied the way we want. Also, I would like to be able to get more rid of the theory in the lessons. Even though I know it is necessary, it has still a great importance in our classrooms, bigger than the one given to practical experiences.

It is also necessary to enhance enquiry skills making them think, reflect and realize what the knowledge they are acquiring is, the reason why they are doing one activity or another. I think this project specially lacks that. Most of the students and teachers, me included, are not used to it; therefore it is really hard to connect ideas later on and to be able to solve our problems, not to mention we are then omitting one of the core elements of scientific method and Science teaching in British Council Schools.

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11. APPENDIX

Lesson 2: 7th March

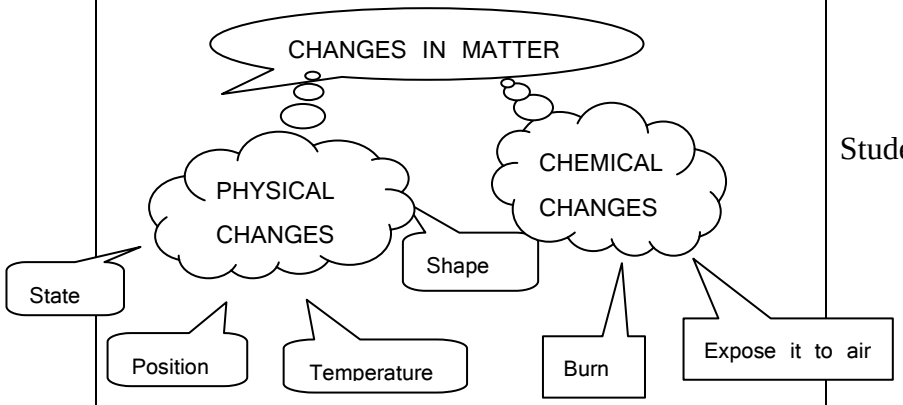
Learning objectives	Learning outcomes	Evidence for Assessment
- Identify the ways in which matter can change: the physical and chemical changes	Be able to: - Distinguish between physical and chemical changes - Use a mind map as a way to summarize the information	Kids will: - Use plasticine to experience how matter changes, by bending, twisting, stretching or squashing - Create a mind map on their notebooks that summarizes the contents of the lesson

Outline of leading activities

Checking homework – Introducing the experiments: coffee, butter & apple – Review: volunteer + ex4 p91 - Changes in matter: (a) physical changes: plasticine; (b) chemical changes: apple – Mind map – Rap - Copy homework

	Timing	Grouping	Pupils	Teacher	Materials/ Resources
Classroom Management	2’	Greetings	Say good morning and get ready to start	Say good morning	-
	3’	Check homework	Show that they did the title of the unit in their notebooks	Check that the students did the title of the unit in the notebook	Students’ notebook
	7’	Coffee and butter	Will listen to the teacher and will answer her questions. Two of them will be taken as volunteers	Will ask to pupils to come to the front and tell the group: *How is the coffee? How is the butter? (The coffee is really hot; the butter is solid and quite hard).* Will show them an apple and will cut it in a half Will tell them that *We will look at all of them again later*.	Warm coffee and a piece of butter Apple and knife

5’	Review	A volunteer will be asked to come to the front of the classroom. With the materials from the previous day (Tupperware, bottle, water, orange and balloon), will explain the concepts of solid, liquid and gas related with shape and volume. The rest of the group will listen	Will ask a student to go to the front of the class and explain what s/he learnt the previous day. Will help him/her with the materials from the previous day - *What is the unit about?* - *What is matter?* - *Where can we find matter? (In everything we can touch, taste or smell)* - *What are the three states of matter?* - *What can you say about…? Show us with the experiments!* *Solids (have a definite shape and volume)* *Liquids (have definite volume, but don’t have a definite shape)* *Gases (don’t have a definite shape or volume)*	Balloon Orange Tupperware and bottle Water
3´	Ex4 p91	Will do the exercise on the book, will correct it (orally)	Will check that they are doing it, will correct it	Students´ books and notebooks
5´	Introduction *Changes in matter*	Will listen to the explanations of the teacher, answering her questions and interacting with her	Will explain that, although we said that solids have definite shape and volume, they can change if we apply a *force*. Will give several practical examples: *Are they still the same object? Yes!* - *Book:* Changes the position - *Butter: changes the state* - *Coffee: changes the temperature* - *Plasticine: changes the shape*	Book, butter, coffee and plasticine
10’	Introducing the *Physical changes*	Will experience with a piece of plasticine each, following the instructions of the teacher	Will give the plasticine to the students, and will ask them to *stretch, squash, bend or twist* it to change its shape	A piece of plasticine for each student
5´	Introducing the *Chemical changes*	Will observe the changes that happen with the toast	Will show the students a burnt toast and the cut apple: a chemical change. Will explain that in a chemical change, the changes are irreversible.	Burnt toast and cut apple

	5’	Read book paragraphs	Will listen to the teacher reading the text (p92), and some volunteers will read after her	Will read the text and will ask for some volunteers to read it after her	Students´ book
	8’	Mind-map	Will copy after the teacher the mind-map from the blackboard, about physical and chemical changes	Will copy on the blackboard the mind-map about physical and chemical changes 	Students´ notebook
	5’	*Changes in matter* rap	Will cut and glue the copy from the *Changes in matter* rap. They will listen and try to sing the song	Will hand out a copy of the rap lyrics. Will play the song and sing it, to encourage them to do the same	A copy for each student of the rap. CD, player
	2´	Greetings	Will write down on their notebooks the homework (write the sentences on their notebooks of the ex4 p91, study). Will tidy up and will get ready for the next class, and will say good-bye to the teacher	Will ask the students to tidy up and get ready for the next class. Will say goodbye to the pupils	Students´agendas

Assessment Criteria

All children must be able to - Identify when do physical changes happen - Identify the difference between physical and chemical changes	Most of the children will be able to - Give examples of when physical changes happen	Some of the children could - Sing the *Changes in matter* rap

Lesson 3: 8th March

Learning objectives	Learning outcomes	Evidence for Assessment
- Identify the ways in which matter can change: chemical changes - Summarize on a paper the characteristics and steps of an experiment	Be able to: - Distinguish between physical and chemical changes - Use a mind map as a way to summarize the information	Kids will: - Identify by seeing examples what a chemical change is - Create a mind map on their notebooks that summarizes the contents of the lesson

Outline of leading activities

Checking homework – Review - Experiments: toast and apple – Changes in matter: (b) chemical changes – Mind map – Rap - Copy homework

Classroom Management

Timing	Grouping	Pupils	Teacher	Materials/Resources
2´	Greetings	Say good morning and get ready to start	Say good morning	-
6´	Homework	Will show the notebook to the teacher. Will correct the exercise	Will check if they all did the homework. Will correct it	Students´ notebooks
10´	Review	A volunteer will be asked to come to the front of the classroom. S/he will answer the questions of the teacher. The rest of the group will listen	Will answer questions about the unit, similar to the previous day.	-
25´	Experiment *What chemical change happens to the apple and the toast?*	Will cut and glue the experiment worksheet. Will follow the *scientific method* to do the experiment. Two of them will help in the development of the experiment, while the rest listen and take notes.	Will ask the two helpers to come and do the experiment Will ask the helpers to cut an apple on a half. Will compare it with the apple from the other day. Will ask the helpers to toast a piece of bread. Will observe and comment what happens.	Toaster, bread Apple, knife

15´	Rap	Will cut and glue the copy from the *Changes in matter* rap. They will listen and try to sing the song. Eventually, they will create dancing steps to mime the song	Will hand out a copy of the rap lyrics. Will play the song and sing it, to encourage them to do the same Will ask them to create a choreography to dance while they sing the song	A copy for each student of the rap. CD, player
2´	Greetings	Will write down on their notebooks the homework (finish the exp. worksheet, and 2exs). Will tidy up and will get ready for the next class, and will say good-bye to the teacher	Will ask the students to tidy up and get ready for the next class. Will say goodbye to the pupils	Students´ agendas

Assessment Criteria

All children must be able to - Identify when do a chemical changes happen - Identify the difference between physical and chemical changes	Most of the children will be able to - Give examples of when chemical changes happen	Some of the children could - Sing and mime the *Changes in matter* rap

Lesson 4: 12th March: REINFORCEMENT AND REVIEW

Learning objectives	Learning outcomes	Evidence for Assessment
- Be gradually aware of the contents that are learning	Be able to: - Recapitulate knowledge from the unit	Kids will: - Answer correctly most of the items of the Quiz

Outline of leading activities

Homework – Review - *Who wants to be a millionaire?* Quiz - Goodbye

Mana	Timing	Activity	Pupils	Teacher	Materials//Resources
	2´	Greetings	Say good morning and get ready to start	Say good morning and get ready to start	

5´	Homework	Will show to the teacher that they did the homework. Will correct it	Will check that all the students did the homework. Will apply the rewarding system, if necessary. Will correct the homework	Students´ notebooks
15´	Review	Some of them will be asked to review the unit, answering to the teacher´s questions	Will ask questions to some students, about the whole unit (*see the review of lesson 2):* About physical and chemical changes: - *What is it?* o *A physical change is when matter changes shape or state* o *A chemical change is when a new substance is produced* - *When does it happen?* o *It happens when we (6) heat, freeze, bend, twist, stretch or squash a substance* o *It happens when we burn a substance or expose it to air* - *Example* o *Water cycle/Butter* o *Apple/Toast*	-
25´	ICT: Quiz	Will answer all the questions of the text in a piece of paper. Will be able to look at the presentation twice. Will correct each other's´ tests	Will display the *Who wants to be a millionaire?* Quiz – power point presentation Will check with the students the right answers	Digital board (room) *Who wants to be a millionaire? PPT*
2´	Greetings	Will go back quietly to the classroom. Will say good-bye to the teacher	Will go with the students downstairs, ask them to tidy up and get ready for the next class. Will say goodbye to the pupils	-

Assessment Criteria

All children must be able to	Most of the children will be able to	Some of the children could
- Answer correctly all the questions of the text but four	- Answer correctly all the questions of the text but two	- Answer correctly all of the questions of the quiz

Lesson 5: 13th March

Learning objectives	Learning outcomes	Evidence for Assessment
- Identify the differences between homogeneous and heterogeneous mixtures by experimenting	Be able to: - Describe mixtures - Classify mixtures as heterogeneous and homogeneous - Know a practical activity to separate the substances in a heterogeneous mixture	Kids will: - Identify what kind of mixture is formed in every situation - Register on the Worksheet the Experiment

Outline of leading activities

Review – Experiment 1 (homogeneous & heterogeneous mixtures) – Experiment 2 (separating substances of a mixture) – Homework

	Timing	Grouping	Pupils	Teacher	Materials/ Resources
Classroom Management	2´	Greetings	Say good morning and get ready to start	Say good morning and get ready to start	-
	3´	Review	Some of them will be asked to review the unit, answering to the teacher´s questions	Will ask questions to some students, about the whole unit	-
	5´	Introducing the *mixtures*	Will listen to the teacher and answer her questions. Will read after the teacher the text of the book p93	Will explain the students what a mixture is, by asking them several questions. Will read the text of the book (p93), and then will ask some of them to read after her.	Students´ book

	20´	Experiment 1: *What mixture is formed?*	Will cut and glue the experiment worksheet. Will follow the *scientific method* to do the experiment. Two of them will help in the development of the experiment, while the rest listen and take notes.	Will ask the two helpers to come and do the experiment. Will mix the water, in the different glasses with different substances Will observe the results and comment it whit the group: *Is it a homogeneous or heterogeneous mixture?*	Glasses, water, spoon, sand, bread, sugar, plasticine, salt. Students notebooks
	10´	Experiment 2: *How can I separate substances in a heterogeneous mixture?*	Will look at the experiment. Will copy the exercise about mixtures.	Will ask the two helpers to come and do the experiment. Will mix sand and water, and will try to separate them afterwards. Will observe and comment the result. Will copy the exercise on the board: - *Complete the text about mixtures:* *When we mix sand with _____ we make a _____mixture.* *The substances <u>can / can't</u> be separated, for example, by pouring the mixture through a newspaper.* Will correct the exercise	Sand, water, glass, newspaper Students' notebooks

10´	Homework	Will copy from the blackboard two exercises	Will copy on the blackboard two exercises of reinforcement: 1- *Circle T (True) of F (False). Copy the sentences and correct the ones that are false* - *Salt water is a homogeneous mixture because it isn't possible to see the different substances T/F* - *Air is a heterogeneous mixture because its easy to see the different substances T/F* 2- *Answer the following questions about mixtures* - *What is a mixture? (It´s something that contains two or more substances)* - *In which type of mixtures can we see the different substances?* - *In which ones can´t we see the different substances?*	Students' notebooks
2´	Greetings	Will write down on their notebooks the homework (complete the experiment worksheet and the exercises). Will tidy up and will get ready for the next class, and will say good-bye to the teacher	Will ask the students to tidy up and get ready for the next class. Will say goodbye to the pupils	Students' agendas

Assessment Criteria

All children must be able to - Identify when a mixture is homogeneous and when it is heterogeneous	Most of the children will be able to - Predict when a mixture is going to be homogeneous and when it is going to be heterogeneous	Some of the children could - Think about other ways of separating the substances in a heterogeneous mixture

Lesson 6: 14th March

Learning objectives	Learning outcomes	Evidence for Assessment
- Understand why certain materials are chosen for certain purposes - Identify some properties of materials - Classify some materials according to their properties	Be able to: - Identify some properties of materials - Classify some materials according to their properties	Kids will: - Identify and fill in the exercise about the materials and their properties

Outline of leading activities

Homework – Review – Poster – Brainstorm – Exercise – Grid

Classroom Management

Timing	Grouping	Pupils	Teacher	Materials/Resources
2´	Greetings	Say good morning and get ready to start	Say good morning and get ready to start	-
10’	Homework	Will show to the teacher that they did the homework. Will correct them (ex 1, 3 p93)	Will check that all the students did the homework. Will apply the rewarding system, if necessary. Will correct the homework	Students’ notebooks
5’	Review	Some of them will be asked to review the unit, answering to the teacher´s questions	Will ask questions to some students, about the whole unit	-
15’	Introduce the lesson: *Materials and their properties*	Will listen and answer the questions of the teacher	By sticking a poster on the board, will start a dialogue with the group about the materials and their properties. Will talk about the objects and the materials they are made of	Materials poster
5’	Read	Will read, after the teacher, the text of p95 A volunteer will write down on the board the properties of the materials that appear on the text, with the help of the group, as a brainstorm activity	Will read the text of page 95. Will ask for a volunteer to create on the board a brainstorm entitled *Properties of materials*	Students’ books

10’	Exercise	Will do the exercise written on the board by the teacher. Will go out to the board in turns, to write the correct answers in order to check the exercise	Will write down on the board: *Look at the pictures a-j. Write the name of the objects and the material they are made of* *Ex. A) A snorkel is made of…*	Students’ notebooks
2’	Grid	Will cut and glue the grid about materials and their properties	Will hand out the grid about materials and properties	One grid per student
2´	Greetings	Will write down on their notebooks the homework (fill out the grid). Will tidy up and will get ready for the next class, and will say good-bye to the teacher	Will ask the students to tidy up and get ready for the next class. Will say goodbye to the pupils	Students’ agendas

Assessment Criteria

All children must be able to - Identify all the materials of the lesson	Most of the children will be able to - Identify all the properties of the materials	Some of the children could - Identify why some materials are useful for certain purposes

Lesson 7: 15th March

Learning objectives	Learning outcomes	Evidence for Assessment
- Identify the origin of some objects and material - Describe how paper is manufactured - Participate in group activities, showing a responsible behaviour	Be able to: - Recognise that materials can be of plan, animal or mineral origin - Classify material as being of plant, animal or mineral origin - Describe how paper is manufactured	Kids will: - Classify materials into man-made or artificial - Recognise the origin of materials (plants, animals or minerals)

Outline of leading activities

Big review – homework – group activity (pans) – natural and manufactured materials – Look at your clothes! – How paper is manufactured?

Classroom Management

Timing	Grouping	Pupils	Teacher	Resources
2´	Greetings	Say good morning and get ready to start	Say good morning and get ready to start	
12´	*Big review*	Some of them will be asked to review the unit, answering to the teacher´s questions	Will ask questions to some students, about the whole unit: *Matter, states of matter, physical and chemical changes (what-when-example), mixture, classification, define homogeneous and heterogeneous mixtures-examples;* using the poster: *materials and properties*	Materials poster
5´	Homework	Will show to the teacher that they did the homework. Will correct them (ex 1, 2 p100, and grid)	Will check that all the students did the homework. Will apply the rewarding system, if necessary. Will correct the homework	Students´ notebooks

10´	Group activity	Will work in groups, discussing *why pans are usually made of meat with a handle made of wood or plastic*. Will share their opinions with the group.	Will organize the students in small groups and ask them to do ex4 p95.Will walk around, checking that students	Students´ notebooks
10´	Introducing the lesson *Natural and manufactured materials*	Will listen to the teacher and eventually will answer to her questions	Using the poster, will explain the differences between natural and manufactured materials *Identify some materials that come from the nature and some that are man-made.* *Do you remember how we call the materials that come from nature? And the man-made ones?*	Materials poster
5´	Read the text	Will read, after the teacher, the text p96	Will read the text, p96	Students´ book
5´	Look at your clothes	Will look at the labels on their clothes to see what materials they contain.	Will ask the students to look at the labels of their clothes to see what materials they contain. Will ask them to share the information with the class	Students´ clothes
5´	*How paper is manufactured*	Will listen to the teacher and will order the pictures of the book, p96	Will as the students to listen to the explanation of how paper is manufactured, to punt in order the pictures of p96	Students´ book
2´	Greetings	Will write down on their notebooks the homework (Science Project, p99; ex2 p96, study for the word-bank) Will tidy up and will get ready for the next class, and will say good-bye to the teacher	Will ask the students to tidy up and get ready for the next class. Will say goodbye to the pupils	Students´ agendas

Assessment Criteria

All children must be able to	Most of the children will be able to	Some of the children could
- Distinguish between materials according to their origin	- Identify general features of manufactured and natural materials	- Retell how paper is manufactured

Lesson 8: 19th March

Learning objectives	Learning outcomes	Evidence for Assessment
- Participate in group activities, showing a responsible behaviour - Recognise the importance of the 3Rs: reduce, recycle and reuse	Be able to: - Recognise the importance of the 3Rs: reduce, recycle and reuse - Give practical examples of how to carry out the 3Rs	Kids will: - Give at least three ideas per group about how to take into practice the 3Rs.

Outline of leading activities

Homework – Review – *How paper is manufactured?* – The 3Rs – Group work

	Timing	Grouping	Pupils	Teacher	Resources
15	2´	Greetings	Say good morning and get ready to start	Say good morning and get ready to start	-
	5´	Review	Some of them will be asked to review the unit, answering to the teacher´s questions	Will ask questions to some students, about the previous lesson: *How do we call materials that come from nature? Where do they come from? Examples, How do we call the ones that are transformed in a manufacturing process? Examples.*	-
	5´	*How paper is manufactured?*	Will do ex4 p96 on their notebooks	Will ask the students to do ex4 p96 on their notebooks	Students´ notebooks and books
	10´	Introducing the 3Rs	Will listen to the teacher´s explanations and will answer her questions	Will explain where does the expression 3Rs comes from, why is it important, and will make the students think about some practical ways of reducing, reusing and recycling	Students´ notebooks

25´	Group work: The 3Rs	Will work in groups, discussing and thinking about possible ways of recycling, reusing and reducing. Will write down the best examples they can find Will share them with the group. Each one of them, will write down at least one idea for each "R", the one they like most	Will explain the students the activity. Will organize the students to work in groups. Will supervise they understood, and their work Will correct in the blackboard, writing the best ideas the different groups give (at least once from each group).	Students´ notebooks
2´	Greetings	Will write down on their notebooks the homework (p96 ex2, p95 ex4). Will tidy up and will get ready for the next class, and will say good-bye to the teacher	Will ask the students to tidy up and get ready for the next class. Will say goodbye to the pupils	-

Assessment Criteria

All children must be able to - Understand the importance of the 3Rs - Give an example of how to reduce, reuse and recycle in their daily lifes	Most of the children will be able to - Give more than one example of how to reduce, reuse and recycle in their daily lives	Some of the children could - Define what recycling, reducing and reusing are, and why are they so important in our society.

Lesson 9: 20th March

Learning objectives	Learning outcomes	Evidence for Assessment
- Be aware of the vocabulary learnt throughout the unit, and the importance of writing it properly - Understand a listening story	Be able to: - Synthesize the vocabulary of the unit in the wordbank - Understand the most important information of a listening text	Kids will: - Write properly at least 5 words of the wordbank - Answer correctly the questions about the listening activity

Outline of leading activities

Homework – Review – Wordbank – Listening – Science Project presentation

Classroom Management

Timing	Grouping	Pupils	Teacher	Resources
2´	Greetings	Say good morning and get ready to start	Say good morning and get ready to start	
5´	Homework	Will show to the teacher that they did the homework. Will correct them (p96 ex2, p95 ex4).	Will check that all the students did the homework. Will apply the rewarding system, if necessary. Will correct the homework.	
10´	Review	Some of them will be asked to review the unit, answering to the teacher´s questions	Will ask questions to some students, about the previous lesson, the 3Rs	-
15´	Wordbank	Will write on their notebooks the Wordbank of this unit, copying the words the teacher is dictating Will correct it, and will tell their mark to the teacher "*Seven out of ten", etc.*	Will dictate the 10 words of the Unit Wordbank: 1- *Stretch* 2- *Physical change* 3- *Freeze* 4- *Substances* 5- *Heterogeneous* 6- *Recycle* 7- *Manufactured* 8- *Waterproof* 9- *Clay* 10- *Steam*	

			Will correct it with them, asking them to change the notebooks with the partner, and asking for volunteers to write down the words on the blackboard.	
15´	Listening	Will copy the questions about the listening Will listen twice, and answer the questions p98 Will correct the answers	Will copy some questions on the blackboard for the listening activity Will play it twice. Will correct the answers.	CD, CD player Students' notebooks
10´	Science Projects	Those who already had done the Science Project, will present it to the group	Will listen with the rest of the group to those volunteers who want to present their Science Project. After, will ask them to place it in their Portfolio	Science Project, Portfolio
2´	Greetings	Will write down on their notebooks the homework (study for the exam! It is next day). Will tidy up and will get ready for the next class, and will say good-bye to the teacher	Will ask the students to tidy up and get ready for the next class. Will say goodbye to the pupils	-

Assessment Criteria

All children must be able to - Get a *Five out of ten* in the wordbank - Listen, read and understand a story - Listen, read and understand a text about the 3Rs - Use the concepts learnt in the unit to do a poster presentation about materials around you	Most of the children will be able to - Make a presentation of their Science Project	Some of the children could - Explain with their own words a factual text about the three Rs.

Lesson 10: 21st March: EXAM

Learning objectives	Learning outcomes	Evidence for Assessment

- Be aware of how much they learnt during the lesson, by answering questions related with the whole unit	Be able to: - Answer questions related with the unit	Kids will: - Do the exam worksheet, answering all the questions

Outline of leading activities

Handing out the exam – Reading it with them – Checking around while they do it – Collecting the worksheets

Classroom Management	Timing	Grouping	Pupils	Teacher	Resources
	2´	Greetings	Say good morning and get ready to start the exam	Say good morning and get ready to start the exam	- -
	2’	Hand out	Will get the copy of the exam	Will hand out a copy of the exam for each student	Exam worksheet
	5’	Read the exam	Will follow the teacher reading the exam aloud	Will read the exam aloud and will explain the possible doubts	Exam worksheet
	50’	Do the exam	Will do the exam.	Will walk around, checking	Exam worksheet
	1’	Collect the exam	Will tidy up and will get ready for the next class, and will say good-bye to the teacher	Will ask the students to tidy up and get ready for the next class. Will say goodbye to the pupils	-

Assessment Criteria

All children must be able to	Most of the children will be able to	Some of the children could
- Answer some the questions of the exam worksheet	- Answer most the questions of the exam worksheet	- Answer all the questions properly of the exam worksheet

Test

unit 8

Name _____ Class _____

1 Identify the three states of water and their names.

State: _____

Name: _____

State: _____

Name: _____

State: _____

Name: _____

/3

2 Complete the sentences with *have* or *don't have*.

(a) Solids _____ a definite shape.

(b) Solids _____ a definite volume.

(c) Liquids _____ a definite shape.

(d) Liquids _____ a definite volume.

(e) Gases _____ a definite shape.

(f) Gases _____ a definite volume.

/6

3 Complete the sentences.

(a) A physical change is _____

_____

It happens when _____

_____

An example of physical change is _____

(b) A chemical change is _____

_____

It happens when _____

An example of chemical change is _____

/5

4 Complete the answers to the question.

What is the difference between a heterogeneous mixture and a homogeneous mixture?

In a heterogeneous mixture it's _____

_____

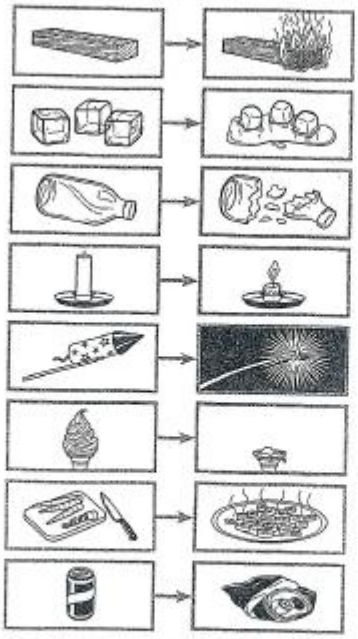
In a homogeneous mixture it's _____

_____

/4

-1

5 Is it a physical change or a chemical change? Write the answer next to the pictures.



a _____

b _____

c _____

d _____

e _____

f _____

g _____

h _____

/8

6 Look at the picture and complete the text.

The pan is made of (a) _____
because it is a heat (b) _____.
The handle is made of (c) _____
because it is a heat (d) _____.

/4

7 The three Rs.
Write a sentence giving an idea for each "R". How can you...?

- Recycle

_____

- Reduce

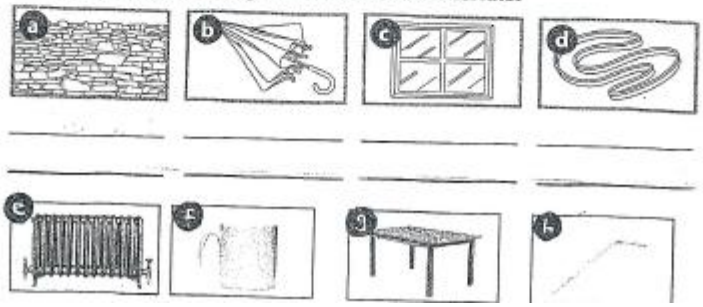
_____

- Reuse

_____

8 Identify two properties of these materials.

/3

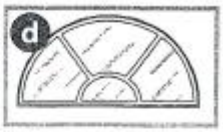


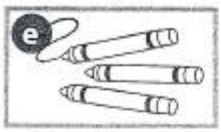
_____ _____ _____ _____

_____ _____ _____ _____

/8

9 **Identify the *natural* materials and the *manufactured* materials.**



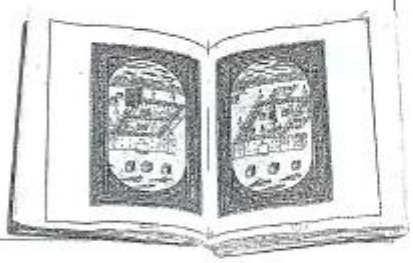


/5

10 Answer these questions, according to the text:

Paper ◆ Paper was first used about 3,500 years ago in Egypt. This paper was made from the papyrus plant. Paper is believed to have been used in China around the 2nd century AD. From there it spread through Islamic countries. Production was introduced into Europe in the 12th century. Paper is made from wood pulp, and by the 19th century the mechanical production of paper had begun. This made communication much easier as people were able to write letters and read newspapers and books.

In modern times, technology saves a lot of paper because people can communicate and read news on the Internet, and save documents on their personal computers. Paper is still necessary for many things such as packaging and cleaning. Nowadays, paper can be recycled, which means fewer trees need to be cut down.



/4

a. What was the first paper made from?

_____

_____

b. When was paper production introduced into Europe?

_____

_____

c. What changed in the 19th century that made the communication much easier?

_____

_____

/50

d. Nowadays, what is paper necessary for?

_____

_____