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# STEM EDUCATION IN THE CLIL CLASSROOM

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**Annual Syllabus for Natural Science in 3rd Grade of Primary Education**

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## **Abstract**

This End-of-Degree Project presents an Annual Syllabus Design aimed at the third year of Primary Education. This syllabus focuses on Natural Science from a STEM perspective, including some curricular contents of other areas in a transversal and interdisciplinary way. The proposal is based on the Content and Language Integrated Learning (CLIL) approach and on STEM education, where the language in the first foreign language (English) is used as an integrative connector. This Project is divided into two main parts. The first part corresponds to the theoretical justification and the legislative framework that supports the contributions of the Project. This first part also includes the school context in which the syllabus design is applied, the cognitive developmental characteristics of nine-year-old children, the learning objectives, contents, and the evaluation strategies used. As part of the theoretical framework, the main characteristics of the CLIL approach applied are developed as well as the concept of Science, Technology, Engineering and Mathematics (STEM) education. This first part also includes the activities and resources necessary to cover the contents and achieve the objectives, the strategies used to ensure attention to diversity, complementary activities, and the Tutorial Action Plan (TAP) and the strategy of collaboration with families. The second part of the syllabus design presents nine didactic units organized in three projects which apply and develop the theoretical foundations mentioned in the first part. From these nine didactic units, four have been further developed, including in one of them, all the resources, and materials created for the sessions and activities designed. The three projects focus on health and healthy lifestyle. These three projects apply a constructivist approach, which starts with an introspective inquiry about how the human body works and its relational functions with the environment and Nature. Experiments and experiential learning are the main methodological strategies used to introduce STEM contents within a CLIL approach so as to enhance a learner-centred philosophy.

## **Keywords:**

Primary Education, STEM, CLIL, Natural Science, Didactic Syllabus Design

## **Resumen**

Este Proyecto de Fin de Grado presenta un Diseño de una Programación Anual dirigido al tercer curso de Educación Primaria. Este plan de estudios se centra en las Ciencias Naturales desde una perspectiva STEM, incluyendo algunos contenidos curriculares de otras áreas de forma transversal e interdisciplinar. La propuesta se basa en el enfoque de Aprendizaje Integrado de Contenido y Lengua (AICLE) integrado en la educación STEM, donde el idioma en la primera lengua extranjera (inglés) se utiliza como conector. Este proyecto se divide en dos partes principales. La primera parte corresponde a la justificación teórica y al marco legislativo que sustenta los aportes del Proyecto. Esta primera parte también incluye el contexto escolar en el que se aplica el diseño de la Programación Anual, las características del desarrollo cognitivo de los niños de nueve años, los objetivos de aprendizaje, los contenidos y las estrategias de evaluación utilizadas. Como parte del marco teórico se desarrollan las principales características del enfoque AICLE aplicado y el concepto de educación basada en Ciencias, Tecnología, Ingeniería y Matemáticas (STEM). Esta primera parte también incluye las actividades y recursos necesarios para cubrir los contenidos y conseguir los objetivos, las estrategias utilizadas para asegurar la atención a la diversidad, las actividades complementarias y el Plan de Acción Tutorial y la estrategia de colaboración con las familias. La segunda parte del diseño de la Programación Anual presenta nueve unidades didácticas organizadas en tres proyectos que aplican y desarrollan los fundamentos teóricos mencionados en la primera parte. De estas nueve unidades didácticas, se han desarrollado cuatro, incluyendo en una de ellas, los recursos y materiales creados para las sesiones y actividades diseñadas. Los tres proyectos se centran en la salud y el estilo de vida saludable. Estos tres proyectos aplican un enfoque constructivista, que comienza con una introspección sobre cómo funciona el cuerpo humano y sus funciones relacionales con el medio ambiente y la naturaleza. Los experimentos y el aprendizaje experiencial son las principales estrategias metodológicas utilizadas para aprender sobre los contenidos STEM dentro de un enfoque AICLE para garantizar una filosofía centrada en el alumno.

### **Palabras clave:**

Educación Primaria, STEM, CLIL, Ciencias Naturales, Diseño de Programación Didáctica

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## **1 GENERAL PRESENTATION**

This End-of-Degree Project is an annual syllabus design for the third year of Primary Education through the CLIL approach to implement STEM education. The Project is divided into two different but related parts. The first part corresponds to the theoretical justification and the legislative framework that supports the contributions of the Project. This first part also includes the school context in which the syllabus design is applied, the cognitive developmental characteristics of nine-year-old children, the learning objectives, contents, and the evaluation strategies used, based on Royal Decree 126 / 2014 and Decree 89/2014. As part of the theoretical framework, the main characteristics of the CLIL approach applied are developed as well as the concept of STEM education. This first part also includes the activities and resources necessary to cover the contents and achieve the objectives, the strategies used to ensure attention to diversity, complementary activities and the Tutorial Action Plan and collaboration with families.

The second part of the syllabus design presents nine didactic units organized in three projects which apply and develop the theoretical foundations mentioned in the first part. From these nine didactic units, four have been further developed, including in one of them, all the resources, and materials created for the sessions and activities designed. The three projects focus on health and healthy lifestyle. The three projects focus on health and healthy lifestyle are called “I am a nutritionist”, “I am a chef”, and “I am an explorer in Nature”. These three projects apply a constructivist approach, which starts with an introspective inquiry about how the humanbody works and its relational functions with the environment and Nature. Progressively the contents are designed to explore living and non-living things, and the vital functions of other living beings. Experiments and experiential learning are the main methodological strategies employed to learn about STEM contents within a CLIL approach to enhance a learner-centred philosophy. Likewise, the projects facilitate reflection and self- knowledge of the achievements acquired during the sessions to make students aware of their own learning process. The students acquire the role of protagonists of their own learning process in addition to respecting individual and common interests in the classroom. Cooperative and collaborative group work is emphasized to engage and motivate students in the different projects, facilitating also scaffolding learning and attending to diversity in terms of



skills and interests. The CLIL approach seeks that students learn respecting the characteristics and needs that each one has, attending to the different rates of acquisition and understanding of the contents according to their interests. The teacher acquires a secondary role, in charge of supporting and promoting learning that integrates different branches of knowledge with a STEM approach, mainly, Science, Technology, Engineering and Mathematics.

I would like to end this presentation by stating the motivations that led me to take on the challenge of developing a Final Degree Project on CLIL and STEM education. I launched into this extraordinary adventure due to my individual interest in knowing what I did not yet know. I started this Project with the hope of acquiring practical and theoretical knowledge about an emerging approach in bilingual classrooms in Primary schools. Once the Project is finished, and looking back, I am proud to see where I started from and everything that I know and apply today. It has been a long process that has required a lot of work and effort, since I had to adapt to research, plan and write in English, applying all the knowledge acquired during my university studies. Throughout the development of this Project, I have been able to reflect on the type of teacher I am, as well as the change of focus that must take place in education to ensure quality learning for our students. There is enough evidence to substantiate the benefits of learning a second language in the integral development process, especially in terms of cognitive and social matters. Therefore, I conclude by seeing the results of my final degree project and feeling tremendously proud of my content training as well as the skills acquired with a nonconformist spirit towards the improvement of educational quality, because I believe that extraordinary things will happen if we improve together.

## **2 THEORETICAL JUSTIFICATION**

### **2.1 Bilingual Education**

The Commission of the European Communities (2003) urged to promote early foreign language learning among citizens to facilitate communication among member states. According to it, apart from their first language or mother tongue, European citizens should know at least one or two foreign languages. This linguistic policy led to a significant shift in national and regional educational systems across Europe. The most extended option to make this shift effective was to apply bilingual education models which involve teaching content subjects in foreign languages. In Spain, in 1996, the Spanish Ministry of Education and the British Council signed an agreement to start a

national bilingual education program. The goal of this program was to offer bilingual education to students in the Spanish state school system. The aims were to promote the acquisition and learning of two languages through an integrated content-based curriculum; to encourage awareness of the diversity of both cultures; to facilitate the exchange of teachers and children; to encourage the use of modern technologies in learning other languages; and, where appropriate, to promote the certification of studies under both educational systems (Dobson, Murillo, & Johnstone, 2010, p. 12). The most common language of instruction would be English, applying an immersion approach.

Even though different bilingual education programs have been implemented in Spain, since 2004, the Community of Madrid has progressively implemented a dual-focused CLIL approach. The regional government believes bilingualism is imperative for students to be effective and integrated participants in the European Union (Decree, 2010, Order 1672/2009 for bilingual education). The main objective is to prepare the students to become fully competent in English, to provide them with more significant economic and academic opportunities in the future.

The bilingual program of the Community of Madrid establishes a third part of the subjects in the official school timetable to be taught in English. The choice of subjects depends on teachers' language qualification to teach content-subjects in English. Science is one the most preferred options in these schools, being Physical Education, Arts and Crafts, Social Science, or Music other common subjects to be taught in English (Llinares & Dafouz, 2010, p. 98). The school this syllabus is designed for implements this bilingual program in Primary Education. At the same time, this school is part of the Bilingual English Development and Assessment (BEDA) program, addressed to catholic schools, such as Padre Manyanet school. BEDA is a flexible program that helps to improve English language teaching for a gradual implementation of English-Spanish bilingual education.

## **2.2 Science Technology Engineering and Mathematics (STEM) Education**

At the European Union's policy level, increasing interest in Mathematics, Science and Technology is seen as a fundamental objective to prepare young Europeans with the knowledge, skills and understanding to allow them to engage in society, influence and shape the future, and participate in economic activities that increasingly depend on STEM skills (European Commission, 2007, 2015; Kearney, 2015).

STEM is important because it involves every part of our lives: Science surrounds us everywhere in the world; Technology is continuously developing into every aspect of our lives; Engineering is in the basic designs of roads and bridges and deals with the challenges of changing global weather and environmentally friendly changes to our homes; Finally, Mathematics is in every occupation, every activity we do in our lives.

Related with Primary Education, we must know that the continual advances in technology are changing the way students learn, connect, and interact every day. Skills developed by students through STEM provide them with the foundation to succeed at school and beyond. By exposing students to STEM and giving them opportunities to explore STEM-related concepts, they will develop a passion for it and hopefully pursue a STEM field job (Becker & Park, 2011; Carroll et al., 2019). This interest may also reduce the current gender gap in favour of boys and increase the number of girls involved in careers in STEM fields (Stoet & Geary, 2028; OECD, 2019).

A curriculum that is STEM-based has real-life situations to help the student learn. STEM activities provide hands-on and minds-on lessons for the student. Making Math and Science both fun and interesting helps the student to do much more than learn. Through STEM, students develop key skills including problem solving, creativity, critical analysis, teamwork, independent thinking, initiative, communication, and digital literacy.

However, despite the increasingly common use of the term “STEM education,” there is still uncertainty as to what constitutes STEM education and what it means in terms of curriculum and student outcomes (Breiner, Harkness, Johnson, & Koehler, 2012; Lamberg & Trzynadlowski, 2015). Several obstacles have been identified to effective STEM teaching in primary education. The first obstacle implies the need for high quality teacher training, the second obstacle refers to the need to offer teachers access to high quality resources and materials to draw light into this area.

According to the education literature review (Li, Froyed, & Wang, 2019) there is not a specific STEM methodology but rather STEM education uses technological tools and pedagogical perspectives to achieve STEM objectives. The idea is to use different methodological approaches to change the focus of modeling from teaching to learning. Some of the strategies that can be used are problem-solving in Mathematics, Design Thinking in Technology, Inquiry-Based Science Education (IBSE), Project-Based

Learning (PBL), experiments and experiential learning, modeling in Science and the design process in Engineering.

### 2.2.1 *STEM Education in the Natural Science CLIL Classroom*

This syllabus is aimed at developing the knowledge of Science content related to body functions and healthy diet taking advantage of integrating Mathematics, and Technology. Engineering is understood as the integration of knowledge and abilities to face needs and challenges and solve problems. Applying this interdisciplinary approach, STEM skills are applied to primary education contents. To achieve this aim, a real problem related to students' experience in the kinds of food they know is formulated to raise their awareness towards the benefits of choosing the best options depending on their needs. Within a CLIL approach, STEM contents are integrated in L2 language learning using active methodologies to motivate students to learn science in a meaningful way.

## 2.3 **CLIL Approach**

CLIL is a dual educational approach in which content and language must be combined. The language is used as a medium to communicate, but also to learn curricular subjects. In CLIL, an additional language is used for the learning and teaching of both content and language with the objective of promoting both content mastery and language to pre-defined levels (Marsh, Mehisto, Wolff, & Frigols-Martin, 2010). To achieve successful CLIL results in primary classrooms, some methodological approaches and strategies are needed due to its eclectic nature. In the following subsections the foundations of effective CLIL lesson plans are presented and discussed.

### 2.3.1 *CLIL methodological principles*

Custodio-Espinar (2019c, pp. 212-214) summarizes the basic methodological principles that must be present in CLIL lesson plans, schematically displayed in Table 1.

Table 1. CLIL methodological principles adapted from Custodio-Espinar (2019c)

Content	<p>Conceptual, linguistic, and procedural dimensions must be considered when planning the content.</p> <p>Curriculum-based.</p>
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	Determines the linguistic demands.
Cognition	<p>Progression from lower order to higher order cognitive demands (Bloom's Taxonomy).</p> <p>Cognitive demands of activities need to be adjusted to the student's cognitive development level.</p>
Communication	<p>Linguistic demands are determined by content; must be analysed to support students' language development; must be analysed to guarantee the development of support strategies for interaction (reception, transformation, and production scaffolding) adapted to the students' linguistic competence level.</p> <p>Language teaching must respect the balanced development of the four basic skills (listening, reading, speaking, and writing).</p> <p>Basic Interpersonal Communicative Skills (BICS) and Cognitive Academic Language Proficiency (CALP) must be addressed.</p> <p>Common European Framework of Reference (CEFR) to determine the proficiency levels and evaluation strategies.</p>
Culture	Intercultural competence must be promoted.
Methodological strategies	<p>Student-centred strategies (learning by doing, autonomous learning).</p> <p>Interactive learning. Flexibility.</p> <p>Adaptation strategies to students' needs.</p>
Activities	Designed from an open, eclectic, and integrated vision of the language learning models.

	<p>Connected to the curricular objectives and contents. Content and meaning approach should be the starting point.</p> <p>Connected to the learners' interests, realistic and motivating.</p> <p>Allow integrative evaluation of content, language, and processes.</p>
Resources	<p>Must promote interaction and autonomous learning. Interaction and Communication Technologies (ICT) resources to respect the students' learning pace and to develop new learning strategies, including academic-scientific learning.</p> <p>Common European Framework of Reference (CEFR) for language demands analysis and assessment.</p>
Assessment	<p>Must reflect to the progresses achieved by the students. Strategies such as individual and group, oral and written, self and co-assessment should be used, as well as formative and summative, to ensure the progressive learning.</p> <p>The CEFR is an essential instrument to determine the levels and develop adapted language evaluation strategies.</p>
Classroom management	<p>Schedule organization must follow the intensity and reiteration principles.</p> <p>Classroom management must ensure a well-being and positive affect environment, obtained by visual resources, furniture organization and students' work layouts.</p>
Attention to diversity	<p>Diversity awareness (from cognitive demands to learning strategies) is vital to ensure the effective content learning. Bloom's taxonomy will be used for this matter. Its division into lower-order thinking skills (LOTS) and higher-order thinking skills (HOTS) allow</p>

	<p>teachers to adapt the activities depending on the student’s cognitive development.</p> <p>Multimodal input: present the contents in various ways to consider different learning styles and multiple intelligences.</p>
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Therefore, the essential features of the CLIL approach include multiple focus (content & language / cross-curricular themes and projects); safe and enriching learning environment; authenticity; active learning; scaffolding; the need for an integrated curriculum; content should not be presented in a fragmented or disperse way; activities should develop children’s motor, emotional, social, and intellectual capacities; oral skills should be used to encourage and promote interaction; there should be a focus on the importance of routine language; a concept-centered approach should be adopted versus a grammar-centered approach.

These methodological principles coincide with those included in ORDER 5958/2010, 7th December, for bilingual state schools in the Community of Madrid ([Annex 1, Table 4](#)). Students learn the L2 as they study different subjects of the primary curriculum. Cross-curricular teaching relates to Natural and Social Science (History and Geography), Music, Physical Education, Arts and Crafts, and English (including Literature). The teaching of a language is secondary to content learning. Content learning should develop from what is relevant within the immediate domain of the students’ experiences and interests, to higher and more specific cognitive items. English should be taught using an active methodology, learning through doing, using the tasks and activities naturally involved in different subject areas. In this sense, the learning process becomes meaningful and significant when students perceive it as being functional and useful. Activities should entail active student participation to encourage autonomous learning. It is therefore important to sequence the contents and the learning of these contents by carefully designing the activities to be carried out, making sure that there is a link between past and present learning.

Finally, to promote students’ role as effective and independent learners, they will progressively develop their oral communication skills. The First Cycle focuses mainly on

speaking and listening, and to a lesser degree on reading and writing, that will be developed during the Second Cycle. These four skills need to be achieved in a balanced way to motivate students by presenting the lessons in an engaging way. Students also need to receive regular positive feedback and appraisal. In the following subsections the foundations of effective CLIL lesson plans are presented and discussed.

### 2.3.2 *The 4Cs*

The theoretical and methodological foundations for CLIL lessons are based on a balanced implementation of content, communication, cognition, and culture. These four elements are referred to as the main components in a CLIL framework, so called 4Cs, as coined by Coyle (1999). Their main characteristics are developed in this section.

Content matter is not only about acquiring knowledge and skills; it is about the learners creating their own knowledge and understanding and developing skills (personalized learning). It is content which initially guides the overall planning along the learning route. At the heart of the learning process lies successful content or thematic learning and the related acquisition of new knowledge, skills and understanding. Content is the subject or the CLIL theme.

Content is related to learning, thinking, and cognition. To enable the learners to create their own interpretation of content, it must be analyzed for its linguistic demands; thinking processes need to be analyzed in terms of their linguistic demands. For CLIL to be effective, it must challenge learners to create new knowledge and develop new skills through reflection and engagement in higher-order as well as lower-order thinking. CLIL is not about the transfer of knowledge from an expert to a novice. CLIL is about allowing individuals to construct their own understandings and be challenged.

Concerning communication, language needs to be learned, which is related to the learning context, learning through that language, reconstructing the content and its related cognitive processes. This language needs to be transparent and accessible; interaction in the learning context is fundamental to learning. This has implications when the learning context operates through the medium of a foreign language. Language is a channel for communication and for learning which can be described as: learning to use language and using language to learn. Communication in this sense goes beyond the grammar system.



For this purpose, according to (Coyle, Hood, & Marsh, 2010) three different types of language learning should be considered:

- Language of learning: which consists of the essential lexicon/grammar associated to the topic.
- Language for learning: which is the language needed to operate in the lesson, in contexts real for the learners.
- Language through learning: related to the language needed to engage learners cognitively and to generate new language use.

Finally, the C of culture refers to the fact that studying through a different language is fundamental to fostering international understanding. If learners understand the concept of ‘otherness’ then this is likely to lead to a deeper understanding of ‘self’ (Byram, 2008). This aspect includes intercultural elements in project planning: setting the context of the content in different cultures.

### 2.3.3 *Scaffolding*

CLIL learning is a process of construction of knowledge and of language at the same time. Students almost always begin with some basic knowledge of the content and of the language that they will learn. In each CLIL lesson, new content and new language are introduced to build on the basis the students already have. Through interaction with classmates, with the teacher, and with multimedia resources, each student constructs new knowledge at his /her own pace, moving from simple awareness to real understanding and proficiency. Between the two states of raised awareness and thorough competence, the student is developing some new knowledge or skill, but cannot yet use it independently and confidently. This intermediate stage of the development of learning is often described by Vygotsky 's metaphor of ‘the Zone of Proximal Development’ (ZPD) (Vygotsky, 1978). During this intermediate stage of learning, students can be helped to progress to complete an independent proficiency by support from someone with a higher level of knowledge or skill than they have themselves.

The temporary support given is described by the metaphor of ‘scaffolding’ because it provides a platform from which learners can construct the next level of understanding and knowledge. Scaffolding as a metaphor is used to describe how learners

can be helped to achieve things which they are not yet ready to do on their own (Bruner, 1999). It is a useful description because it highlights that this help is only temporary. The help is removed gradually as the learner gains the necessary knowledge and experience to be independent, just as scaffolding is removed once a building is complete.

According to van Lier (2004) scaffolding describes support for learning of both content and language. It provides an image of how new learning is built on what is already known. Although scaffolding is often provided by a teacher, it can also be provided by a more proficient peer, or group of peers. Once the learner is confident of how to say what they want in a situation, they will be able to use their linguistic knowledge in other situations, without scaffolding. The knowledge/skill/understanding needed will have been internalized and can now be utilized without external support.

One example of how teachers can scaffold learning is the use of graphic organizers (Gibbons, 2015; Grossman, 2015). Tools like tables and grids, flow charts and mind maps enable data processing, and develop thinking skills such as comparing and contrasting, sequencing, recognizing relationships and classifying. The same authors describe how scaffolding takes many forms. For example, when scaffolding the skill of listening, we might help a learner grasp meaning by focusing their attention on the form of a tense used; in reading, the questions the teacher asks about a particular text can guide the reader to a clear understanding; writing skills can be developed through model texts, or the use of graphic organizers to help organize ideas. In time, with scaffolding, language learners internalize what they are learning, and scaffolding is decreased. The Can-Do area grows, and the learner's Zone of Proximal Development develops a new focus. This scaffolding is a dynamic element of teaching and learning, not a static or permanent feature (Mahan, 2020).

#### 2.3.4 *CLIL in Primary (Concrete-operational 7–11)*

When considering what kind of CLIL model to implement in Primary Education, it is particularly important to consider students' developmental stage (Marsh, 2012). Taking into account Piaget's theory of cognitive developmental stages (Huitt & Hummel, 2003), the age of 7–11-year-old would correspond to the concrete-operational stage. It involves the development of logical thought processes and the ability to reason syllogistically. From a cognitive perspective, children at this age can draw conclusions

and understand cause and effect intellectually. These are essential skills for an inquiry-based science education or a project-based learning, applied to STEM education in this syllabus. Therefore, at this stage in Primary education, it is very important that teachers encourage independence, use logical explanations and analogies, related to the child's experience, use subject-centered focus. It is also essential to provide group activities, use drawings, models, dolls, action figures, painting, realia, or videos (Santrock, 2005, 2013).

Regarding language learning, Cummins (1979, 2000) distinguished between Basic Interpersonal Communicative Skills (BICS) and Cognitive Academic Language Proficiency (CALP). Both language dimensions need to be considered when designing a CLIL syllabus in Primary education since students will need to understand and express concepts and ideas beyond basic conversational skills. Therefore, it is important to increase motivation towards language learning and build learner confidence about using the L2 in relevant content areas (Coyle, 2006).

In addition, with specific regards to CLIL, Mehisto, Marsh, & Frigols (2008: 12) propose five different areas that teachers should consider: (i) grade-appropriate levels of academic achievement in subjects taught through the CLIL language; (ii) grade-appropriate functional proficiency in listening, speaking, reading and writing in the CLIL language; (iii) age-appropriate levels of first-language competence in listening, speaking, reading and writing; (iv) an understanding and appreciation of the cultures associated with the CLIL language and the student's first language; and (v) the cognitive and social skills and habits required for success in an ever-changing world.

### 2.3.5 *Teacher's role and student's role*

According to Eurydice (2006), in the CLIL type provision, teachers are specialists in one or more non-language subjects or have two areas of specialisation, one in a language subject and the other in a non-language subject. Marsh, Maltjers, & Hartiala (2001) outline the 'idealised competencies' required of CLIL teachers which involve having sufficient target language knowledge and pragmatic skills of the language used (pp. 78-79). They must understand the differences and similarities between language learning and language acquisition concepts. Regarding methodology, teachers should identify linguistic difficulties and use communication or interaction methods that facilitate the understanding of meaning. They should be able to use different strategies to

correct and model language usage. They should be able to design dual-focused activities for language and content. To achieve this purpose, teachers will select and adapt materials and resources on related topics. They will also be ready to work with learners of diverse linguistic or cultural backgrounds. They will be able to develop and implement evaluation and assessment tools to evaluate both language and content.

In a CLIL context, students' active role and involvement are essential since they have to work in pairs and groups and cooperate in activities and tasks to complete their STEM projects. The benefits of CLIL for students include aspects of motivation, development of language production and meaningful communicative ability, as well as learning the culture of a subject (Dale & Tanner, 2012, pp.11-13).

#### 2.3.6 *Activities and resources*

Materials and resources should be diverse and able to let student reproduce real life situations, autonomy, and interaction to ensure meaningful learning. The use of ICT can help develop materials and can motivate students. Mehisto (2010) proposes a checklist of criteria for producing CLIL materials which consists of the following items, which will be considered in this syllabus:

- Making the learning intentions (language, content, learning skills) and process visible;
- Systematically fostering academic language proficiency;
- Fostering learning skills development and learner autonomy;
- Including self, peer, and other types of formative assessment;
- Helping create a safe learning development;
- Fostering cooperative learning;
- Seeking ways of incorporating authentic language and authentic language use;
- Fostering critical thinking,
- Fostering cognitive fluency through scaffolding of a) content, b) language, c) learning skills development;
- Helping to make learning meaningful.

In general terms, with this approach there is a variety of techniques and strategies that can be used. It will depend on the characteristics of the group and context, and the aims of the lesson (Dale & Tanner, 2012). A sequence of CLIL activities should start with

a diagnostic activity, that connects the content with the interests of the students and activates their previous knowledge about it. Then, depending on the methodology and the content, activities can be reinforcement, application, or extension. It is essential that this sequence promotes higher order thinking and interaction.

Therefore, analysis, evaluation and production tasks must be included on the content that is learned, preferably in groups or pairs. This allows for the publication of the outcome, which increases the interaction at the end of the sequence and, therefore, the consolidation of content and language learning. The integration in the programming of activities based on digital tools and resources promotes the integration of all these principles (Custodio-Espinar & Caballero-García, 2016).

### 2.3.7 *Assessment and evaluation*

Since CLIL is a dual approach, evaluation and assessment should involve both the content and the language. The evaluation strategy should include an initial and formative evaluation to diagnose and optimize the learning process; and a summative evaluation, at the end of the learning process to measure the quality of learning. Wewer (2014) points out a series of standards that a CLIL quality assessment should achieve. Assessment should focus on both content and language; assessment methods must include all four language skills; language assessment should be based on evidence-related inferences objective; inferences must be based on predefined criteria; there should be a frequency and sufficiency of information on evaluation and feedback. Formative assessment focuses on the learning process and helps identify areas of improvement (Coyle et al., 2010; Custodio-Espinar, 2019a, 2019b).

The challenge when programming and evaluating in a CLIL approach lies in understanding the relationship between academic language (CALP) and conversational language (BICS), with the level of cognitive demand and dependence on the language context, necessary to carry out the task. Cummins (2002) explains it is essential that the student receives explicit instruction about the academic language of the content area being studied. Cummins (1979) also points out that for CALP development, the instruction must be cognitively challenging and meaningful; the content must be integrated with language teaching to facilitate learning, and awareness of a critical language must be developed. However, balancing linguistic complexity with cognitive load in learning tasks is not an

easy task and requires training and effective planning of the fundamental elements of CLIL.

Some of the strategies used for content assessment are grids, diagrams, learning walls, and alternative and polar questions. We Are Learning To (WALT) and What I am Looking For (WILF) techniques are useful since they prepare students for the lesson as they know in advance what is going to be taught and what the final product is expected to be. Visuals and diagrams can help 3<sup>rd</sup> year of Primary education students to understand these techniques better.

To enhance learning autonomy as a methodological strategy, assessment should not only come from the teacher but involve the students' own reflection on their learning as well as the reflection on other students' learning process. Therefore, teacher assessment should also include students' self- and peer-assessment techniques. Self-assessment is an essential part of formative assessment and refers to the learners' own reflection on their learning process. With peer-assessment students assess one another using pair or whole-class discussions. Using these techniques, students are given the chance to interact and communicate what they think about their classmates' projects, tasks, or performances.

These principles and techniques will be applied to the evaluation and assessment of each project in this syllabus, as detailed in the section devoted to the projects. Some examples of formative assessment tools necessary in CLIL are: For language (Teacher's oral language modelling on spot; Feedback of activities using short answers, thumbs up/down; KWL charts; Flow charts; Cycle graphs; Venn diagram graph; infographic organizers), for content (Teacher oral and written feedback on the activities; Teacher checklist for active observation of group research; Rubric to assess the research process; Boardgame), for process (Learning intentions wall; Teacher checklist for active observation while Ss are doing the activities; Class minibook journal).

### 2.3.8 *Attention to diversity through CLIL*

As it is mentioned in Decree 89/2014, article 17, there are three different types of measures to attend diversity in Primary Education: general, ordinary, and extraordinary. In this section, these measures will be addressed considering the Padre Manyanet school and specifically the CLIL Science year 3 group.

The general attention to diversity measures involve regulated strategies that schools implement to adequate the Curriculum prescriptive elements to the school context. The aim is to provide the most inclusive answer to the different curricular competencies, capacities, expectations, motivations, rates or learning styles, as well as the cultural and social differences from the school students. The school general measures involve the following principles and actions:

- The specific educational needs of the students are an opportunity to promote varied methodologies that allow the development of multiple intelligences.

- Inclusive classrooms that support spaces and times to reinforce the learning process of students who need it.

- A curricular adaptation program according to the psychopedagogical evaluation carried out by the Guidance department. Students with specific needs receive support from specialist teachers in Hearing and Language and / or Therapeutic Pedagogy to follow the curriculum.

- This school is a reference centre for students with visual disabilities: a specialist teacher from the National Organization of Blind People (ONCE) attends to the specific needs of these students and coordinates their learning process with the teachers.

In this sense, Madrid & Pérez-Cañado (2018), referring to prior research conducted in the area of CLIL, mentions some of the strategies to attend diversity that have been proved to be efficient:

Gathering information from parents on the academic difficulties that their children experience, negotiating joint interventions strategies, and adapting content and tasks according to student's capability, intelligence, personal abilities, learning methods, and multiple intelligences. (p. 245)

Ordinary measures relate to the organization and modifications that each school should implement regarding the groupings, methods, techniques, activities, evaluation, and teaching-learning strategies (Madrid & Pérez-Cañado, 2018, pp. 245-246). The aim is to attend to diversity without modifying the prescriptive curriculum elements, such as

objectives, contents, and evaluation criteria. The ordinary measures for the 3<sup>rd</sup> year class are:

- In Science lessons, students will work through CLIL and STEM project-based learning methodology which is engaging for students. This approach facilitates scaffolding, contextualized learning, interpersonal skills development, and problem-solving strategies.

- Tasks and activities are adapted to students' different academic characteristics and competences from LOTS to HOTS or from HOTS to LOTS depending on students' needs.

- Methodological strategies encourage every student participation, including cooperative learning, pair and group work, projects, and debates.

- Different space, material and personal resources are used in class considering students difficulties, interests, and preferences.

- Techniques, procedures, and evaluation tools are adapted to the student's educational needs, without modifying evaluation criteria.

Finally, extraordinary measures address individual actions taken in a school to face the specific educational needs that students have. They require the organization of personal and material resources. These measures will be adopted when ordinary measures are not enough, and they can be amplified and restructured attending to the school organization, group-class measures, and individual measures.

The extraordinary measures for the class are destined to a student with special needs who has been diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). These measures involve: assigning work that suits the student's skill level, avoiding classwork that is too difficult or too long; offering choices to complete an activity; providing visual reminders, including visual clues and examples, to demonstrate a skill or a concept; increasing active class participation, such as working through a problem in a group and discussing for maximized understanding; encouraging hands-on learning to create opportunities to experience activities; establishing rules and routines, with short, simple classroom rules; providing appropriate supervision to help delayed maturity,



forgetfulness, distractibility, and disorganization; reducing potential distractions; using positive peer models to ease distraction from other students; introducing transitions in the class activities to be clearly marked and monitored; and creating opportunities for physical action or movement.

### **3 ANNUAL SYLLABUS**

#### **3.1 Context Analysis**

##### *3.1.1 School context*

The majority of students in the school come from the nearby city of Alcobendas. Alcobendas was founded in 1208 and is situated roughly 15 km north of Madrid's capital. The population amounts to 116.000 inhabitants. Alcobendas is often regarded as a "commuter town", as most of its inhabitants have jobs in the nearby capital but live in Alcobendas to avoid the busy city life. Thus, the housing prices are higher than average, and the population mostly belongs to the "edge city" as arterial roads around the city meant that the urban expansion has focused in the surrounding areas. Thus, the best shopping centers and entertainment facilities have left the downtown district favoring the city's better-connected outskirts. As for the cultural aspect, Alcobendas hosts some museums, libraries, and theatres, most of them inaugurated recently.

Colegio Padre Manyanet is located just outside Alcobendas' outskirts and is surrounded by the Valdelatas natural reservoir. Therefore, there is a remarkable lack of noise pollution, as well as a beautiful natural landscape. However, Alcobendas' recent development means that this privilege is coming to an end as there are plans to expand the outskirts up to the school's location.

This semi-private school was founded in 1980 and hosted a small group of students (only the first three primary education years). As the students grew, so did the school, which started offering *Bachillerato* (Spanish High School level) in 1990. Being able to receive the entire pre-primary, primary and secondary education became an important school in just one place. Students show a great deal of companionship, having been together from a very early age.

##### *3.1.2 School staff*

The Primary education department is composed of 26 teachers and 487 students, grouped in 4 lines of about 20 students. The school methodology in Primary education is

based on cooperative learning, thinking skills and routines comprehension projects, competence activities and experimentation activities.

Learning is contextualized, achieving better assimilation of the contents, and reflecting on what is learned. This reinforces metacognitive competences. The school is a bilingual center of the Bilingual Program of the Community of Madrid since the 2010-2011 academic year and belongs to BEDA Program to promote bilingual education, a program managed by *Federación Española de Religiosos de Enseñanza – Titulares de Centros Católicos* (FERE-CECA). In Primary education, a third of the teaching time is taught in English. The hours are divided between Science, Technology and Arts and Crafts, depending on the course and the foreign language subject. Native language assistants help different groups three hours per week, allowing students to have real contact with the language and culture of the English-speaking countries. The methodology used is based on “learning by doing”. Learning takes place playfully and experientially through the different areas taught in English.

The present syllabus was designed for a group of students currently on the 3rd year of Primary education. The group is formed by 20 students and is part of the school’s bilingual program. The group is homogeneous, and students have a similar level. There is one student with special needs who suffers from Attention Deficit Hyperactivity Disorder (ADHD). In order to guarantee that these students can be supported by those who are more proficient in the L2, a cooperative language teaching methodology is implemented.

### **3.2 Cognitive, linguistic, and emotional development in children**

Human beings go through a series of developmental stages during their lives, which broadly define their behaviour, perception of reality, and needs. According to (Fisher and Bullock, 1984) in the initial stages of primary education, the cognitive, socio-affective, linguistic, and moral development of children are paramount.

It is necessary to know that children learn from close reality and are very curious about the world they discover. The experience and manipulation of what surrounds them are closely linked to their reasoning. At this stage, 8-to-9-year-old children learn to empathize and play by following fictitious roles and using objects of a symbolic nature. The child is forced to adapt to a social world of the elderly, with external rules and norms,

so it is still a physical world that they do not understand well. Games give them the emotional and intellectual balance they need (Hromek & Roffey, 2009). Besides, they begin to understand the cause-and-effect relationship, which helps them interpret processes and a scientific method (Santrock, 2005, 2013), these skills are essential to implement a STEM approach.

Chomsky (2003) states that children have the innate ability to understand a language's grammar, an ability that they develop over time as they live new experiences and acquire learning. According to Vygotsky, language is a social construction that evolves continuously, since it is the society that creates the norms and uses of language. Children often use language in a particular way: mixing concepts, inventing words, or changing others. Gradually, their brains assimilate the language rules, so they speak more and more appropriately and make fewer mistakes. Thanks to brain plasticity in childhood, children can correctly acquire the basics of new languages (Fisher & Bullock, 1984; Bruer, 2008). Thus, it is essential to take advantage of this stage to learn new languages, as in this case, we will do with English.

Besides, it is worth noting the weight that friends take on when it comes to satisfying their emotional needs (Gottman, 1997). For this reason, they generally seek to be recognized beyond their family nucleus. They tend to imitate the behaviour of people who are significant to them, either family, teachers, or friends. At this age, children try to win the approval of the important people, that is, of attachment figures.

Therefore, collaborative work is very positive because it teaches them to cooperate with others, learn to listen, and reinforce interpersonal relationships. In the present syllabus, students will work on projects, in which teamwork will be very present to achieve a series of common objectives. In this way, responsibility and commitment to others are encouraged.

Regarding the morality of these children, Piaget (mentioned by Fuentes et al., 2012) refers to the stage of heteronomous morality, also known as moral realism, as the stage in which morality is imposed from the outside. Children consider that morality obeys the rules and laws of other people, that they have been created by an authority figure, such as parents, the teacher or God. They think that the rules cannot be changed and that they have always been the same. Besides, they think that violating them carries

immediate punishment, proper to justice. They do good so that they are not punished or to obtain a reward.

Likewise, Kohlberg and Zigler (1967) places children aged 6-7 years in the pre-conventional phase, according to the categories he used to indicate the level of moral development. These children judge events according to how they affect them, so they opt for relativism and individualism, generally being self-centered. Still, they need begin to think more about others at this age compared to preschool.

As for how to get the child to have certain behaviour or carry out certain actions, there is no doubt that a specific reward or a prize creates a more immediate incentive to act than a simple verbal recognition that their answer is correct. “However, long-term maintenance of behavior depends on the cognitive stability of children's definition of behavior as good.” (Kohlberg, 1992, p. 151).

Emotional learning begins at a very young age, as children discover a wide range of emotions, and evolves as they grow. The emotional development in middle childhood (7-10 years) has the following characteristics: Problem-solving preferred coping strategy if control is at least moderate; distancing strategies used if control is appraised as minimal; appreciation of norms for expressive behaviour, whether genuine or dissembled; use of expressive behavior to modulate relationship dynamics (e.g., smiling while reproaching a friend); awareness of multiple emotions toward the same person; and the use of multiple time frames and unique personal information about another as aids in the development of close friendships (Gottman, 1997, Fabes and Martin, 2001).

In conclusion, when designing a syllabus, it is essential to understand children’s development and acknowledge their mentality at each stage to promote and enrich their learning. However, we must bear in mind that, within the general parameters, each individual has their rhythm, and we must respect it. What should always be promoted is training aimed at developing people's intellectual and emotional ability.

### **3.3 Objectives**

#### *3.3.1 Stage objectives*

The general objectives at this stage are included in [Annex 2, Table 5](#). These are the same that appear in the Royal Decree 126/2014, of 28 February, by which the core curriculum of Primary Education is established.

The aim of the Primary Education is to help students to learn the principles of oral expression and comprehension, reading, writing, calculation, the acquisition of basic notions of culture, and the habit of coexistence as well as study and work habits, the artistic sense, creativity, and affectivity, in order to ensure an integral formation that contributes to the full development of the students' personality, and to prepare them effectively for Compulsory Secondary Education (RD/126/2014).

Primary Education is divided into six academic years, which will ordinarily be taught between six and twelve years old, and it is organized in areas, which will have a holistic and integrative approach.

### 3.3.2 *Natural Science Course objectives*

The course objectives for the subject of Natural Science used in this syllabus are based on Decree 89/2014, 24th July, that establishes the Primary Education Curriculum at the Community of Madrid, included in [Annex 2, Table 5](#). These objectives are divided into five blocks in the Royal Decree 126/2014, 28th February, that establishes the core Curriculum for Primary Education:

- Block 1. Initiation to scientific activity
- Block 2. The human being and health
- Block 3. Living beings
- Block 4. Matter and energy
- Block 5. Technology, objects, and machines

### 3.4 **Competences**

Article 5 of the Decree 89/2014, of 24th July, that establishes the Primary Education Curriculum at the Community of Madrid, determines the main competences for Primary Education. According to DeSeCo (Definition and Selection of Competencies) (2002), a competence is the ability to respond to complex demands and carry out diverse tasks in an appropriate way. In line with the Recommendation 2006/962/EC of the European Parliament and Council, 18th December 2006, on Key Competences for Lifelong Learning, the Royal Decree 126/2014, 28th February, that establishes the core Curriculum of Primary Education, is based on the empowerment of learning through competences, integrated into curricular elements to promote a renewal in educational practice and teaching and learning process. The competence represents a combination of practical

skills, knowledge, motivation, ethical values, attitudes, emotions, and other social and behavioral components that are mobilized jointly to achieve an effective action.

Competences in the academic environment give students the capacity to know in different contexts how to resolve any conflict they may have, whether in the school or out of it. Also, competences make the lessons more inclusive and allow to work with different subjects in the same topic. These principles are paramount in the present syllabus.

Key competences are those which every person requires to his or her self-realization and personal fulfilment, as well as to active citizenship, social inclusion, and employment. According to the Royal Decree 126/2014, of 28th February, the key competences are:

1. Competence in Linguistic Communication.
2. Competence in Mathematics, Science and Technology.
3. Digital Competence.
4. Learning to Learn.
5. Social and Civic Competences.
6. Sense of Initiative and Entrepreneurship.
7. Cultural Awareness and Expressions.

### 3.5 Contents

#### 3.5.1 *Official Curriculum*

This syllabus is divided into three major projects to cover the contents for Science. These contents are based on Decree 89/2014, 24th July, that establishes the core Curriculum for Primary Education at the Community of Madrid, included [in Annex 2, Table 5](#), which have been described above.

#### 3.5.2 *Sequence in the Annual Syllabus*

This section presents the annual CLIL syllabus sequence divided into the three projects: Project 1: I am a nutritionist; Project 2: I am a chef; and Project 3: I am exploring Nature.

The aim of these three projects is to make students aware of the importance of health, nutrition, and the benefits of a healthy lifestyle from a STEM perspective within a CLIL approach. In [Annex 3, Table 6](#) presents the contents of third grade, that will be taught. Table 2 shows the sequence of these contents.

Table 2. Sequence and schedule for projects within the syllabus.

Term	Projects	Contents	Dates
<b>First</b>	Project 1: I am a nutritionist.	<ul style="list-style-type: none"> <li>• The vital functions of the human being.</li> <li>• The senses.</li> <li>• Digestive system.</li> <li>• Health and sickness.</li> </ul>	7th September to 25th September
			28th September to 6th November
			10th November to 21st December
<b>Second</b>	Project 2: I am a chef.	<ul style="list-style-type: none"> <li>• Health and sickness</li> <li>• States of the material.</li> <li>• Energy. Electricity.</li> <li>• Pure substances and mixtures.</li> </ul>	8th January to 29th January
			1st February to 5th March
			8th March to 26th March
<b>Third</b>	Project 3: I am exploring Nature.	<ul style="list-style-type: none"> <li>• Vertebrate and invertebrate animals. Classification and characteristics.</li> <li>• The plants. Structure and physiology.</li> </ul>	6th April to 26th April
			27th April to 17th May
			18th May to 21st June

### 3.6 Complementary and Extra-curricular Activities

#### 3.6.1 *Extra-curricular activities*

Learning takes place not only inside but outside the classroom. In STEM education the connection with the world is essential since it involves experiential learning, observing Nature, formulating hypotheses, and solving problems in society. Out-of-the class activities are considered those that promote content and language related to the outside world and that improve the ability to establish connections between what students have learned in class and

other contexts. These activities also help to improve students' motivation towards the content.

Table 3, shows the out-of-class activities proposed in this annual syllabus:

Table 3. *Distribution of the complementary activities.*

<b>Projects</b>	<b>Out-of-class activity</b>
<i>I am a nutritionist</i>	<p>Visit an ecological market (<a href="#">Mercados Agroecológicos en Madrid</a>) that takes place every week. associated to value local produce and the benefits for health.</p> <p>Visit <a href="#">Danone Factory</a> (Tres Cantos, Madrid) to learn about the production process of yoghurt.</p>
<i>I am a chef</i>	Visit <a href="#">Madrid Fair for Science &amp; Innovation</a> to learn about different projects conducted by other schools.
<i>I am exploring Nature</i>	<p>Visit <a href="#">Faunia</a> to learn about animals in a thematic park.</p> <p>Visit <a href="#">Valdelatas Forest</a> to learn about students' natural environment.</p> <p>Ss identify plants in their environment that provide them with oxygen, by listing some places where there are plants in the environment (parks, countryside), and the plants you can find in those places and in Valdelatas forest during a trip.</p>

### 3.6.2 *Complementary activities*

Apart from these out-of-class activities, several complementary activities are also carried out at the school to apply curricular content in an engaging way. One example is inviting an expert in yoga and mindfulness to one session so that students can experiment physically the concepts related to the human body or the locomotor and the nervous systems. Another example is promoting experiential learning by conducting experiments with appliances to discover how they work. Observing seeds or a butterfly so that students can learn by doing in a meaning way. Raising their curiosity towards the importance of observing Nature, or recycling and respecting our environment are vital lessons they learn constructively based on their enquiry and research. Being aware of the importance of nutrition and healthy lifestyles through discovery of healthy foods, their sources, or



interesting recipes to prepare them is another example of STEM applied to primary education. All these key competences will be crucial in students' academic, professional, and personal lives.

### 3.6.3 *Extensive reading programme*

In a CLIL approach to implement STEM education, literacy becomes an important tool to reinforce the linguistic demands that a content and language integrated learning implies. Literacy involves a collection of skills including oral expression, analytical and critical reading skills, and creative writing skills. The extensive reading programme provides a series of books, illustrated encyclopedias and stories to design literacy activities aimed at developing essential skills. These books and stories are related to the contents of the curriculum but also promote that students express their own ideas and creativity. Literacy skills allow students to understand and internalize better concepts they are learning in other subject areas as Natural Science in English. Working with explicit meaning of words and structures, understanding implicit meaning, or guessing and reading between the lines, and being able to interpret the sociocultural context of the story help students tackling texts in the foreign language. Literacy also offers the opportunity of reading for pleasure.

Having access to a classroom library offers a great opportunity for students to use reference books but also to choose the stories they would like to read in class and at home. Taking books home also reinforces the collaboration with families in the learning process. According to De la Roz (2019), folk and traditional stories bring into the classroom cultural and social values. They help students to develop higher order thinking skills such as thinking, analyzing, judging, evaluating, criticizing, inventing, and assuming facts. More specifically, De la Roz (2019) emphasizes the positive influence literacy has on three dimensions which are relevant in the present syllabus:

a) The linguistic dimension: literacy is strongly linked to the development of written and oral communicative abilities, reading comprehension and written expression. It allows students to communicate with their peers and share stories, as well as develop their listening skills when they are being read a story or watching a video.

b) The cultural dimension: literacy provides relevant data on other worlds, other cultures, other spaces, and other times. It helps students to understand that the world is larger than they think, broadens their vision of the world, and connects them with diverse realities.

c) The emotional dimension: literary stories bring the reader into contact with new, surprising, and different realities and experiences, generating new ideas, emotions, and concepts. Through the different characters, students can identify and understand the emotions of others, highlighting their empathy or ability to understand each other.

Taking into account the criteria reviewed above, the extensive reading programme for this syllabus includes a combination of strategies, books, illustrated encyclopedias, hands-on books, texts and stories that will be progressively adapted to students' needs and interests related to STEM, Natural Science and CLIL:

### **First Term – First Project**

- Clark, J. (1998) *The human body*. Marshat editions.
- Day, T. (1994). *Human body (1001 questions and answers)*. Kingfisher books.
- Muskopf, S. (2021). *Human anatomy activity book for kids. Hands-on activities*. Rockridge press.
- Tanco, M. (2019). *Count on me*. Tundra books.
- Wilsdon, C., Daniels, P., & Agestra, J. (2014). *Ultimate bodypedia: An amazing inside-out tour of the human body*. National geographic kids.
- Winston, R. (2016). *The skeleton book*. DK children.
- Winston, R. (2017). *My amazing body machine*. DK children.
- Wynne, P., & Silver, D. (2009). *My first human body book*. Dover Publications.

### **Second Term – Second Project**

- Biberdorf, K. (2020). *Kate the chemist series*. Philomel books.
- Bull, J. (2017). *Crafty science*. DK children.
- Calloner, J. (2016). *Maker Lab. 28 super cool projects*. DK children.
- Deutsch, S. (2017). *Girls who code series*. Penguins random house.
- Grandin. T. (2019). *Calling all minds*. Puffin books.
- Macaulay, D. (2015). *How machines work: Zoo break*. DK children.

- Maynard C. (2001). *Kitchen science with over 50 fantastic experiments*. DK children.
- Maynard C., & Ling, M. (2001). *Backyard science with over 50 fantastic experiments*. DK children.
- Oxley, J., & Aronson, B. *Peg +cat: The pizza problem*. Candlewick.
- Winston, R. (2019). *Ask a scientist*. DK children.
- Winston, R. (2020). *Inventors. Incredible stories of the world's most ingenious inventions*. DK children.

### **Third Term – Third Project**

- Brown, K. (2021). *Nature anatomy activities for kids*. Rockridge press.
- Colvin, L., Speare, E., & Bowring, I. (2010). *The living world encyclopedia*. Usborne books.
- Fredericks, A. (2017). *Tall tall tree: A Nature book for kids about forest habitats*. Dawn publications.
- Hickman, P., & Gavin C. (2019). *Nature all around: Bugs*. Kids Can Press.
- Hickman, P., & Gavin C. (2020). *Nature all around: Plants*. Kids Can Press.
- Kirkman, M. (2020). *Seeds*. Raintree.
- Newland, S. (2020). *Plants (outdoor science)*. Capstone press.
- Pratt-Serafini, K., & Crandell, R. (2008). *The forever forest: Kids saved a tropical treasure*. Dawn publications
- *Strange but true*. (2015). DK children.

### **3.7 Tutorial Action Plan and Collaboration with Families**

The Tutorial Action Plan (TAP) is developed within the Educational Project and the Annual Programme of the School according to the Legislation from the Community of Madrid. The TAP is a collective programme that aims to generate among the educational community a framework of trust and cooperation, together with the academic and professional guidance for students and families. The Tutorial Action Plan supports the students along their path of learning and emotional and social development, encouraging diversity and a comprehensive development for each student. The Tutorial

Action Plan works on study habits and multiple intelligences to prepare students for life-long-learning strategies, social skills, interpersonal relationships, and problem solving. Workshops are organized to provide students with the necessary knowledge and skills to choose and adopt healthy lifestyles, to help each other, to reinforce the value of family, to solve conflicts, to show care about each other. The main goals of the TAP:

- To strength individual and group monitoring.
- To promote diversity and inclusion values.
- To encourage personal relations among the students.
- To learn how to avoid, detect and solve conflicts in a peaceful manner.
- To ensure coordination among the group teachers regularly.
- To coordinate an assessment and evaluation process of students.
- To develop a coexistence plan for the group, stablishing values.
- To establish the organization of the classroom and the positions each student has.
- To inform families regularly of the progress of their children, including information about the activities carried out by the school.
- To guide families providing learning strategies and habits.
- To carry out a teaching evaluation and assessment.

The collaboration of families in the learning process of their children at school is essential. This cooperation is even more critical when students are learning in bilingual contexts, applying a CLIL approach to STEM education, as in the present Syllabus. A fluent and regular communication is crucial to inform families about the teaching and learning process, the tasks carried out and the methodologies implemented. Families will need guidance on how to deal with the difficulties their children will face when learning content subjects in an L2, English in this case. Some orientations on strategies to help their children at home will reinforce that mutual collaboration and understanding. To achieve this aim, it is important to plan periodic sessions for all parents to receive

feedback, share perspectives, and inform of the development of the CLIL and STEM projects. Inviting parents to the school and counting on their likely expertise of some of the Syllabus projects and contents will strength and enrich the relationship of students, families, tutors, and teachers, as a learning community. In addition, periodic meetings with individual families provide an excellent chance to share their perspectives on each student's progress and needs to solve challenges and difficulties. This collaborative mechanism helps to attend diversity, a key element for the successful development of the approach implemented in the present Syllabus.

## 4 PROJECTS

### 4.1 Project 1: “I am a nutritionist”

4.1.1 <i>Didactic Unit 1. Digestion and nutrients</i>	
<p><b>Content area:</b> Science  <b>Level:</b> Year 3, Primary Education  <b>Timing:</b> 8 sessions at the beginning of the first trimester, in 4 weeks.  <b>Description:</b> Students understand the journey of food in our digestive system as well as some characteristics of the system and the food we eat.  <b>Product:</b> Modelling of the digestive system with recycled materials.</p>	
<b>CONTENT</b>	
<p><b>Content:</b>  <u><i>The human being and health</i></u></p> <p><b>Digestive system.</b>          Main characteristics of the digestive system and the organs that constitute it (mouth, oesophagus, stomach, intestine small and large intestine).</p> <p><b>Language content:</b>          Presentation of the journey of the food in digestion.</p>	<p><b>STEM education</b></p> <ul style="list-style-type: none"> <li>• Formulating questions.</li> <li>• Searching for information.</li> <li>• Analyzing and selecting data.</li> <li>• Writing the characteristics of the digestive.</li> <li>• Labeling the parts of the digestive system.</li> <li>• Assessing the peers’ final model.</li> <li>• Raising awareness of the important of nutrients of food as fuel for our body.</li> </ul> <p>From theory to practice:          ❖ Design a digestive system.</p>
<p><b>Key competences</b></p> <ol style="list-style-type: none"> <li>1. Competence in Linguistics: This competence is developed through communication between members of a team, requesting information from external sources, reading, and selecting information, writing different types of texts and presenting conclusions or results orally. Communication to participate in a debate.</li> <li>2. Competence in Mathematics Science and Technology: Activities related to the use of the digestive system organs and macronutrients.</li> <li>3. Digital Competence: This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used.</li> <li>4. Learning to Learn: Selecting and using various sources of information, analysing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one’s own learning effectively.</li> <li>5. Social and Civic Competences: Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication, will encourage the development of these.</li> <li>6. Cultural Awareness and Expressions: Developing creativity by producing various artworks (a digestive system design using recycled materials) is a way to support this competence.</li> </ol>	

COGNITION	
<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>1. To know the devices involved in relational functions: the digestive system.</li> <li>2. To relate the organs that constitute it (mouth, oesophagus, stomach, intestine small and large intestine).</li> <li>3. To design a model of the digestive system to display the journey of the food during the digestion.</li> <li>4. To judge the result of peers' models using a rubric, justifying the assessment they give to improve it.</li> <li>5. To know about the macronutrients and essential vitamins, associated with the diet pyramid.</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>1.1 Pupils label a diagram of the digestive system.</li> <li>1.2 Pupils explain the process of digestion.</li> <li>2.1 Pupils match, label, locate and draw the organs with their functions during the digestion process in the digestive system on a worksheet.</li> <li>3.1 Pupils design a digestive system using recycled materials.</li> <li>3.2 Pupils expose the journey of the food in digestion.</li> <li>4.1 Pupils judge the result of peers' models using a rubric, justifying the assessment they give to improve it.</li> <li>5.1 Pupils identify the macronutrients and essential vitamins (A, B, C, D and E), in the pyramid.</li> </ol>
CULTURE	
<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>6. To inquiry about different food pyramids in other cultures.</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>6.1 Pupils discover different food pyramids in other cultures.</li> <li>6.2 Pupils identify macronutrients and foods from other cultures.</li> </ol>
COMMUNICATION	
<p><b>Language of learning:</b></p> <ul style="list-style-type: none"> <li>• Digestive system: large intestine, mouth, esophagus, saliva, small intestine, stomach, teeth.</li> <li>• Nutrients: carbohydrates, fats, minerals, proteins, vitamins.</li> <li>• Identifying macronutrients and vitamins in food: Avocados have fat; Proteins are in the middle of the pyramid; Some fruit has vitamin C; The sun helps to absorb vitamin D.</li> <li>• Parts of a presentation: table of content, headings, covering and closing.</li> <li>• Genre: description: This is... It has...</li> <li>• Connectors: The first organ, then, after...</li> <li>• Body language (formal body posture, eye contact, no crossed arms, no hands in pockets...).</li> <li>• Discussing ideas: I think, in my opinion, I agree/disagree with ... because...</li> </ul> <p>Language structures:</p> <ul style="list-style-type: none"> <li>– The large intestine isn't thin. It's wide.</li> <li>– Eggs have proteins.</li> <li>– Nuts have healthy fats.</li> <li>– I have to eat some fruit and vegetable every day.</li> <li>– Sugar should be reduced.</li> </ul>	

**Language for learning:**

- Explaining a process: The food we eat is processed as it moves through the stomach and intestines.
- Listing the steps on the journey of the food in digestion: (1) The mouth is where the digestive tract begins. (2) Saliva released into the mouth starts the process of digestion. (3) The **esophagus** moves food from the back of your throat to your stomach.
- Judging the result of peers': it is well-designed, the process is clear...it is incorrect.
- Classroom language: I have a question, another example is, what's the word in English for ...?

**Language through learning:**

Searching for information; learning about digestive systems. Using ICT; using recycled material; readings; peer interaction and project presentation.

**ASSESSMENT**

- **Of language:**
  - Teacher's oral language modelling on spot.
  - Feedback of activities using short answers, thumbs up/down.
- **Of content:**
  - Teacher oral and written feedback on the activities.
  - Teacher rubric for active observation of group research.
  - Rubric to assess the research process.
  - Rubric to assess the model of the digestive system.
  - Summary of students' self-evaluation.
  - Rubric to evaluate the presentation of the results.
- **Of process:**
  - Learning intentions wall.
  - Teacher checklist for active observation while Ss are doing the activities.
  - Class minibook.

**Evaluation criteria:**

1. Give opinion on healthy and unhealthy lifestyles.
2. Distinguish dishes and be able to associate dishes and cultures.
3. Identify and locate the main organs involved in carrying out the vital functions of the human body, establishing some fundamental relationships between them and certain health habits.
4. Know the functioning of the human body: cells, tissues, organs, devices, systems: their location, shape, structure, functions, care, etc.
5. Relate certain life practices with the proper functioning of the body, adopting healthy lifestyles, knowing the health repercussions of their way of life.

**STEM content evaluation criteria:**

6. Obtain relevant information to know the digestive system and the journey of food.
7. Communicate orally and in writing the results obtained after carrying out various experiences, presenting them with graphic supports.
8. Work cooperatively, appreciating care for their own safety and that of their colleagues, taking care of tools and making proper use of materials.
9. Carry out projects and present reports.



ATTENTION TO DIVERSITY	
<p><b>LOTS to HOTS</b></p> <ul style="list-style-type: none"> <li>To compare the digestive system of mammals: What are they different? What are they alike?</li> <li>To find out about digestive problems and explain them.</li> </ul>	<p><b>HOTS to LOTS</b></p> <ul style="list-style-type: none"> <li>To choose one memorizing strategy (mind map, list, diagram) to know the functions and characteristics of the parts of the digestive system.</li> <li>To draw, label and locate parts of the digestive system in a worksheet.</li> </ul>

4.1.2 Didactic Unit 2. All systems are connected	
<p><b>Content area:</b> Science  <b>Level:</b> Year 3, Primary Education  <b>Timing:</b> 8 sessions in 4 weeks.  <b>Description:</b> Students understand the basic function of the respiratory, circulatory, excretory system, as well as the reproductive system, to create an analogical model of one of them.  <b>Product:</b> Infographic of the nutrition and reproductive functions.</p>	
CONTENT	
<p><b>Content:</b>  <u>The human being and health</u></p> <p><b>The vital functions of the human being.</b>            Devices involved in nutrition (respiratory, digestive, circulatory and excretory systems) and reproduction (reproductive system).</p> <p><b>Language content:</b>            Oral presentation of the infographic.</p>	<p><b>STEM education</b></p> <ul style="list-style-type: none"> <li>Engaging students into a topic.</li> <li>Analyzing and selecting out information.</li> <li>Summarizing information.</li> <li>Providing shared experiences.</li> <li>Developing research/information skills.</li> <li>Sorting out human systems.</li> <li>Representing and transferring ideas and information found out into infographics or mind maps.</li> <li>Revising as a group.                From theory to practice:</li> <li>❖ Design a mind map or infographic.</li> </ul>
<p><b>Key competences</b></p> <ol style="list-style-type: none"> <li>Competence in Linguistics: This competence is developed through communication between members of a team, requesting information from external sources, reading and selecting information, writing different types of texts and presenting conclusions or results orally. Communication to participate in a debate.</li> <li>Competence in Mathematics Science and Technology: Activities related to the devices involved in nutrition and reproduction.</li> </ol>	

3. **Digital Competence:** This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used.
4. **Learning to Learn:** Selecting and using various sources of information, analysing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one's own learning effectively.
5. **Social and Civic Competences:** Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication.
6. **Cultural Awareness and Expressions:** Developing creativity by producing various artworks (infographics about body systems) is a way to support this competence.

### COGNITION

<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>1. To know the devices involved in nutrition functions: respiratory, digestive, circulatory and excretory.</li> <li>2. To collaborate in an investigation about the respiratory, circulatory, and excretory systems, to discover the system, parts, and basic functions.</li> <li>3. To assess their peers' presentations based on an evaluation rubric.</li> <li>4. To know the reproduction system: male and female organs.</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>1.1 Pupils recall what they know about the digestive system with a one-minute paper.</li> <li>1.2 Pupils discuss about the nutrition function.</li> <li>1.3 Pupils interpret a video about the respiratory, circulatory, and excretory systems.</li> <li>2.1 Pupils investigate in groups the respiratory, circulatory, and excretory systems, applying a jigsaw strategy to discover the system, parts, and basic functions.</li> <li>2.2 Pupils transfer the information they found to mind map or infographic.</li> <li>3.1 Pupils reflect as a group about what they have learned on the respiratory, circulatory, and excretory systems.</li> <li>3.2 Pupils summarize and classify the information of all the mind maps or infographics in their minibook journal.</li> <li>4.1 Pupils identify and label the reproduction system (male and female organs) on a worksheet.</li> <li>4.2 Pupils distinguish between female and male reproductive organs.</li> </ol>
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### CULTURE

<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>5. To value the impact of pollution in our respiratory system.</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>5.1 To inquire places in our city which are more and less polluted.</li> </ol>
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## COMMUNICATION

### Language of learning:

- Respiratory system: respiratory, respiration, carbon dioxide, mouth, oxygen, inspiration, expiration, breath, air, lungs.
- Circulatory system: veins, heart, blood, arteries,
- Excretory system: anus, bladder, excretory system, kidneys.
- Reproduction system: ovary, uterus, vagina, sperm, testicle, urethra.
- Parts of a presentation: table of content, headings, covering and closing.
- Body language (formal body posture, eye contact, no crossed arms, no hands in pockets...)
- Exposing facts and results (First, second, third, ...)

### Language structures:

- The ureters are thin tubes.
- Blood doesn't go through the bladder.
- Breathe deeply, stand up, kneel, lay down, raise your feet.

### Language for learning:

- Discussing about the nutrition function: I think food makes our bodies grow and keep us strong, in my opinion..., I agree..., I disagree...
- Reflecting as a group: we have learned how...we found out, we listened to..., we watched..., we created...,
- Summarizing and classifying the information: At the beginning, in the next part, finally.
- Asking and answering questions about the senses: How does it taste? How does it feel?
- Recalling questions and answers: What is the function of the stomach?
- Examining and classifying information: We check, we research, we test...
- Associating information: This connects to..., It joins...
- Identifying the senses: We see with our... we smell with our... we taste...
- Sorting out the features: circulatory system transports materials to and from cells..., the major organs are: heart, veins...
- Presenting the journey of food: The journey of food starts in our mouth, the teeth help crush the food into smaller pieces...

### Language through learning:

Searching for information; learning about body systems. Using ICT, video, readings; peer interaction and infographic presentation.

## ASSESSMENT

- **Of language:**
  - Teacher's oral language modelling on spot.
  - Feedback of activities using short answers, thumbs up/down.
- **Of content:**
  - Teacher oral and written feedback on the activities
  - Teacher rubric for active observation of group research.
  - Rubric to assess the research process.
  - Rubric to assess the model of the body systems.
  - Summary of students' self-evaluation.
  - Rubric to evaluate the presentation of the infographic or mind map.
- **Of process:**
  - Learning intentions wall.

<ul style="list-style-type: none"> <li>• Teacher checklist for active observation while Ss are doing the activities.</li> <li>• Class minibook journal.</li> <li>• One-minute paper.</li> </ul>	
<p><b>Evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>1. Name the five senses and some adjectives related to food.</li> <li>2. Explain the process of the digestive system.</li> <li>3. Identify and locate the main organs involved in carrying out the vital functions of the human body, establishing some fundamental relationships between them and certain health habits.</li> <li>4. Know the functioning of the human body: cells, tissues, organs, devices, systems: their location, shape, structure, functions, care, etc.</li> <li>5. Relate certain life practices with the proper functioning of the body, adopting healthy lifestyles, knowing the health repercussions of their way of life.</li> </ol> <p><b>STEM content evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>6. Obtain relevant information on body systems body systems and communicating the results.</li> <li>7. Communicate orally and in writing the results obtained after carrying out various experiences, presenting them with graphic supports.</li> <li>8. Work cooperatively, appreciating care for their own safety and that of their colleagues, taking care of tools and making proper use of materials.</li> <li>9. Carry out projects and present reports.</li> </ol>	
<b>ATTENTION TO DIVERSITY</b>	
<p><b>LOTS to HOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils design a model of the system they have inquired.</li> </ul>	<p><b>HOTS to LOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils highlight vocabulary related to pollution.</li> </ul>

<b>4.1.3 Didactic Unit 3. To be aware of your body</b>	
<p><b>Content area:</b> Science  <b>Level:</b> Year 3, Primary Education  <b>Timing:</b> 8 sessions in 4 weeks.  <b>Description:</b> Students understand vital functions of the human being and the experiences humans have in relation with the environment.  <b>Product:</b> Create a Genially illustrating yoga postures and a minibook journal about body awareness.</p>	
<b>CONTENT</b>	
<p><b>Content:</b>  <u>The human being and health</u></p> <p><b>The vital functions of the human being.</b>  Devices involved in relational functions (sense organs, locomotor system and nervous system).  <b>The senses.</b></p>	<p><b>STEM education</b></p> <ul style="list-style-type: none"> <li>• Engaging students into a topic (yoga).</li> <li>• Sharing personal experiences about a topic.</li> <li>• Providing shared experiences.</li> <li>• Developing research / information skills.</li> <li>• Classifying parts of the locomotor, nervous and reproductive systems.</li> </ul>

<p>Function of the sense organs, their possible alterations and the care they require.</p> <p><b>Language content:</b></p> <ul style="list-style-type: none"> <li>• Presentation of a yoga posture displayed with Genially.</li> </ul>	<ul style="list-style-type: none"> <li>• Relating sports with the relational human functions.</li> <li>• Transferring the information of a worksheet to a performance.</li> <li>• Revising as a group.</li> <li>• Evaluating and assessing the learning process.</li> </ul> <p>From theory to practice:</p> <ul style="list-style-type: none"> <li>❖ With the yoga instructions, perform a yoga posture correctly.</li> </ul>
<p><b>Key competences</b></p> <ol style="list-style-type: none"> <li>1. Competence in Linguistics: This competence is developed through communication between members of a team, requesting information of the different body systems from external sources, reading and selecting information, writing different types of texts and presenting conclusions or results orally.</li> <li>2. Competence in Mathematics Science and Technology: Activities related to the use of the different systems of the nutrition and reproduction human function.</li> <li>3. Digital Competence: This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used.</li> <li>4. Learning to Learn: Selecting and using various sources of information, analysing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one's own learning effectively.</li> <li>5. Social and Civic Competences: Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication, will encourage the development of these.</li> <li>6. Cultural Awareness and Expressions: Developing creativity by producing a yoga performance.</li> </ol>	
<p><b>COGNITION</b></p>	
<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>1. To know the devices involved in relational functions: senses, knowing the functions, their possible alterations, and the care they require.</li> <li>2. To know the devices involved in relational functions: locomotor and nervous systems.</li> <li>3. To explain the function of the locomotor system by talking about sports and active lifestyle.</li> <li>4. To relate the nervous system with the practice of yoga.</li> <li>5. To assess the yoga posture based on an evaluation rubric.</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>1.1 Pupils discuss about the relational function humans have with the environment and the senses.</li> <li>1.2 Pupils write on post-its and paste them on a mural reflecting on their experiences related with the five senses.</li> <li>2.1 Pupils connect the locomotor system with sports and active lifestyle, talking about their experiences.</li> <li>2.2 Pupils identify the sickness consequences if they do not do some sports.</li> <li>3.1 Pupils label the organs involved in the nervous system.</li> <li>4.1 Pupils identify the functions of the nervous system and locomotor system in the movements involved in a yoga posture.</li> </ol>

	<p>5.1 Pupils develop a performance of a yoga posture.</p> <p>5.2 Pupils assess their own yoga posture based on an evaluation rubric.</p> <p>5.3 Pupils assess their peers' performance.</p>
<b>CULTURE</b>	
<p><b>Learning goals:</b></p> <p>6. To search about the origin of yoga.</p> <p>7. To value pleasant and unpleasant things in the immediate environment through the senses (smell of flowers, flavour of food, sound of birds).</p>	<p><b>Learning outcomes:</b></p> <p>6.1 Pupils explain the origin of yoga.</p> <p>7.1 Pupils identify pleasant and unpleasant things in the immediate environment through the senses (smell of flowers, flavour of food, sound of birds).</p>
<b>COMMUNICATION</b>	
<p><b>Language of learning:</b></p> <ul style="list-style-type: none"> <li>• Senses: sight, see, eyes, colorful, bright, darkish, taste, mouth, sweet, sour, salty, bitter, touch, hands, skin, fingers, hard, soft, smooth, rough, hear, ears, sound, crunchy, liquid.</li> <li>• Nervous system: brain, nerves, stimulus, receptor.</li> <li>• Locomotor system: bones, muscles, joints, skeleton.</li> <li>• Sports/Yoga: stretch, relax, strength, cardio, walk, run, jump, cobra, triangle, cat, camel, tree and rocket postures.</li> <li>• Explaining concepts: This is ..., the brain sends information, the muscle responses.</li> <li>• Parts of a presentation: table of content, headings, covering and closing.</li> <li>• Connectors: First, next, after that, then, finally.</li> <li>• Body language (formal body posture, eye contact, no crossed arms, no hands in pockets...).</li> </ul> <p>Language structures:</p> <ul style="list-style-type: none"> <li>– It tastes salty.</li> <li>– It has a disgusting flavour.</li> <li>– It does not look appetizing.</li> </ul> <p><b>Language for learning:</b></p> <ul style="list-style-type: none"> <li>• Discussing about the relational function humans: I think..., in my opinion..., I don't think..., I agree... That is right/wrong... I noticed that... I wonder ...</li> <li>• Reflecting on their experiences: I think about, I consider, I review, my partner and I/ my group discussed / decided / agreed on...</li> <li>• Assessing the language used to present their own yoga posture based on an evaluation rubric: First, we warm up, then, we stand, we balance our body, we breathe deeply, we relax.</li> <li>• Explaining the origin of yoga: Yoga is an old discipline from India. It is both spiritual and physical. Yoga uses breathing techniques, exercise, and meditation.</li> <li>• Giving and understanding instructions: Stand up, kneel, breathe deeply, ...</li> <li>• Relating actions to parts of the locomotor system: strength to muscles, stretch to joints, run to legs.</li> <li>• Classroom language: What did you say? Do you have a suggestion? Do you understand? I don't understand, Say it again, please.</li> </ul> <p><b>Language through learning:</b></p>	

Reading and understanding worksheets; learning about relational function; use ICT, peer interaction.

### ASSESSMENT

- **Of language:**
  - Teacher’s oral language modelling on spot.
  - Feedback of activities using short answers, thumbs up/down.
- **Of content:**
  - Teacher oral and written feedback on the activities
  - Teacher rubric for active observation of group research.
  - Rubric to assess the research process.
  - Rubric to assess the yoga posture.
  - Summary of students’ self-evaluation.
  - Worksheets.
- **Of process:**
  - Learning intentions wall.
  - Teacher checklist for active observation while Ss are doing the activities.
  - Class minibook journal.

**Evaluation criteria:**

1. To name the parts of the locomotor system and the reproduction system.
2. To identify and locate the main organs involved in carrying out the vital functions of the human body, establishing some fundamental relationships between them and certain health habits.
3. To know the functioning of the human body: cells, tissues, organs, devices, systems: their location, shape, structure, functions, care, etc.
4. To relate certain life practices with the proper functioning of the body, adopting healthy lifestyles, knowing the health repercussions of their way of life.

**STEM content evaluation criteria:**

5. Obtain relevant information on relational function (locomotor system, nervous system and senses) and communicating the results.
6. Communicate orally the results obtained after carrying out various experiences, presenting them with graphic supports.
7. Work cooperatively, appreciating care for their own safety and that of their colleagues, taking care of tools and making proper use of materials.
8. Carry out projects.

### ATTENTION TO DIVERSITY

**LOTS to HOTS**

- Pupils invent a new yoga posture.
- Pupils identify the benefits of calming down.
- Pupils justify their choices about pleasant and unpleasant things in the immediate environment and compare their different choices.

**HOTS to LOTS**

- Pupils identify the muscles that are involved in their yoga posture.
- Pupils draw and label one of the organs of their body system.



### PROCEDURE



Timing/ Stage	Task/Activity Inquiry method	Group
Session 1 (45 min)- The senses		
10 mins / Activation /Listening /Speaking	<p><b>Act 1.</b>T asks Ss some activation questions:</p> <ul style="list-style-type: none"> <li>- Is there any sense more important than others?</li> <li>- Can we live without any sense?</li> </ul> <p>Ss work in pairs to answer those questions.</p>	WG/SG
10 mins / Thinking skills/ Speaking	<p><b>Act 2.</b> Ss discuss their result, meanwhile the T takes notes of their discussion in the digital board.</p>	WG
15 mins / Scaffolding /	<p><b>Act 3.</b> T gives a flashcard with vocabulary to Ss, then Ss play a guessing game trying to figure out what organ they have in their flashcard without saying the name of the organ. Ss can use the rest of the vocabulary it appears in the flashcard to formulate sentences so the whole group can find out the organ. Then Ss name orally the functions of the main organs of the senses.</p>	WG / I
10 mins / Thinking skills / Round up	<p><b>Act 4.</b> Ss brainstorm about pleasant and unpleasant experiences they had with the senses and their relational function with the environment and complete a Mind Map.</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>            Activation questions            Flashcards with key vocabulary.            Notes about the brainstorm of the resulting answers  <b>Transformation scaffolding:</b>            Answers in pairs of the activation questions            Sentence cards for discussion</p> <ul style="list-style-type: none"> <li>- For me X is the most important sense; I think that we can/cannot...</li> </ul> <p>List of functions            Mind map about pleasant and unpleasant experiences  <b>Production scaffolding:</b>            Formulation of sentences so the whole group can find out the organ</p>	WG
Session 2 (45 min)- The nervous system		
5 mins / Activation	<p><b>Act 1.</b> T asks in class:</p> <ul style="list-style-type: none"> <li>- What can you hear?</li> <li>- What can you see?</li> </ul>	WG / I



<p>10 mins / Thinking skills</p> <p>5 mins / Thinking skills</p> <p>10 mins / Thinking skills</p> <p>15 mins / Thinking skills</p>	<ul style="list-style-type: none"> <li>- What can you feel?</li> <li>- What can you smell?</li> <li>- Can you taste something?</li> </ul> <p>Ss write on their mini whiteboards the answers.</p> <p><b>Act 2.</b> Ss choose a special place and complete a worksheet:</p> <ul style="list-style-type: none"> <li>- What can you hear? I can hear...</li> <li>- What can you see? I can see...</li> </ul> <p><b>Act 3.</b> Ss transfer the information from the worksheets to a post-it note to create a mural.</p> <p><b>Act 4.</b> Ss. discuss about the result experiences. Ss guess about some peers' special places.</p> <p><b>Act 5.</b> Some Ss use the blackboard to play a short Pictionary game. Ss draw one of the components of the nervous system, and the rest of the class has to find out what it is. The next Ss that goes to the blackboard must try to relate the function of the nervous system with the senses.</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>          Questions about the senses          Mural with peers' especial places  <b>Transformation scaffolding:</b>          Answers on the mini whiteboard          Worksheet with activities to create the mural and talk about it.          Guessing of the peers' especial places  <b>Production scaffolding:</b>          Pictionary game</p>	<p>I</p> <p>I / WG</p> <p>SG</p> <p>WG / SG</p>
<p>Session 3 (45 min)- Locomotor system (bones, joints and muscles)</p>		
<p>10 mins / Activation</p> <p>15 mins / Thinking skills / Listening / Writing</p>	<p><b>Act 1.</b> To activate their prior knowledge, T introduces the session talking about the film “Coco” she has just watched and showing the Ss a picture of the film poster. Ss discuss about the characters of the film. LA guides the discussion to talk about “skeletons”.</p> <p><b>Act 2.</b> To activate their knowledge about the locomotor system Ss watch a video about muscles, bones and joints:</p> <p><b>Post-listening:</b> Ss complete a visual graph with the information from the video.</p>	<p>WG</p> <p>WG</p> <p>I</p>

<p>20 mins / Thinking skills / Listening /Writing</p>	<p><b>Act 3.</b> Ss watch a second video with names of bones and joints: <b>Post-listening:</b> Ss label the names of the bones in blue and joints in green on the skeleton on the worksheet of the skeletons. Once they write all the names, Ss cut out and paste the parts of the skeleton.</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Coco's poster Video about muscles, bones and joints Flashcards to support the TPR activity <b>Transformation scaffolding:</b> T-chart graph with the information from video about muscles, bones and joints <b>Production scaffolding:</b> Labels using different colours, hand-on activities to learn by doing (cutting out and pasting) on a worksheet</p>	<p>WG I</p>
<p>Session 4 (45 min)- What is yoga?</p>		
<p>10 mins / Activation /Watch a video</p> <p>20 min / Thinking skills / Listening / Speaking /Writing</p> <p>15 mins / Thinking skills / Writing / Round up</p>	<p><b>Act 1.</b> LA activates Ss' prior knowledge by telling a short story about one day practicing yoga. Ss tell what they know about yoga and what it is for. Questions: - What is yoga? Why is it used for? Have you ever practised yoga?</p> <p><b>Act 2. Pre-listening:</b> Ss brainstorm their answers to the question in Act 1. before listening to a video about the origin of yoga to introduce the topic: <b>While-listening:</b> Ss complete a worksheet, circling or writing some words from the video. - Yogis imitated movements of  / , the trees, the mountains... - Yoga the way to exercise our bodies, our (breath) and our (minds) all...</p> <p><b>Post-listening:</b> Ss put their hands together on their chest to try to hear and feel their hearts pump while breathing deeply. Ss become aware of their body recalling from the video the relation between relaxing and the nervous system.</p> <p><b>Act 3.</b> Ss write on their minibook journals the answers to reflect about these questions: - How is the nervous system connected with yoga?</p>	<p>WG</p> <p>WG I</p> <p>WG</p> <p>SG</p>

	<ul style="list-style-type: none"> <li>- What are the important organs of our nervous system? Brain, spinal cord.</li> <li>- Draw inside a human figure the important organs of the nervous system (brain and spinal cord), how does it look like?</li> </ul> <p>Ss use the writing frame displayed on the digital board:</p> <ul style="list-style-type: none"> <li>- Yoga helps our brain relax.</li> <li>- Spinal cord connects the brain with...</li> </ul> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Short story by the LA  Pre-listening questions: What is yoga? Why is it used for? Have you ever practised yoga?  <b>Transformation scaffolding:</b>  Brainstorm about what Ss know about yoga and what it is for  Worksheet, circling or writing some words from the video  <b>Production scaffolding:</b>  Writing on their minibook journal using a writing frame:</p> <ul style="list-style-type: none"> <li>- Yoga helps our brain relax.</li> <li>- Spinal cord connects x to x ...</li> </ul>	
<p>Session 5 (45 min)- How do you feel?</p>		
<p>10 mins / Activation / Speaking</p>	<p><b>Act 1.</b> T shows some pictures of the postures from the Internet so that Ss can guess what the name of each pose might be. Body gestures and scaffolding questions will guide them: Please, have a look to this picture. What do you think it looks like? Does it look like a tree? Once Ss have made their guesses, LA asks them to decide on the posture they would like to investigate on the next session.  Postures:</p> <ul style="list-style-type: none"> <li>- Downward Dog Pose</li> <li>- Cobra Pose</li> <li>- Frog Pose</li> <li>- Butterfly Pose</li> <li>- Tree Pose</li> </ul>	<p>WG</p>
<p>30 mins / Thinking skills/Reading / Writing</p>	<p><b>Act 2.</b> Ss read the rubric for their evaluation. Ss have time to read the flashcards with the information they need for the performance: sequence of steps and the benefits of their posture for relaxation.</p> <p><b>Act 3.</b> Ss read cards with yoga postures, practise their posture and note down the feelings they notice in the</p>	<p>SG  SG</p>

<p>10 mins/ Reading / Round up</p>	<p>muscles while practicing their yoga posture. Ss use these prompts for their writings (frame):</p> <ul style="list-style-type: none"> <li>- Ss “I can feel my legs stretching...”</li> <li>- Ss “I can feel my back stretching...”</li> </ul> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Questions of the activation activity and illustrations with yoga postures. Rubric for peer- assessment Cards with yoga postures. <b>Transformation scaffolding:</b> Use posture card to practice physically <b>Production scaffolding:</b> Note down the feelings of their body using a writing frame: I can feel my legs stretching...</p>	
	<p>Session 6 (45 min)- Performance Day</p>	
<p>5 mins/ Activation</p> <p>30 mins /Performance</p> <p>10 mins / Evaluation</p>	<p><b>Act 1.</b> T and Ss go to the gym to do the yoga session.</p> <p><b>Act 2.</b> Ss perform their yoga postures: Ss have to explain the name, steps and benefits of the posture, naming the parts of the body they are stretching.</p> <p><b>Act 3.</b> Ss asses in groups their own yoga posture and the peers’ posture and evaluate it qualitatively based on the rubric T gave them.</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Rubric for peer- assessment <b>Production scaffolding:</b> TPR activity for yoga session</p>	<p>WG</p> <p>SG / WG</p> <p>SW/ WG</p>
	<p>Session 7 (45 min)- Mindfulness</p>	
<p>15 mins / Activation / Relaxation</p> <p>15 mins / Thinking skills/ Speaking</p>	<p><b>Act 1.</b> T invites an expert in yoga to guide a mini mindfulness session. Ss listen to the expert and perform the actions using a TPR methodology.</p> <p><b>Act 2.</b> Ss talk about what they have felt during the session using these questions as a guideline:</p> <ul style="list-style-type: none"> <li>- Were you aware of your body?</li> <li>- Were you aware of your respiration?</li> <li>- Could you hear your heart?</li> <li>- How do you feel now? Talk about your feelings.</li> </ul>	<p>WG</p> <p>WG</p>



- Muscles, bones and joints: <https://www.youtube.com/watch?v=g7dFX-mJKHU>
  - Names of bones and joints: <https://www.youtube.com/watch?v=ynVRDsDC-84>
- Others:
- Genially
  - iPads

**HUMAN:**

- Expert in yoga

**MATERIAL:**

- Worksheets:
  - o My favourite place
  - o What can your body do?
  - o Express yourself prompts
- Post-it notes
- Flashcards of yoga postures

## 4.2 Project 2: “I am a chef”

### 4.2.1 Didactic Unit 4. A chef must know about nutrition

**Content area:** Science

**Level:** Year 3, Primary Education

**Timing:** 8 sessions in 4 weeks, in the second term.

**Description:** Students understand the importance of a healthy style and actively inform about it to the school.

**Product:** Podcasts about nutrients of food and mini nutritional report to assess a healthy diet for a particular person.

### CONTENT

**Content:**

*The human being and health*

**Health and sickness.**

Importance of a healthy diet.  
The principles of a balanced diet.

**Language content:**

Podcast reporting the result of their research on macronutrients, vitamins, and sources in food.

**STEM education**

- Engaging students into a topic.
- Sharing personal experiences about a topic.
- Knowing students’ questions and interests in the topic.
- Finding out information.
- Summarizing information.
- Developing research/information skills.
- Sorting out macro and micronutrients.
- Representing ideas and information found out into infographics.
- Transferring the information found to a podcast.
- Creating a model to represent the journey of food.
- Revising as a group.
- Reflecting how things went and what we can do with what we have learned.

	<ul style="list-style-type: none"> <li>• Providing further opportunities and context for learning about the topic.</li> </ul> <p>From theory to practice:</p> <ul style="list-style-type: none"> <li>❖ Completing a nutritional report to model a healthy diet for another person.</li> </ul>
<p><b>Key competences</b></p> <ol style="list-style-type: none"> <li>1. Competence in Linguistics: This competence is developed through communication between members of a team, requesting information from external sources, reading, and selecting information about health and nutrition.</li> <li>2. Competence in Mathematics Science and Technology: Activities related to the use of the relational function, system organs and nutrients.</li> <li>3. Digital Competence: This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used.</li> <li>4. Learning to Learn: Selecting and using various sources of information, analysing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one's own learning effectively.</li> <li>5. Social and Civic Competences: Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication, will encourage the development of these.</li> <li>6. Cultural Awareness and Expressions: Developing creativity by recording a podcast.</li> </ol>	
<p><b>COGNITION</b></p>	
<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>1. To know about health and sickness.</li> <li>2. To classify examples of food in healthy or unhealthy (fresh food and processed food) dishes based on the macronutrients (balanced diet), using the pyramid and the healthy dish proportions.</li> <li>3. To investigate the function of a vitamin and their sources in food.</li> <li>4. To record a podcast with the result of their research on macronutrients, vitamins, and sources in food.</li> <li>5. To write a nutritional report for a real person in which they have to design a diet, and establish some healthy habits related with the relational function (take</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>1.1 Pupils compare healthy and unhealthy lifestyles.</li> <li>1.2 Pupils report on dietary habits in other cultures to hypothesize the principles of a balanced diet.</li> <li>1.3 Pupils infer a definition of gastronomy.</li> <li>1.4 Pupils assess their own diet and their peers'.</li> <li>2.1 Pupils classify food related with the macronutrients in examples of traditional dishes and its ingredients in Mediterranean diet using the pyramid.</li> <li>3.1 Pupils inquiry the function of a vitamin and their sources in food.</li> <li>4.1 Pupils record a podcast with the result of their research about nutrients of food.</li> <li>5.1 Pupils complete a nutritional report recommending a healthy diet (fresh food) and healthy habit to a friend or relative.</li> </ol>

<p>care of the senses and practice some sports).</p> <p>6. To assess a peer's report based on an evaluation rubric (peer-evaluation).</p>	<p>6.1 Pupils talk about the final results, reflecting how things went and what we can do with what we have learned.</p> <p>6.2 Pupils assess a peer's report based on an evaluation rubric.</p>
<b>CULTURE</b>	
<p><b>Learning goals:</b></p> <p>7. To express their opinion about dietary habits in other cultures.</p> <p>8. To value food and dishes from other cultures.</p>	<p><b>Learning outcomes:</b></p> <p>7.1 Pupils debate about their habits and the habits in other cultures.</p> <p>8.1 Pupils list some dishes of other cultures.</p>
<b>COMMUNICATION</b>	
<p><b>Language of learning (Appendix A):</b></p> <ul style="list-style-type: none"> <li>• Nutrients: carbohydrates, fats, minerals, proteins, vitamins. (Figure 1/ Figure 2)</li> <li>• Kinds of food: chicken, turkey, soy, egg, fish, rice, potatoes, lentils, oat, wheat, avocado, nuts, milk, yoghurt, cheese, fruit. (Figure 4/ Figure 5)</li> <li>• Identifying macronutrients and vitamins in food: Avocados have fat; Proteins are in the middle of the pyramid; Some fruit has vitamin C; Carrots have vitamin A. (Figure.3)</li> <li>• Healthy lifestyle: Healthy, unhealthy, sport, gastronomy, dish, nutritionist.</li> <li>• Names of cultures (countries): Mediterranean (Greece, Italy), Asian (China, Iran), Mexican (Mexico), American (United States). (Figure 6)</li> <li>• Reporting information: This report shows that eating a variety of foods keeps our meals flavourful and healthy. There are many vegetables and fruits you can eat every day.</li> <li>• Connectors: First, next, after that, then, finally.</li> </ul> <p>Language structures:</p> <ul style="list-style-type: none"> <li>- Lettuce is healthy.</li> <li>- Sweets aren't healthy.</li> <li>- I like fish.</li> <li>- You should eat vegetables every day.</li> <li>- I shouldn't drink fizzy drinks every day.</li> <li>- We should eat chocolate only sometimes.</li> <li>- Eggs have proteins.</li> <li>- Nuts have healthy fats.</li> <li>- I have to eat some fruit and vegetable every day.</li> <li>- Sugar should be reduced.</li> </ul> <p><b>Language for learning (Appendix B, Figure 7):</b></p> <ul style="list-style-type: none"> <li>• Comparing healthy and unhealthy lifestyles: Eating vegetables is healthier than eating cakes.</li> <li>• Reporting on dietary habits: Drink water, don't drink sodas, limit food with sugar.</li> <li>• Inferring a definition of gastronomy: It is related to eating and cooking. It means a style of cooking or eating.</li> <li>• Assessing their own diet and their peers': eat a variety of vegetables and fruits, choose a variety of protein food (seafood, meat, eggs, beans) ...</li> <li>• Talking about the results: First, after that, finally...</li> </ul>	



<ul style="list-style-type: none"> <li>• Debating about their habits and the habits in other culture: In my opinion, Mediterranean diet is healthier than American diet because it has more vegetables and fruits.</li> <li>• Classroom language (<a href="#">Appendix C</a>, <a href="#">Figure 8</a>): Which topic will your group report on? Who would like to start? Listen to the recording, please.</li> </ul> <p><b>Language through learning:</b> Listening and understanding a recording; learning about healthy lifestyle and sickness; use ICT; peer interaction.</p>	
<b>ASSESSMENT</b>	
<ul style="list-style-type: none"> <li>• <b>Of language:</b> <ul style="list-style-type: none"> <li>• Teacher’s oral language modelling on spot.</li> <li>• Feedback of activities using short answers, thumbs up/down.</li> </ul> </li> <li>• <b>Of content:</b> <ul style="list-style-type: none"> <li>• Teacher oral and written feedback on the activities</li> <li>• Teacher rubric for active observation of group research.</li> <li>• Rubric to assess the research process and podcast.</li> <li>• Rubric to assess the nutritional reports.</li> <li>• Summary of students’ self-evaluation.</li> <li>• Rubric to evaluate the classification of macronutrients in the pyramid.</li> <li>• One-minute paper</li> </ul> </li> <li>• <b>Of process:</b> <ul style="list-style-type: none"> <li>• Learning intentions wall.</li> <li>• Teacher checklist for active observation while Ss are doing the activities.</li> <li>• Class minibook journal.</li> </ul> </li> </ul>	
<p><b>Evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>1. Name macronutrients and vitamins in different kinds of food.</li> <li>2. Identify and locate the main organs involved in carrying out the vital functions of the human body, establishing some fundamental relationships between them and certain health habits.</li> <li>3. Know the functioning of the human body: cells, tissues, organs, devices, systems: their location, shape, structure, functions, care, etc.</li> <li>4. Relate certain life practices with the proper functioning of the body, adopting healthy lifestyles, knowing the health repercussions of their way of life.</li> </ol> <p><b>STEM content evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>5. Obtain relevant information on healthy habits and nutrients and communicating the results.</li> <li>6. Communicate orally and in writing the results in a nutritional report obtained after carrying out various experiences, presenting them with graphic supports.</li> <li>7. Work cooperatively, appreciating care for their own safety and that of their colleagues, taking care of tools and making proper use of materials.</li> <li>8. Carry out projects and present reports about nutrition.</li> </ol>	
<b>ATTENTION TO DIVERSITY</b>	
<p><b>LOTS to HOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils complete a nutritional report recommending a healthy diet and healthy habit to a sedentary and overweight person.</li> </ul>	<p><b>HOTS to LOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils create a list of foods that includes the vitamin they have researched instead of doing an infographic summary.</li> </ul>

	<ul style="list-style-type: none"> <li>Pupils classify food and dishes with the corresponding culture.</li> </ul>	
<b>PROCEDURE</b>		
Timing/ Stage	Task/Activity Inquiry method	Group
Session 1 (45 min)- What is health?		
15 mins / Activation - Listening & Speaking	<p><b>Act 1.</b> T introduces this question:</p> <ul style="list-style-type: none"> <li>Do you think we live in a healthy world?</li> </ul> <p>Ss watch a video about health, and then start a brainstorm:</p>	WG
10 mins / Thinking skills / Listening & Understanding / TPR	<p><b>Act 2.</b> Ss decide on healthy / unhealthy foods and habits by standing up or (healthy) or sitting down (unhealthy):</p> <ul style="list-style-type: none"> <li>People should eat fruit every day.</li> <li>People should eat pizza every day.</li> <li>People should sleep 8 hours minimum.</li> <li>People should be unactive.</li> </ul>	WG
20 mins / Listening & Writing	<p><b>Act 3.</b> Ss visit the school's kitchen to discover the food and dishes that makes up the Mediterranean gastronomy by asking and writing a list of them with the help of the cooks in their minibook journals (<a href="#">Appendix D</a>, <a href="#">Figure 9</a>/ <a href="#">Figure 10</a>). Then, Ss infer a definition of gastronomy using a writing frame and model of definitions (<a href="#">Figure 11</a>):</p> <p style="padding-left: 40px;">Gastronomy is.... (noun) of cooking / eating...</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Video about health  Brainstorm  <b>Transformation scaffolding:</b>  TPR responses  Writing model to write definitions  <b>Production scaffolding:</b>  Writing a list of foods and dishes of the Mediterranean gastronomy</p>	WG / I
Session 2 (45 min)- Balanced diet		
10 mins / Activation/	<p><b>Act 1.</b> Ss hypothesize the principles of a balanced diet and write a list on the minibook journal by paying attention to vegetables, fruit, cereals, fish, meat.</p>	SG

<p>Speaking &amp; Writing</p> <p>15 mins / Thinking skills / Designing</p> <p>10 mins / Thinking skills / Listening &amp; Speaking</p> <p>10 mins / Creating &amp; Writing / Reasoning / Round up</p>	<p><u>Model of hypotheses of a healthy eating dish: (Figure 12)</u></p> <ul style="list-style-type: none"> <li>- Healthy fats</li> <li>- More veggies</li> <li>- Eat plenty of fruits of all colors</li> <li>- Drink water</li> <li>- Eat variety of whole grains</li> <li>- Unprocessed protein</li> </ul> <p><b>Act 2.</b> Ss design a food pyramid with illustrations to classify the macronutrients of food to create the Mediterranean diet pyramid (Figure 13).</p> <p><b>Act 3.</b> Ss compare the macronutrients in some examples of other foods and dishes using a T-chart graphic organizer to classify between balanced and unbalanced macronutrients (Figure 14). Ss use the next question as a guideline:</p> <ul style="list-style-type: none"> <li>- Which have balanced macronutrients? Why?</li> </ul> <p>Ss give examples of other dishes to name the food associated with the macronutrients and LA takes notes of the examples in the digital board.</p> <p><b>Act 4.</b> Ss create a balanced salad with realia and list the selection of ingredients on the presentation card of the salad and justify orally (Figure 15).</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Model of hypotheses  <b>Transformation scaffolding:</b>  T-chart graphic organizer  Example of foods to locate in the pyramid  <b>Production scaffolding:</b>  List of hypotheses  Design of a pyramid with illustrations  Create a balanced salad with realia (food)  Write a salad presentation card with the list of ingredients</p>	<p>SG</p> <p>WG</p> <p>SG</p>
<p>Session 3 (45 min)- Dishes around the world</p>		
<p>15 mins / Activation – Problem-solving / Speaking</p>	<p><b>Act 1.</b> LA shows a menu from a Chinese restaurant and asks Ss to find out some ingredients (tofu, soybean sauce) of the Chinese dishes in the Mediterranean pyramid diet (problem-solving) (Figure 16). When they can't find them, Ss check whether those ingredients are in the pyramid they worked on previous session. LA notes down their answers on the digital board.</p>	<p>WG</p>

<p>15 mins / Thinking skills – Debate - critical thinking / Writing &amp; Listening</p> <p>15 mins / Investigating – Reading &amp; Writing / Reporting results /Round up</p>	<p><b>Act. 2.</b> Ss list some restaurants from other cultures and debate about their own eating habits and the habits in other cultures (<a href="#">Figure 17</a>). Ss agree to search about the food pyramid of the cultures they are interested in, using a jigsaw strategy.</p> <p><b>Act 3.</b> Ss search for information about the nutritional pyramid in other cultures to complete a chart and show the results (<a href="#">Figure 18</a>).</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Menu from a Chinese restaurant. Mediterranean diet pyramid <b>Transformation scaffolding:</b> Chart about nutritional pyramids in other culture <b>Production scaffolding:</b> Lists restaurant of dishes</p>	<p>WG/ SG</p> <p>SG</p>
<p>Session 4 (45 min)- Micronutrients</p>		
<p>10 mins/ Activation – Problem-solving</p> <p>20 mins / Investigating – Reading &amp; Writing</p> <p>10 mins / Finding solution – Listening &amp; Speaking</p> <p>5 min/ Grouping / Round up</p>	<p><b>Act 1.</b> T starts the class by showing the Ss some pictures of food and asking them to select which of them they think it may have more vitamins. Ss write one minute paper to answer the question, using a writing frame (<a href="#">Figure 19/ Figure 20/ Figure 21</a>):</p> <ul style="list-style-type: none"> <li>- I think tomatoes have more vitamins than sweets</li> </ul> <p><b>Act 2.</b> Ss search and select on the Internet the meaning of micronutrients and what the essential vitamins are and note down the results in their minibook journals (<a href="#">Figure 22</a>).</p> <p><b>Act 3.</b> LA asks again the question of the beginning of the session and Ss report their results orally.</p> <p><b>Act 4.</b> T asks Ss to choose their grouping according to their interests in for next session:</p> <ul style="list-style-type: none"> <li>- Vitamin A/B...</li> </ul> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Pictures of food Question about vitamins <b>Transformation scaffolding:</b> The minibook journal to collect and analyze results</p>	<p>WG</p> <p>WG</p> <p>SG</p> <p>SG</p>

	<p><b>Production scaffolding:</b> One minute paper using a writing frame: I think apples have more vitamins than...</p>	
Session 5 (45 min)- Let´s create a podcast		
<p>15 mins / Activation / Investigate – Selecting information / Writing</p> <p>30 mins / Making decisions / Writing -Round up</p>	<p><b>Act 1.</b> T proposes the activity of the podcast. Ss inquire about the function of a vitamin and their sources in food to prepare their recordings and take notes in their minibook journals.</p> <p><b>Act 2.</b> Ss write the script for the recording using a writing frame: key vocabulary, connectors, and formal script (<a href="#">Figure 23</a>):</p> <ul style="list-style-type: none"> <li>- We find vitamin A in carrots, tuna fish and broccoli. It is good for our eyes and skin.</li> </ul> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Inquire information about vitamins <b>Transformation scaffolding:</b> Notes on the minibook journal about the inquire information of vitamins <b>Production scaffolding:</b> Writing frame with key vocabulary, connectors, and formal aspects of a script.</p>	<p>WG / SG</p> <p>SG</p>
Session 6 (45 min)- Let´s record a podcast		
<p>25 mins / Transferring information - Speaking</p> <p>5 mins / Digital skills</p> <p>15 mins / Round up</p>	<p><b>Act 1.</b> Ss record a podcast with the results of their research about vitamins in food.</p> <p><b>Act 2.</b> Ss upload their recording to a podcast platform.</p> <p><b>Act 3.</b> Ss listen to their peers' recordings using a checklist for peer assessment (<a href="#">Figure 24</a>):</p> <ul style="list-style-type: none"> <li>- List of vitamin sources / functions for body</li> </ul> <p><b>Scaffolding.</b> <b>Production scaffolding:</b> Checklist for peer-assessment of recording List of vitamin sources / functions for body</p>	<p>SG</p> <p>SG</p> <p>SG</p>
Session 7 (45 min)- Finally, I am a nutritionist		

<p>5 min/ Activation- Reading</p> <p>15 mins / Creating - Making decisions / Writing</p> <p>15 mins / Presenting results / Speaking – Listening</p> <p>10 mins / assessment - Writing</p>	<p><b>Act 1.</b> Ss read a checklist about healthy eating dish (<a href="#">Figure 26</a>).</p> <p><b>Act 2.</b> Ss design (draw and write) their own healthy eating dish based on the foods they eat and recognize if they are healthy or can be improved to make them healthier (<a href="#">Figure 25</a>).</p> <p>Guideline:</p> <ul style="list-style-type: none"> <li>- The first step in our healthy eating plate is about "greens", veggies and fruit.</li> <li>- The second step in our healthy eating plate is the selection of whole grains (carbohydrates).</li> <li>- The next step is to choose quality proteins formed by meat, fish and eggs.</li> <li>- Last but not least, include healthy fats.</li> </ul> <p><b>Act 3.</b> Ss present the results of their healthy eating dish using the rubric as a guideline (<a href="#">Figure 26</a>).</p> <p><b>Act 4.</b> Ss use a rubric to assess their own diet and their peers’.</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Video about the food pyramid  Rubric of healthy eating dish  <b>Transformation scaffolding:</b>  Drawings of Ss’ health eating dish  <b>Production scaffolding:</b>  Oral presentation of results: Our healthy dish has vegetables and cereals...</p>	<p>I</p> <p>SG</p> <p>SG</p> <p>SG / I</p>
<p>Session 8 (45 min)- Nutritional report</p>		
<p>10 min / Activation- Reading</p> <p>15 mins / Thinking skills Reporting/ Writing</p> <p>10 mins / Reflecting / Speaking</p>	<p><b>Act 1.</b> Ss read a rubric to assess the nutritional report (<a href="#">Figure 31</a>).</p> <p>Ss analyse a sample of a nutritional report and underline the main sections (<a href="#">Figure 27/ Figure 28</a>).</p> <p><b>Act 2.</b> Ss complete a nutritional report recommending a healthy diet (fresh food) and healthy habit to a friend or relative (<a href="#">Figure 29/ Figure 30</a>).</p> <ul style="list-style-type: none"> <li>- You should eat ... everyday</li> </ul> <p><b>Act 3.</b> Ss talk about the results, reflecting on how things went and what we can do with what we have learned.</p>	<p>WG</p> <p>I</p> <p>SG/WG</p>

<p>10 mins / Assessment – Writing / Round up</p>	<p><b>Act 4.</b> Ss assess a peer’s report based on an evaluation rubric (<a href="#">Figure 31</a>).</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Rubric to assess the nutritional report  <b>Transformation scaffolding:</b>  Model of a nutritional report  Rubric to assess peers’ nutritional report  <b>Production scaffolding:</b>  Nutritional report for a friend or relative</p>	<p>I/SG</p>
<b>MATERIALS</b>		
<p>ICT: Videos:  <ul style="list-style-type: none"> <li>- Health by WHO: <a href="https://www.youtube.com/watch?v=XMcab1MFaLc&amp;t=22s">https://www.youtube.com/watch?v=XMcab1MFaLc&amp;t=22s</a></li> <li>- Food pyramid: <a href="https://www.youtube.com/watch?v=0KbA8pFW3tg">https://www.youtube.com/watch?v=0KbA8pFW3tg</a></li> </ul> Others:  <ul style="list-style-type: none"> <li>- Podcast</li> <li>- iPads</li> </ul> HUMAN: Language Assistant  MATERIAL:  <ul style="list-style-type: none"> <li>- Menu from a Chinese restaurant</li> <li>- Mediterranean pyramid</li> <li>- Portions in a dish</li> <li>- Pyramid to fill</li> <li>- Flash cards/ pictures of food and dishes</li> <li>- Model of a nutritional report</li> <li>- Nutritional report</li> <li>- Minibook journal</li> </ul> </p>		

<i>4.2.2 Didactic Unit 5. Ingredients and quantity</i>	
<p><b>Content area:</b> Science  <b>Level:</b> Year 3, Primary Education  <b>Timing:</b> 7 sessions in 4 weeks, approximately.  <b>Description:</b> Students understand the concept of matter related to kitchen actions and experiences.  <b>Product:</b> A debate about the impact of plastic in nature.</p>	
<b>CONTENT</b>	
<b>Content:</b>	<b>STEM education</b>

<p><u>Matter and energy. Technology. objects and machines</u></p> <p><b>States of the material.</b> Properties of solids, liquids, and gases. The water in the three states.</p> <p><b>Pure substances and mixtures.</b> Mixes and their characteristics.</p> <p><b>Language content:</b> Discussion of impact of plastic in Nature.</p>	<ul style="list-style-type: none"> <li>• Finding out what students already know about states of water.</li> <li>• Sharing personal experiences about a topic.</li> <li>• Knowing students' questions and interests in the topic.</li> <li>• Finding out information about recipes.</li> <li>• Providing shared experiences.</li> <li>• Developing research/information skills.</li> <li>• Calculating quantities and measures using a digital scale.</li> <li>• Creating a list of the ingredients they will need for their recipe.</li> <li>• Revising as a group.</li> <li>• Reflecting about the impact of plastic in Nature.</li> <li>• Providing further opportunities and context for learning about the topic.</li> </ul> <p>From theory to practice:</p> <ul style="list-style-type: none"> <li>• Modeling a shopping list knowing the best choices.</li> </ul>
<p><b>Key competences</b></p> <ol style="list-style-type: none"> <li>1. Competence in Linguistic: This competence is developed through communication between members of a team, requesting information from external sources, reading and selecting information, writing different types of texts and presenting conclusions or results orally.</li> <li>2. Competence in Mathematics Science and Technology: Activities related to the use of a digital scale to measure capacity and mass.</li> <li>3. Digital Competence: This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used.</li> <li>4. Learning to Learn: Selecting and using various sources of information, analysing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one's own learning effectively.</li> <li>5. Social and Civic Competences: Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication, will encourage the development of these.</li> <li>6. Cultural Awareness and Expressions: Developing creativity by writing a traditional recipe.</li> </ol>	
<p><b>COGNITION</b></p>	
<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>1. To research about recipes students like and want to cook (Mediterranean diet or other cultures).</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>1.1 Pupils research about recipes they like and want to cook (Mediterranean diet or other cultures).</li> </ol>



<ol style="list-style-type: none"> <li>2. To identify pure and mixed substances in foods and recipes.</li> <li>3. To discuss about different ways of cooking related with the states of matter and identify the effect of heat on different foods.</li> <li>4. To know the properties of solids, liquids, and gases: water in the three states.</li> <li>5. To analyse a chosen recipe</li> <li>6. To know different ways of measures (mass and capacity), using the digital scale and the analogical scale.</li> <li>7. To discuss about the impact in Nature of plastic containers, and how to avoid them.</li> </ol>	<p>2.1 Pupils identify pure and mixed substances in the recipes.</p> <p>3.1 Pupils list some ways of cooking and the tools they need (oven-baked).</p> <p>4.1 Pupils identify the three different states of matter using water in the kitchen.</p> <p>4.2 Pupils create a graph explaining the three different states of matter.</p> <p>4.3 Pupils identify and write the three states of matter in the stages of their recipe.</p> <p>5.1 Pupils classify in the recipe ingredients, measures, tools, and procedure.</p> <p>5.2 Pupils identify the quantities of ingredients in the chosen recipe.</p> <p>6.1 Pupils weight some water in different containers in grams and litres using a digital scale (mass and capacity).</p> <p>6.2 Pupils experiment with the measures and quantities in their recipes.</p> <p>7.1 Pupils value the impact on Nature of plastic containers in Nature, and how to avoid them.</p> <p>7.2 Pupils compare product containers using illustrations to select Nature-friendly options in the supermarket.</p> <p>7.3 Pupils justify their choices for a shopping list with the best ingredients for their recipes.</p> <p>7.4 Pupils decide on the products to buy in a supermarket based on their choice after the debate.</p>
<b>CULTURE</b>	
<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>8. To evaluate the variety of recipes in different cultures.</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>8.1 Pupils value recipes from different cultures from the point of view of the quantity of healthy nutrients they have.</li> <li>8.2. Pupils rank the recipes from more to less healthy according to the amount of healthy ingredients.</li> </ol>

COMMUNICATION	
<p><b>Language of learning:</b></p> <ul style="list-style-type: none"> <li>• States of matter: solid, liquid, gas, vaporization, condensation, freeze, melt,</li> <li>• Measure: capacity, liter, milliliter, mass, gram, kilogram, scale, containers, bottle.</li> <li>• Kinds of food: chicken, turkey, soy, egg, fish, rice, potatoes, lentils, oat, wheat, avocado, nuts, milk, yoghurt, cheese, fruit.</li> <li>• Describing substances: A smoothy is a mixed substance. You need a wooden spoon to stir the sauce. This is...</li> <li>• Genre: A debate.</li> </ul> <p>Language structures:</p> <ul style="list-style-type: none"> <li>- Discussing ideas: I think, in my opinion, we should avoid plastic containers, we must recycle ...</li> <li>- Connectors: First, second, third, after, finally.</li> <li>- Body language (formal body posture, eye contact, no crossed arms, no hands in pockets...).</li> </ul> <p><b>Language for learning:</b></p> <ul style="list-style-type: none"> <li>• Comparing measures, products, and prices: This or that/ The best is.../ the lower-higher prices are...</li> <li>• Discussing about the impact in Nature of plastic containers: I think it is important to reduce plastic in our environment.</li> <li>• Comparing product containers: glass and paper containers are better than plastic containers.</li> <li>• Justifying their choices for a shopping list. We buy apples because they good for our health.</li> <li>• Deciding on the products to buy in a supermarket: Our choice is ...</li> <li>• Asking and answering questions: How much does a cup of water weigh? How much / many ... we need? We need some, a, an ...</li> <li>• Classroom language: What's the next step? First, we add, second, we mix, I have a question, another example is, what's the word in English for ...?</li> </ul> <p><b>Language through learning:</b> Analyzing recipes; learning about ingredients, measures, cooking instructions, plastic containers. Use of ICT; peer interaction and teamwork.</p>	
ASSESSMENT	
<ul style="list-style-type: none"> <li>• <b>Of language:</b> <ul style="list-style-type: none"> <li>• Teacher's oral language modelling on spot.</li> <li>• Feedback of activities using short answers, thumbs up/down.</li> </ul> </li> <li>• <b>Of content:</b> <ul style="list-style-type: none"> <li>• Teacher oral and written feedback on the activities.</li> <li>• Teacher rubric for active observation of group research.</li> <li>• Rubric to assess the research process.</li> <li>• Rubric to assess the recipes (ingredients, tools, and quantities).</li> <li>• Summary of students' self-evaluation.</li> <li>• Rubric to evaluate the graph explaining the three different states of matter.</li> </ul> </li> <li>• <b>Of process:</b> <ul style="list-style-type: none"> <li>• Learning intentions wall.</li> <li>• Teacher checklist for active observation while Ss are doing the activities.</li> <li>• Class minibook journal.</li> </ul> </li> </ul>	

**Evaluation criteria:**

1. Discuss about the impact in Nature of plastic containers, and how to avoid them.
2. Know the basic principles that govern machines and devices.
3. Plan the construction of objects and devices with a previous purpose, using energy sources, operators, and appropriate materials, carrying out individual and teamwork, and providing information on what strategies have been used.
4. Know the basic laws that govern phenomena, such as the reflection of light, the transmission of electric current.
5. Carry out simple experiences and small investigations on different physical phenomena of matter: posing problems, stating hypotheses, selecting the necessary material, assembling, performing, drawing conclusions, communicating results, applying basic knowledge of the basic laws that govern these phenomena, such as reflection of light, transmission of electric current.

**STEM content evaluation criteria:**

6. Obtain relevant information on the states of matter, making predictions about water in the three states and communicating the results.
7. Establish hypotheses about measures through an experiment with containers and water.
8. Communicate orally and in writing the results obtained after carrying out various experiment, presenting them with graphic supports.
9. Work cooperatively, appreciating care for their own safety and that of their colleagues, taking care of tools and making proper use of materials.

**ATTENTION TO DIVERSITY**
**LOTS to HOTS**

- Pupils calculate the quantities of ingredients in the chosen recipe for different servings.
- Pupils reflect about the quality of products and price comparison.
- Pupils make a graph explaining the three different states of matter.

**HOTS to LOTS**

- Pupils circle the best products containers, and prices for their recipes in a worksheet.
- Pupils illustrate the three different states of matter.
- Pupils classify examples of dishes according to their state of matter using stickers.

**PROCEDURE**

Timing/ Stage	Task/Activity Inquiry method	Group
Session 1 (45 min)- Healthy recipes		

<p>15 mins / Activation / Reading</p> <p>10 mins / Search &amp; Writing</p> <p>20 mins / Thinking skills / Designing /Writing</p>	<p><b>Act 1.</b> Ss read the rubric to assess the project to share the objectives. Ss read the descriptors and ask questions to solve doubts. Then, LA lets Ss form small groups (3-4 pupils).</p> <p><b>Act 2.</b> Ss search and list some recipes of other cultures and rank them from more to less healthy according to the amount of healthy ingredients.</p> <p><b>Act 3.</b> Ss use the results of their previous research on the recipes from different cultures to design a proposal for an intercultural school menu to the school chefs: - The menu for Monday/Tuesday is...</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Rubric to assess the project <b>Production scaffolding:</b> List some recipes of other cultures and rank them from more to less healthy Intercultural menu writing frame</p>	<p>WG</p> <p>SG</p> <p>SG</p>
<p>Session 2 (45 min)- My recipe</p>		
<p>10 mins / Activation</p> <p>15 mins / Thinking skills / Investigating / Reading</p> <p>15 mins / Thinking skills / Writing/ Round up</p>	<p><b>Act 1.</b> Ss read the chefs' feedback about their intercultural menu proposal.</p> <p><b>Act 2.</b> Ss research about the recipes they like and want to cook (Mediterranean diet or other cultures). They have to find complete a chart with this information:</p> <ul style="list-style-type: none"> <li>• Ingredients</li> <li>• Quantities</li> <li>• Cooking tools</li> <li>• Instructions</li> </ul> <p><b>Act 3.</b> T gives Ss a minibook journal in which they will be completing all the information of the recipe, starting by writing the name of the recipe, ingredients and photo.</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Chefs' feedback about their intercultural menu proposal <b>Transformation scaffolding:</b></p>	<p>WG</p> <p>SG</p> <p>SG</p>

	<p>Complete a chart on the minibook journal with: Ingredients / Quantities /Cooking tools/ Instructions</p> <p><b>Production scaffolding:</b> Complete the information of their recipes on the minibook journals</p>	
<p>Session 3 (45 min)- Cooking tools</p>		
<p>10 mins / Activation / Thinking skills</p>	<p><b>Act 1.</b> LA shows the recipe she has selected and shows them the final model of a finished recipe for the class cooking book.</p> <ul style="list-style-type: none"> <li>- Ingredients (pure substances) and quantities</li> <li>- Equipment (tools)</li> <li>- Method (mix substances)</li> </ul> <p>Ss list the ways of cooking that appears in the T's recipe and the tools used.</p>	<p>WG</p>
<p>10 mins / Classifying / Speaking / Writing</p>	<p><b>Act 2.</b> Ss brainstorm about the difference between pure and mix substances in the T's recipe and classify them in two separate lists.</p>	<p>SG</p>
<p>10 mins / Writing / Problem-solving</p>	<p><b>Act 3.</b> Ss recall their chosen recipe and review possible cooking methods. T shows in the screen some useful vocabulary with some cooking tools. Ss practice the pronunciation and define each one orally and with gestures with the help of the LA.</p>	<p>SG /WG</p>
<p>15 mins / Problem- solving / Writing /Round up</p>	<p><b>Act 4.</b> Ss list the equipment they need for their recipe (oven-baked). Ss create a flow chart to order how decisions will be made (the ingredients, measures, tools) for their recipe procedure. Ss will locate where the pure and mixed substances are in the recipes by underlining them in different colours.</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Recipe model Vocabulary about cooking tools and cooking methods <b>Transformation scaffolding:</b> List the ways of cooking of the model on the minibook journal Brainstorm about pure and mix substances and classify them in two separate lists in the minibook journal</p>	<p>SG</p>

	<p>Locate where the pure and mixed substances are in the recipes by underlining them in different colours</p> <p><b>Production scaffolding:</b> List of the equipment and design of a flow chart in the minibook journal</p>	
<p>Session 4 (45 min)- Mass and capacity</p>		
10 mins / Activation	<p><b>Act 1.</b> LA shows the process to conduct an experiment on the digital board. Ss have to order the steps of the process. Then Ss match each step with the instructions they have to follow.</p>	WG/ SG
10 mins / Thinking skills / Hypothesizing / Listening, Speaking & Writing	<p><b>Act 2.</b> Ss make hypotheses on how to measure some bread, some juice and an apple (realia). Then, Ss watch a video to check their hypotheses with the concept of mass and corresponding measures on a chart: Kg., gr., After that, Ss watch a video about capacity to check their hypotheses and match the concept with corresponding measures: l., ml.</p>	WG / SG
15 mins / Experiment	<p><b>Act 3.</b> Ss experiment weighting some water in different containers in grams and litres using a digital scale (mass and capacity) and noting their results down on their minibook journals.</p>	SG
10 mins Problem- solving/ Round up	<p><b>Act 4.</b> Ss calculate the quantities of the ingredients they need to make the necessary number of servings for their group components.</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Process to conduct an experiment Video on mass Video on capacity Realia (food) <b>Transformation scaffolding:</b> Order the steps of the experiment in their minibook journals and match with the instruction Match the concepts with measures in a chart <b>Production scaffolding:</b> Write hypotheses on how to measure some bread, some juice and an apple on the minibook journals</p>	SG

	<p>Experiment weighting some water in different containers in grams and litres using a digital scale and noting the results down</p> <p>Calculate the quantities of the ingredients they need to make the necessary number of servings</p>	
<p>Session 5 (45 min)- Plastic is polluting our food</p>		
<p>10 mins /Activation / Solving problems / Critical thinking</p>	<p><b>Act 1.</b> Ss check the classroom dustbin after the break to observe the quantity of plastic containers they wasted to raise their awareness towards pollution in Nature. Ss calculate the number of containers the waste in a school week: 20 plastic containers x 5 days=</p>	WG/SG
<p>20 mins / Thinking skills / Solving problems / Speaking / Writing</p>	<p><b>Act 2.</b> As Ss watch a video about the impact of plastic containers in Nature, they have to identify the problems displayed on the video. Ss list the problems and propose how to help reduce the impact of plastic in Nature by discussing each problem and a possible solution to solve it in groups.</p>	WG / SG
<p>15 mins / Thinking skills / Writing / Round up</p>	<p><b>Act 3.</b> Ss note down their solutions on their minibook journals using a worksheet:</p> <ul style="list-style-type: none"> <li>- Problem: The problem is</li> <li>- Solution: We propose to solve it by ... (using less plastic bags / recycling containers...)</li> </ul> <p>Ss share their solutions with the whole group.</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Classroom dustbin  Video  <b>Transformation scaffolding:</b>  Worksheet to note down problems and solutions  <b>Production scaffolding:</b>  List the problems of plastic and propose how to help reduce the impact of plastic in Nature.  Language about the impact in Nature of plastic containers: I think it is important to reduce plastic in our environment  Comparing products: This or that/ The best is...  Comparing product containers: glass and paper containers are better than plastic containers</p>	SG / WG
<p>Session 6 (45 min)- Shopping list</p>		

<p>15 mins / Activation / Thinking skills / Speaking</p>	<p><b>Act 1.</b> Ss talk about the food they bring in for their break. Ss name the containers of their food. Ss discuss about the containers of fruit and vegetables they know to associate containers with common materials they are made of to activate prior vocabulary and learn new one.</p>	<p>WG / SG</p>
<p>15 mins / Thinking skills / Comparing</p>	<p><b>Act. 2.</b> Ss compare product containers using illustrations in a graphic organizer (chart) to select Nature friendly options in the supermarket. Ss stand up if the containers are made with plastic and sit down if they are eco-friendly using a TPR methodology.</p>	<p>SG</p>
<p>15 mins / Thinking skills/ Speaking / Writing / Round up</p>	<p><b>Act 3.</b> Ss justify their choices for a shopping list with the best ingredients for their recipes. Ss decide on the products to buy in a supermarket based on their choice after the debate by writing a shopping list.</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> Illustrations of product containers Realia (food, containers) <b>Transformation scaffolding:</b> Graphic organizer (chart) <b>Production scaffolding:</b> Shopping list</p>	<p>SG</p>
<p>Session 7 (45 min)- How does water look like?</p>		
<p>10 mins / Activation / Reading / Writing</p>	<p><b>Act 1.</b> Ss observe illustrations displayed in the digital board of different states of matter in Nature (water in the sea, in snow, in clouds), read the lyrics of a song about states of matter and listen to the song.</p>	<p>WG</p>
<p>20 mins / Observing / Experimenting</p>	<p><b>Act 2.</b> Ss identify the three different states of matter with an experiment in the class: <i>Gelatine (Agar agar) or Three States of Matter</i>. Ss make vegetable gelatine to observe all three states of matter. Ss follow these steps:</p> <ul style="list-style-type: none"> <li>- First, Ss pour water into the kettle to boil (the water represents a liquid).</li> <li>- Second, once the water starts to boil, Ss observe that the heat causes a change in matter to form steam (the steam represents a gas).</li> </ul>	<p>SG</p>



<p>10 mins / Creating infographic</p> <p>5 mins / Applying / Round up</p>	<ul style="list-style-type: none"> <li>- Third, Ss mix the gelatine pre-packaged crystals, representing a solid, with the boiling water to form another liquid (mix substance).</li> <li>- Finally, Ss leaves the mixture sets for 20 minutes. The change in temperature forms a solid once again.</li> </ul> <p><b>Act 3.</b> Ss create a graph explaining the three different states of matter based on the experiment with gelatine.</p> <p><b>Act. 4.</b> Ss identify and write the three states of matter in the stages of their recipe by circling in different colour each state.</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Illustration of the states of matter in Nature Song and lyrics to activate knowledge about states of matter.  Vocabulary for the experiment: pour water, water starts to boil, ...  Steps for the experiment: First, second, third, ...  <b>Transformation scaffolding:</b>  Ss order the steps of the experiment and then do it.  <b>Production scaffolding:</b>  Explain the experiment on the graph using the sentences they have worked on in the transformation stage.</p>	<p>SG</p> <p>SG</p>
<p><b>MATERIALS</b></p>		
<p>ICT:</p> <p>Videos:</p> <ul style="list-style-type: none"> <li>- About plastic pollution: <a href="https://youtu.be/ODni_Bey154">https://youtu.be/ODni_Bey154</a></li> <li>- Mass: <a href="https://www.youtube.com/watch?v=ivAD44nh0D0">https://www.youtube.com/watch?v=ivAD44nh0D0</a></li> <li>- Capacity: <a href="https://www.youtube.com/watch?v=QMpkm4dAB4w">https://www.youtube.com/watch?v=QMpkm4dAB4w</a></li> </ul> <p>Others:</p> <ul style="list-style-type: none"> <li>- iPads</li> </ul> <p>HUMAN: LA</p> <p>MATERIAL:</p> <ul style="list-style-type: none"> <li>- Minibook journals</li> <li>- Containers with different shapes</li> <li>- Digital scale</li> <li>- Illustrations of matter in Nature</li> <li>- Illustration of pollution in Nature</li> </ul>		

- Lyrics of a song and observation sheet:  
<https://www.mccracken.kyschools.us/Downloads/2%20NGSS%20UNIT%20Matter.pdf> (pp. 3 and 5)
- Tools for experiment with gelatine (Agar agar).
- Infographic

4.2.3 <i>Didactic Unit 6. Hands on</i>	
<p><b>Content area:</b> Science  <b>Level:</b> Year 3, Primary Education  <b>Timing:</b> 9 sessions in 4 weeks, approximately.  <b>Description:</b> Students understand the function and characteristic of some appliances and tools used in the kitchen.  <b>Product:</b> YouTube video of a recipe and promotional poster.</p>	
CONTENT	
<p><b>Content:</b>  <u>Matter and energy. Technology, objects and machines</u></p> <p><b>Energy. Electricity.</b>            The effect of heat on different materials.            Conductors and insulators.</p> <p>Machines and appliances in everyday life.            Important inventions and discoveries: the kettle, the steam engine and the telegraph.</p> <p><b>Language content:</b>            Description of the states of matter, ways of cooking, and functions of electrical appliances.            Description of some machines and appliances of everyday life, explaining its components, operation, and utility.</p>	<p><b>STEM education</b></p> <ul style="list-style-type: none"> <li>• Engaging students into a topic.</li> <li>• Sharing personal experiences about a topic.</li> <li>• Finding out information about an electrical appliance in the kitchen (fridge).</li> <li>• Developing research/information skills.</li> <li>• Summarizing information.</li> <li>• Sorting out cooking tools.</li> <li>• Representing ideas and information found.</li> <li>• Transferring the information learned to their further recipes.</li> <li>• Creating a drawing to label the parts of a fridge.</li> <li>• Assess their own rap and also the peers', revising as a group the results.</li> <li>• Providing further opportunities and context for learning about the topic.</li> </ul> <p>From theory to practice:            ❖ Modeling an experiment with a toaster and a kettle.</p>
<p><b>Key competences</b></p> <ol style="list-style-type: none"> <li>1. Competence in Linguistic: This competence is developed through communication between members of a team, requesting information from external sources, reading, and selecting information, writing different types of</li> </ol>	

- texts and presenting conclusions or results orally. Communication to participate in a debate.
2. Competence in Mathematics Science and Technology: Activities related to energy and machines, knowing some technological knowledge to understand the impact of both in our daily life.
  3. Digital Competence: This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used, contributing to enhanced digital skills.
  4. Learning to Learn: Selecting and using various sources of information, analysing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one's own learning effectively.
  5. Social and Civic Competences: Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication, will encourage the development of these.
  6. Cultural Awareness and Expressions: Developing creativity by producing various experiments with different materials and tools.

### COGNITION

**Learning goals:**

1. To recall some cooking tools.
2. To know conductors and insulators materials.
3. To experiment with some appliances to observe the effect of heat in different materials.
4. To analyze and describe an electrical appliance in the kitchen, explaining its components, operation, and utility.
5. To write and evaluate a rap song to explain the functions and characteristics of one appliance (fridge).
6. To record a video about the recipe they have worked in groups and upload it in a YouTube channel.
7. To design a poster to advertise the class recipe book at the school.

**Learning outcomes:**

- 1.1 Pupils list some ways of cooking.
- 1.2 Pupils write on post-it notes some cooking tools.
- 2.1 Pupils identify and select conducting and non-conducting materials from their examples of cooking tools.
- 3.1 Pupils hypothesize and experiment about the effect of heat using a toaster and asses the results.
- 3.2 Pupils experiment with water and a kettle to gather data in their minibook journals about the effect of heat.
- 4.1 Pupils differentiate the components, operation, and utility of the fridge.
- 5.1 Pupils write a rap song to explain the functions and characteristics of one appliance (fridge).
- 5.2 Pupils evaluate their own rap and the peers' rap using a rubric.
- 6.1 Pupils record the cooking of the recipe in a kitchen describing the ingredients, measures, tools, and procedure.
- 6.2 Pupils present the recorded video and upload it in a YouTube channel.
- 7.1 Pupils design a poster to advertise the class recipe book at the school.

### CULTURE

<b>Learning goals:</b> 8. To value local products for their recipes.	<b>Learning outcomes:</b> 8.1 Pupils are aware of local products for their recipes.
<b>COMMUNICATION</b>	
<b>Language of learning:</b> <ul style="list-style-type: none"> <li>• Electrical appliances in the kitchen: toaster, fridge, cooker, oven, kettle.</li> <li>• Cooking tools: frying pan, saucepan, timer, chopping board, bowl, plate, spoon, spatula, knife, fork, oven glove, whisk, apron, metal, wood, wooden spoon.</li> <li>• Cooking actions (verbs): add, bake, barbecue, beat, boil, break chop, flip, fry, heat, grate, melt, peel, pour, slice, stir, wash, weigh.</li> <li>• Parts of a kettle: power base, power cord, on/off switch, handle, cup.</li> <li>• Describing functions of electrical appliances: What is the function of a toaster / fridge / oven / kettle? It keeps food cold. It toasts the bread. This is a microwave; it heats the food.</li> <li>• Describing materials: What is a non-conductive material? Metal is a conductive material. You need a wooden spoon to stir the sauce. This is...</li> </ul> <b>Language for learning:</b> <ul style="list-style-type: none"> <li>• Hypothesizing: The heat of the toaster will toast the bread. If we heat the bread longer it will burn...</li> <li>• Explaining the functions and characteristics: This is, these are, first we add...</li> <li>• Cooking instructions:             <ul style="list-style-type: none"> <li>- Mix the flour, melted butter and sugar together.</li> <li>- Boil the potatoes until they are cooked.</li> <li>- You can blend fruit to make your own smoothie.</li> <li>- Add more salt to the dish if necessary.</li> <li>- Pour the chocolate sauce over the pears.</li> <li>- Weigh the mix to make sure you have the right amount.</li> </ul> </li> <li>• Asking and answering questions: Which state of matter can you observe...? It is liquid, solid, gas.</li> <li>• Discussing ideas: I think, in my opinion..., that idea connects to...,</li> <li>• Writing a rap song: This is a fridge, it has a door, I open it...</li> <li>• Evaluating their own rap and the peers' rap using a rubric: I liked it, I enjoyed, it should...</li> <li>• Classroom language: Pay attention, you need..., we'll learn how to...</li> </ul> <b>Language through learning:</b> Analyzing electrical appliances; learning about state of matter, functions, conducting and non-conducting materials, instructions.	
<b>ASSESSMENT</b>	
<ul style="list-style-type: none"> <li>• <b>Of language:</b> <ul style="list-style-type: none"> <li>• Teacher's oral language modelling on spot.</li> <li>• Feedback of activities using short answers, thumbs up/down.</li> </ul> </li> <li>• <b>Of content:</b> <ul style="list-style-type: none"> <li>• Teacher oral and written feedback on the activities</li> <li>• Teacher rubric for active observation of group research.</li> <li>• Rubric to assess the research process.</li> <li>• Rubric to assess the experiments with the toaster and the kettle.</li> <li>• Summary of students' self-evaluation.</li> <li>• Rubric to evaluate the presentation of the results.</li> </ul> </li> </ul>	

<ul style="list-style-type: none"> <li>• <b>Of process:</b> <ul style="list-style-type: none"> <li>• Learning intentions wall.</li> <li>• Teacher checklist for active observation while Ss are doing the activities.</li> <li>• Class minibook journal.</li> </ul> </li> </ul>	
<p><b>Evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>1. Know the basic principles that govern machines and devices.</li> <li>2. Plan the construction of objects and devices with a previous purpose, using energy sources, operators, and appropriate materials, carrying out individual and teamwork, and providing information on what strategies have been used.</li> <li>3. Know the basic laws that govern phenomena, such as the reflection of light, the transmission of electric current.</li> <li>4. Carry out simple experiments and small investigations about the effect of heat in different materials: posing problems, stating hypotheses, selecting the necessary material, assembling, performing, drawing conclusions, communicating results, applying basic knowledge of the basic laws that govern these phenomena, such as reflection of light, transmission of electric current.</li> </ol> <p><b>STEM content evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>5. Obtain relevant information on appliances, materials in the kitchen and their characteristics communicating the results.</li> <li>6. Communicate orally and in writing the results obtained after carrying out various experiences, presenting them with graphic supports.</li> <li>7. Work cooperatively, appreciating care for their own safety and that of their colleagues, taking care of tools and making proper use of materials.</li> <li>8. Carry out projects and present reports about the effect of heat in different materials.</li> </ol>	
<b>ATTENTION TO DIVERSITY</b>	
<p><b>LOTS to HOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils experiment with other food and appliance rather than the toaster and the bread to observe the effect of heat.</li> </ul>	<p><b>HOTS to LOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils illustrate the chosen recipe with pictures of ingredients and procedure.</li> </ul>

### 4.3 Project 3: “I am an explorer in Nature”

4.3.1 <i>Didactic Unit 7. Slow down and observe</i>	
<p><b>Content area:</b> Science  <b>Level:</b> Year 3, Primary Education  <b>Timing:</b> 8 sessions in 4 weeks in the last term.  <b>Description:</b> Students understand animals and plants and their environment.  <b>Product:</b> Animals online questionnaire.</p>	
<b>CONTENT</b>	
<p><b>Content:</b>  <u>Living beings</u></p>	<p><b>STEM education</b></p> <ul style="list-style-type: none"> <li>• Raising awareness of women in science: Mary Temple Grandi.</li> </ul>

<p>Vertebrate and invertebrate animals. Classification and characteristics.</p> <p>The plants. Structure and physiology. The characteristics of the different groups of plants.</p> <p><b>Language content:</b> A questionnaire to identify characteristics of vertebrate animals and plants.</p>	<ul style="list-style-type: none"> <li>• Exploring their environment.</li> <li>• Reading stories about animals.</li> <li>• Engaging students into a topic.</li> <li>• Sharing personal experiences about the origin of different kinds of food: animals and plants.</li> <li>• Developing research/information skills.</li> <li>• Sorting out living and non-living things.</li> <li>• Transferring the information found in the stories into a chart, being able to classify animals, plants and non-living things.</li> <li>• Providing further opportunities and context for learning about the topic.</li> </ul> <p>From theory to practice:</p> <ul style="list-style-type: none"> <li>• Identify animals and their habitats in their environment.</li> </ul>
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**Key competences**

1. Competence in Linguistics: This competence is developed through communication between members of a team, requesting information from external sources, reading stories and selecting information, writing different types of texts and presenting conclusions or results orally.
2. Competence in Mathematics Science and Technology: Activities related to the process of observation in Science to know about living-things.
3. Digital Competence: This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used.
4. Learning to Learn: Selecting and using various sources of information, analyzing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one's own learning effectively.
5. Social and Civic Competences: Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication.
6. Cultural Awareness and Expressions: Developing creativity by producing various artworks (KWL charts about animals and plants).

**COGNITION**

**Learning goals:**

1. To know about a female scientist and understand the importance of science in life.

**Learning outcomes:**

- 1.1. Pupils match the scientists' photos with their profession.

<ol style="list-style-type: none"> <li>2. To differentiate between living and non-living things, and kind of vertebrate animals.</li> <li>3. To understand the origin of different kinds of food: animals and plants.</li> <li>4. To organize their knowledge and make questions using <i>I know /I want to know</i> worksheets (KWL).</li> <li>5. To design a questionnaire about the classification of vertebrate animals.</li> </ol>	<p>1.2 Pupils infer the scientific work of Mary Temple Grandi.</p> <p>1.3 Pupils identify examples that explain the importance of slowing down and observing Nature.</p> <p>1.4 Pupils recognize the importance of science in life.</p> <p>2.1 Pupils listen and recognize living beings in stories of vertebrate animals.</p> <p>2.2 Pupils list the differences between living and non-living things.</p> <p>2.3 Pupils classify vertebrate animals, plants and non-living things in stories.</p> <p>3.1 Pupils make a chart with the food from animals and plants they eat in a day.</p> <p>4.1 Pupils complete a worksheet with I know /I want to know (KWL).</p> <p>5.1. Pupils use the classification of vertebrate animals and the list of the differences between living and non-living things to write the questions of a questionnaire.</p> <p>5.2 Pupil create a google form questionnaire.</p>
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**CULTURE**

<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>6. To compare the characteristics of animals and plants in their habitats.</li> </ol>	<p><b>Learning outcomes:</b></p> <p>6.1 Pupils reflect about their experiences with animals and plants, where they can find those animals and plants (farms, parks, country), formulating more questions for the final test to play a boardgame.</p> <p>6.2 Pupils inquiry in groups the characteristics of their animals (avatar) and their habitats.</p> <p>6.3 Pupils locate the habitats a map.</p>
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**COMMUNICATION**

<p><b>Language of learning:</b></p> <ul style="list-style-type: none"> <li>• Non-living things: house, rocks, water, bucket.</li> <li>• Living things: grass, tree, leaves, nuts, acorn, sunflowers, birds, fish, squirrel, frog, chicken, snake, salmon, butterfly.</li> <li>• Habitats: forest, river, ocean, pond, farm, countryside.</li> <li>• Others: scientific, science.</li> <li>• Genre: A questionnaire</li> </ul>
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**Language structures:**

- Is a house a living thing?
- Is it brought into life by birth?
- Does it eat?
- Does it breathe?
- Does it die?
- It is a plant. A plant is a living thing.
- Plants grow...
- Non-living things do not eat.
- Discussing ideas: I noticed that..., from my perspective...

**Language for learning:**

- Discussing about the importance of slowing down and observing Nature: I can observe, I see, I look at, take a deep breath.
- Listing the differences between living and non-living things.
- Asking and answering questions: Are animals living or non-living things? Animals are born, is it true or false? Where do salmons live? What is the habitat of ...? Where do eggs come from? What animals have feathers?
- Classroom language: I don't understand what you mean by..., that's an interesting example..., what makes you think that ...?)

**Language through learning:**

Reflecting about their experiences with animals and plants; Formulating questions about their interests; use of ICT and videos; teamwork and peer interaction.

**ASSESSMENT**

- **Of language:**
  - Teacher's oral language modelling on spot.
  - Feedback of activities using short answers, thumbs up/down.
- **Of content:**
  - Teacher oral and written feedback on the activities.
  - Teacher rubric for active observation.
  - Worksheet with a list of living beings in stories of vertebrate animals and the sunflower.
  - Chart to identify the origin of different kinds of food: animals and plants.
- **Of process:**
  - Learning intentions wall.
  - Teacher checklist for active observation while Ss are doing the activities.
  - Class minibook journals.

**Evaluation criteria:**

1. Listen to and read a story about animals and plants.
2. Know the structure of living beings: cells, tissues, types, organs, devices and systems: identifying the main characteristics and functions.
3. Know different levels of classification of living beings, taking into account their characteristics and types.
4. Know the characteristics and components of an ecosystem.



<p>5. Use technological means, respecting the rules of use, safety and maintenance of observation instruments and work materials, showing interest in the observation and rigorous study of all living beings, and habits of respect and care towards living beings.</p> <p><b>STEM content evaluation criteria:</b></p> <p>6. Obtain relevant information about the characteristics of living and non-living beings, communicating the results.</p> <p>7. Work cooperatively, appreciating care for their own safety and that of their colleagues, taking care of tools and making proper use of materials.</p>	
<b>ATTENTION TO DIVERSITY</b>	
<p><b>LOTS to HOTS</b></p> <ul style="list-style-type: none"> <li>Pupils choose a favourite vertebrate animal, investigate their characteristics and explain it to the class.</li> </ul>	<p><b>HOTS to LOTS</b></p> <ul style="list-style-type: none"> <li>Pupils distinguish between living and non-living things by circling the right options / pointing the correct option in the illustrations.</li> </ul>

<p>4.3.2 <i>Didactic Unit 8. The double cycle of seeds: from seeds to plants or from seeds to food!</i></p>	
<p><b>Content area:</b> Science  <b>Level:</b> Year 3, Primary Education  <b>Timing:</b> 8 sessions in 4 weeks.  <b>Description:</b> Students identify and understand the parts and stage of reproduction of a plant to observe and record the results.  <b>Product:</b> a boardgame about plants and vertebrate animals.</p>	
<b>CONTENT</b>	
<p><b>Content:</b>  <u>Living beings</u></p> <p>The plants. Structure and physiology.</p> <p>The characteristics of the different groups of plants.</p> <p>Observation and study of animals and plants.</p> <p><b>Language content:</b>          Description of the life cycle of a sunflower.</p> <p>Questions for a boardgame used for final evaluation.</p>	<p><b>STEM education</b></p> <ul style="list-style-type: none"> <li>Engaging students into a topic.</li> <li>Finding out information.</li> <li>Summarizing information.</li> <li>Rising more questions.</li> <li>Providing shared experiences.</li> <li>Developing research/information skills.</li> <li>Sorting out function of nutrition, reproduction, and parts of the plant.</li> <li>Representing ideas and information found out into infographics.</li> </ul>

	<ul style="list-style-type: none"> <li>• Reflecting how things went and what we can do with what we have learned.</li> <li>• Evaluating and assessing the learning process.</li> <li>• Providing further opportunities and context for learning about the topic.</li> </ul> <p>From theory to practice:</p> <ul style="list-style-type: none"> <li>❖ Experiment and observe the life cycle of a sunflower, from seeds to flower.</li> </ul>
<p><b>Key competences</b></p> <ol style="list-style-type: none"> <li>1. Competence in Linguistics: This competence is developed through communication between members of a team, requesting information from external sources, reading and selecting information, writing different types of texts and presenting conclusions or results orally about a sunflower.</li> <li>2. Competence in Mathematics Science and Technology: Activities related to the use of the cycle of life of a sunflower.</li> <li>3. Digital Competence: This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used.</li> <li>4. Learning to Learn: Selecting and using various sources of information, analysing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one's own learning effectively.</li> <li>5. Social and Civic Competences: Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication, will encourage the development of these.</li> <li>6. Cultural Awareness and Expressions: Developing creativity by producing various artworks (infographic about diversity of plants in their environment).</li> </ol>	
<p><b>COGNITION</b></p>	
<p><b>Learning goals:</b></p> <ol style="list-style-type: none"> <li>1. To know the main parts of a sunflower and edible plants.</li> <li>2. To research and describe the characteristics and forms of life of plants: function of nutrition, and reproduction.</li> <li>3. To illustrate the life cycle of a plant.</li> <li>4. To experiment with sunflower seeds respecting the rules of uses, safety and maintenance of observation instruments and work materials, applying personal safety and risk prevention.</li> </ol>	<p><b>Learning outcomes:</b></p> <ol style="list-style-type: none"> <li>1.1 Pupils identify the main parts of a sunflower and an edible plant.</li> <li>2.1 Pupils match the characteristics and forms of life of a sunflower.</li> <li>3.1 Pupils design in groups an infographic representation of a plant.</li> <li>4.1 Pupils hypothesize, observe and collect information about the development of a sunflower in class (from seeds to flower).</li> <li>5.1 Pupils discover different types of seeds we use to cook.</li> </ol>

<p>5. To find out how many different types of seeds are used to cook.</p> <p>6. To formulate a question bank for the final test to play a boardgame.</p>	<p>6.1 Pupils generate a question bank for the final test to play a boardgame.</p> <p>6.2 Pupils present the information they have searched and gathered to create the boardgame.</p> <p>6.3 Pupils play the boardgame they have created.</p>
<b>CULTURE</b>	
<p><b>Learning goals:</b></p> <p>7. To value the diversity of plants in their environment (parks, countryside).</p>	<p><b>Learning outcomes:</b></p> <p>7.1 Pupils value the diversity of plants in their environment (parks, countryside).</p>
<b>COMMUNICATION</b>	
<p><b>Language of learning:</b></p> <ul style="list-style-type: none"> <li>• Parts of a plant: branch, flower, fruit, leaf, root, stem, trunk, tree.</li> <li>• Cycle of plants: a seed falls on the ground/ a seed sprouts, the stem grows tall and strong, and then, the flower blooms.</li> <li>• Vocabulary for experiments: jar, damp cotton wool, inside, air, grow, petal, water.</li> <li>• Genre: Description <ul style="list-style-type: none"> <li>-Ordering the stages in the life cycle of a plant: First, next, after that, finally.</li> </ul> </li> <li>• Genre: questions and answers for a boardgame <ul style="list-style-type: none"> <li>-Generating a question bank for the boardgame and final test.</li> </ul> </li> </ul> <p>Language structures:</p> <ul style="list-style-type: none"> <li>- It is a flower. It is tall, small, thin, thick.</li> <li>- What happens after the seeds fall on the ground?</li> </ul> <p><b>Language for learning:</b></p> <ul style="list-style-type: none"> <li>• Describing the characteristics and forms of life.</li> <li>• Describing parts of a plant: This is the root, that is the stem...</li> <li>• Making predictions about the results of experiments: What appears first? What will grow next? I think it will...</li> <li>• Classroom language: As I see it..., What's the next stage in the development?</li> </ul> <p><b>Language through learning:</b></p> <p>Formulating hypothesis, making observations, noting down stages in a process, presenting results, identifying edible plants. Using stories, ICT, charts, peer interaction.</p>	
<b>ASSESSMENT</b>	
<ul style="list-style-type: none"> <li>• <b>Of language:</b> <ul style="list-style-type: none"> <li>– Teacher's oral language modelling on spot.</li> <li>– Feedback of activities using short answers, thumbs up/down.</li> </ul> </li> <li>• <b>Of content:</b></li> </ul>	

<ul style="list-style-type: none"> <li>– Teacher oral and written feedback on the activities about the sunflower.</li> <li>– Teacher oral and written feedback on the activities.</li> <li>– Teacher rubric for active observation.</li> <li>– Worksheet with a list of living beings in stories of vertebrate animals and the sunflower.</li> <li>– Chart to identify the origin of different kinds of food: animals and plants.</li> <li>– Teacher oral and written feedback on the activities</li> <li>– Teacher rubric for active observation of group research.</li> <li>– Rubric to assess the research process.</li> <li>– Summary of students’ self-evaluation.</li> <li>– Rubric to evaluate the presentation of the infographic.</li> <li>– Observation of the taxonomy of leaves.</li> <li>• <b>Of process:</b> <ul style="list-style-type: none"> <li>– Learning intentions wall.</li> <li>– Teacher checklist for active observation while Ss are doing the activities.</li> <li>– Class minibook journal and charts.</li> <li>– 3-2-1 activation activity.</li> </ul> </li> </ul>	
<p><b>Evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>1. Listen to and read a story about a sunflower.</li> <li>2. Know the structure of living beings: cells, tissues, types, organs, devices and systems: identifying the main characteristics and functions.</li> <li>3. Know different levels of classification of living beings, taking into account their characteristics and types.</li> <li>4. Know the characteristics and components of a plant.</li> <li>5. Use technological means, respecting the rules of use, safety and maintenance of observation instruments and work materials, showing interest in the observation and rigorous study of a sunflower and habits of respect and care.</li> </ol> <p><b>STEM content evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>6. Obtain relevant information on previously defined events or phenomena, making predictions about the cycle of life of plants, integrating direct and indirect observation data about a sunflower and communicating the results.</li> <li>7. Establish hypotheses about the processes in the cycle of life through an experiment.</li> <li>8. Communicate orally and in writing the results obtained after carrying out various experiences, presenting them with graphic supports.</li> <li>9. Work cooperatively, appreciating care for their own safety and that of their colleagues, taking care of tools and making proper use of materials.</li> <li>10. Carry out projects and present infographic in their notebooks.</li> </ol>	
<p><b>ATTENTION TO DIVERSITY</b></p>	
<p><b>LOTS to HOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils plant different kind of seeds and observe how they grow and what their differences are.</li> </ul>	<p><b>HOTS to LOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils search for a video to explain the function of nutrition,</li> </ul>

	<p>reproduction, and parts of sunflower, to support understanding.</p> <ul style="list-style-type: none"> <li>• Pupils illustrate a mural from the observation of the plant once it has grown.</li> </ul>	
<b>PROCEDURE</b>		
Session 1 (45 min)- Do all plants have flowers?		
10 mins / Activation	<p><b>Act 1.</b> T shows Ss a grocery bag with some fruits, vegetables, and other kinds of food. Ss take them out in turns and identify the plants of the grocery bag and guess which plants have flowers (Ss understand that not every plant has flowers).</p>	WG
5 mins / Thinking skills / Speaking & Writing	<p><b>Act 2.</b> Ss brainstorm about the edible plants they eat daily. First, Ss write in their mini whiteboards the vegetables, then fruits, and finally, the beans they eat.</p>	WG / I
20 mins / Hands on / Writing	<p><b>Act 3.</b> Ss identify the main parts of an edible plant from the grocery bag with illustrations on the digital board. Different parts are associated to their functions (leaves, roots). Using the illustrations Ss recall the basic functions of the human body and transfer that information to plants, note their ideas down on their minibook journal to explain the function of each part.</p>	WG / I
10 mins / Drawing and labelling/ Round up	<p><b>Act 4.</b> Ss choose an edible plant, draw it and label its parts from the example's Ss wrote on their mini whiteboards.</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>            Realia (grocery bag, vegetables, and fruit)            Illustrations of plants displayed in the digital board            Brainstorm about the edible plants they eat daily using the mini whiteboards  <b>Transformation scaffolding:</b>            Guesses about if all plants have flowers            Draw and label parts of an edible plant in the minibook journal  <b>Production scaffolding:</b>            Write an explanation of the function of each part of the plant on the minibook journal</p>	I

Session 2 (45 min)- Our plant: a sunflower		
5 mins / Activation / writing	<b>Act 1.</b> Ss complete a KWL chart about the sunflower to activate their prior knowledge and what they would like to learn.	WG
10 mins / Thinking skills / Listening	<b>Act 2.</b> Ss see the illustrations of the story displayed in the digital board to start guessing about what the story will be about. Then, while pointing at the pictures, the LA reads the story of the sunflower to support the understanding of the content of the story and the relation with the content of the session.	WG
10 mins / Thinking skills / Speaking	<b>Act 3.</b> Ss check orally what they remember from the story to elicit questions to solve problems: <ul style="list-style-type: none"> <li>- What do sunflowers eat? Observe the illustrations from the book. (Nutrition).</li> <li>- What is the bee doing? (Reproduction).</li> <li>- Why is the sunflower moving with the sun? (Relation).</li> </ul>	WG/SG
10 mins / Thinking skills / Listening/ Writing	<b>Act 4.</b> Ss watch a video to observe the time lapse of a sunflower and answer some questions to identify the parts of the flower and functions of the sunflower included in an EddPuzzle to reinforce their understanding.	SG
10 / Drawing / Labelling / Round up	<b>Act 5.</b> Ss draw and label the life cycle of a sunflower.  <b>Scaffolding.</b> <b>Reception scaffolding:</b> Illustrations of the book story Video to observe the time lapse of a sunflower KWL chart <b>Transformation scaffolding:</b> A diagram to draw and label the life cycle of a sunflower <b>Production scaffolding:</b> Answer questions on a Edpuzzle	I
Session 3 (45 min)- Let´s make it grow		
10 mins / Activation / Writing	<b>Act 1.</b> Ss review a KWL chart about the sunflower from previous session. Ss do a 3-2-1 activity, writing 3 ideas they remember from the sunflower in their minibook journal.	WG
5 mins / Understanding instructions / Listening	<b>Act 2.</b> Ss collect the material they will need to plant the seeds, and to observe the development of the plant. With the help of the LA, Ss order the process in the digital board with the instructions to cultivate their seeds.	WG

<p>10 mins / Investigating/ Speaking/ Writing</p> <p>15 mins / Hands on experiments</p> <p>5 mins / Round up</p>	<p><b>Act 3.</b> Ss write some hypotheses about the development of sunflower seeds in different situations (e.g., number of days, which materials they would use to plant the seeds, exposition or not from the sun, etc.) in their minibook journal.</p> <p><b>Act 4.</b> Ss plant the seeds in transparent plastic bags and hang them in the wall.</p> <p><b>Act 5.</b> As homework Ss need to collect and bring in the next session different kinds of leaves.</p> <p><b>Scaffolding.</b> <b>Reception scaffolding:</b> KWL chart review Instructions in the digital board Materials to plant the seeds <b>Transformation scaffolding:</b> 3-2-1 activity on the minibook journals Order the process in the digital board with the instructions to cultivate their seeds <b>Production scaffolding:</b> Write hypotheses about the development of sunflower seeds on the minibook journal Plant the seeds in transparent plastic bags and hang them in the wall</p>	<p>SG</p> <p>SG</p> <p>WG</p>
	<p>Session 4 (45 min)- How do plants make us breath?</p>	
<p>10mins / Activation / Hands-on</p> <p>15 min / Thinking skills/ Hypothesizing</p> <p>10 mins / Thinking skills / Listening and Understanding</p> <p>10 mis / Thinking skills</p>	<p><b>Act 1.</b> Ss categorize the leaves they have brought in an infographic:</p> <ul style="list-style-type: none"> <li>- According to their shape</li> <li>- According to their border</li> <li>- Between deciduous and evergreen trees</li> </ul> <p><b>Act 2.</b> Ss in pairs complete a sunflower drawing with what they think the respiratory system looks like in a plant. Ss use an infographic of photosynthesis to reflect on how plants breathe and check their hypotheses from the drawing. T reviews all the hypotheses and LA introduces some vocabulary about the photosynthesis.</p> <p><b>Act 3.</b> Ss watch a video about photosynthesis in plants and check their understanding of the process with thumbs up/ thumbs down.</p> <p><b>Act 4.</b> Ss design a cycle graphic to explain the respiratory function of the sunflower.</p>	<p>SG</p> <p>SG</p> <p>WG</p> <p>SG</p>

/ Creating /Round up	<p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Video  Realia (leaves to categorize)  <b>Transformation scaffolding:</b>  Classification of leaves  Design an infographic of photosynthesis to reflect on how plants breathe  TPR after the video  <b>Production scaffolding:</b>  Sunflower drawing and infographic. Language to describe the Infographic:  The graph represents the process in which the sunflower makes its own food to be able to grow and develop.  Design a graphic (cycle) to explain the respiratory function of the sunflower</p>	
	Session 5 (45 min)- How many seeds are there?	
10 mins /Activation  25 mins / Thinking skills – Hands on  15 mins / Observation and note down – Round up	<p><b>Act 1.</b> T brings to class a bottle with different kinds of seeds so that Ss observe them to decide on how many kinds of seeds they can see. LA gives a sticker to the student who guesses the closest answer. This sticker will be an extra chance to participate in the final game.</p> <p><b>Act 2.</b> Ss discover different types of seeds from the bottle. Ss design a taxonomy to classify the seeds into those that can be eaten as a whole (sunflower/ pumpkin seeds) and those that need to be processed (corn seeds as powder), and those that cannot be eaten (fruit seeds as apple or grape seeds).</p> <p><b>Act 3.</b> Ss observe and collect information in the minibook journals about the development of a sunflower in class (from seeds to flower).</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Bottle with seeds  Word cards with the names of the seeds: Corn seeds /Sunflower seeds /Pumpkin seeds /Apple seeds  <b>Transformation scaffolding:</b>  Taxonomy of seeds  Observe and collect information in the minibook journals  <b>Production scaffolding:</b>  Note down the results in the minibook journals.</p>	WG  SG  SG
	Session 6 (45 min)- Create your avatar	



20 mins / Activation	<b>Act 1.</b> Ss brainstorm and recall what they learned in the previous session and formulate questions for the boardgame using sentence cards with the beginning of the questions for them to finish them.	WG
15 mins / Thinking skills – Hands on	<b>Act 2.</b> Ss present the final question bank with all the information they have searched and gathered to create the boardgame and design the question cards.	SG
10 mins / Round up	<p><b>Act 3.</b> Ss design their avatars (character, logo) to play the game.</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Brainstorm and recall what they learned in the previous session  <b>Transformation scaffolding:</b>  Possible question cards:  Which process requires solar energy? -Photosynthesis.  Which of the following is correct about living things?  Living things can grow / Living things do not breathe.  <b>Production scaffolding:</b>  Describe their avatars (character, logo) to play the game.</p>	SG
	Session 7 (45 min)- Verification or refutation	
10 mins / Hands on / Speaking & Writing	<b>Act 1.</b> Ss observe and collect information about the development of a sunflower in class (from seeds to flower).	SG
10 mins / Thinking skills / Checking hypotheses	<b>Act 2.</b> Ss write down the verification or refutation about the hypotheses they elaborated at the beginning of the unit on their minibook journals.	SG
10 mins / Presenting results / Speaking	<b>Act 3.</b> Ss present the results of their projects using a cycle graphic organizer, mentioning the hypothesis, the procedure, and the results.	SG
10 mins / Round up / Speaking	<p><b>Act 4.</b> Ss discuss about the experience of taking care a plant so that T &amp; LA note their ideas on the digital board to have a common view of the projects.</p> <p><b>Scaffolding.</b>  <b>Reception scaffolding:</b>  Realia (Sunflower experiment)  Digital board for common view of projects  <b>Transformation scaffolding:</b></p>	WG

	<p>Hypotheses of the beginning of the experiment on the minibook journals</p> <p>Graphic organizer (cycle graphic)</p> <p><b>Production scaffolding:</b></p> <p>Presentation of the results (First, we plant a seed on the ground and after 3 days it sprouts. The stem grows tall and strong, and then, the sunflower blooms).</p>	
	<p>Session 8 (45 min)- Play with your game!!</p>	
<p>35 mins / Playing a game</p> <p>10 min/ Round up/ Writing</p>	<p><b>Act 1.</b> Ss play the boardgame they have created.</p> <p><b>Act 2.</b> Ss answer the questions from the initial KWL on a worksheet.</p> <p><b>Scaffolding.</b></p> <p><b>Transformation scaffolding:</b></p> <p>Boardgame and question cards KWL chart</p> <p><b>Production scaffolding:</b></p> <p>Boardgame Answers of the KWL on a worksheet</p>	<p>WG</p> <p>I</p>
<b>MATERIALS</b>		
<p>ICT:</p> <p>Videos:</p> <ul style="list-style-type: none"> <li>- <a href="https://www.youtube.com/watch?v=BwC4WRKi5QY">https://www.youtube.com/watch?v=BwC4WRKi5QY</a></li> <li>- <a href="https://www.youtube.com/watch?v=P67GGGLJ-aM">https://www.youtube.com/watch?v=P67GGGLJ-aM</a></li> <li>- <a href="https://www.youtube.com/watch?v=mkuNI_N0Gqg">https://www.youtube.com/watch?v=mkuNI_N0Gqg</a></li> <li>- <a href="https://www.youtube.com/watch?v=UPBMG5EYydo">https://www.youtube.com/watch?v=UPBMG5EYydo</a></li> <li>- <a href="https://www.youtube.com/watch?v=Z-iPp6yn0hw">https://www.youtube.com/watch?v=Z-iPp6yn0hw</a></li> </ul> <p>Other:</p> <ul style="list-style-type: none"> <li>- Eddpuzzle with <a href="https://www.youtube.com/watch?v=Z-iPp6yn0hw">https://www.youtube.com/watch?v=Z-iPp6yn0hw</a></li> <li>- Google forms</li> </ul> <p>HUMAN:</p> <ul style="list-style-type: none"> <li>- LA</li> </ul> <p>MATERIAL:</p> <ul style="list-style-type: none"> <li>- Grocery bag</li> <li>- Slow Down book</li> <li>- Bottle with seeds</li> <li>- Materials to plant</li> <li>- Plastic bags</li> <li>- KWL</li> <li>- Minibook journal</li> <li>- Boardgame</li> <li>- Question cards</li> </ul>		

- White mini board

#### 4.3.3 *Didactic Unit 9. Insects, the food of the future!*

**Content area:** Science

**Level:** Year 3, Primary Education

**Timing:** 8 sessions in 4 weeks.

**Description:** Students recognize different types of invertebrate animals to choose one endangered animal to investigate.

**Product:** eBooks about the life cycle of a butterfly.

### CONTENT

**Content:**

Living beings

Vertebrate and invertebrate animals.  
Classification and characteristics.

Observation and study of animals and plants.

**Language content:**

Biography of the life cycle of a butterfly.

**STEM education**

- Reading and writing stories about animals.
- Engaging students into a topic.
- Sharing personal experiences about a topic.
- Finding out information about insect food.
- Summarizing information.
- Rising more questions.
- Providing shared experiences.
- Developing research/information skills.
- Representing ideas and information found out into infographics.
- Transferring the information learned into the questions of the game.
- Reflecting how things went and what we can do with what we have learned.

From theory to practice:

- ❖ Experiment and observe the life cycle of a butterfly with a magnifying glass.

**Key competences**

1. Competence in Linguistics: This competence is developed through communication between members of a team, requesting information from external sources to develop a question bank, reading and selecting information, writing different types of questions and participating in a boardgame.

<ol style="list-style-type: none"> <li>2. Competence in Mathematics Science and Technology: Activities related to the use of a magnifying glass to observe the cycle of life of a butterfly.</li> <li>3. Digital Competence: This competence has an essential role in the project, given that ICT is used to search for and select information. In addition, various forms of digital media are used.</li> <li>4. Learning to Learn: Selecting and using various sources of information, analysing data, taking decisions by consensus, and producing diagrams and concept maps contribute significantly to managing one's own learning effectively.</li> <li>5. Social and Civic Competences: Knowing about our social environment and participating in its improvement, as well as developing the skills related to interpersonal communication.</li> <li>6. Cultural Awareness and Expressions: Developing creativity by creating a boardgame about animals and plants.</li> </ol>	
<b>COGNITION</b>	
<b>Learning goals:</b> <ol style="list-style-type: none"> <li>1. To know the classification of invertebrates.</li> <li>2. To compare the characteristics of a vertebrate and invertebrate animal, naming some dishes with them.</li> <li>3. To experiment and observe a butterfly, respecting the rules of uses, safety and maintenance of observation instruments and work materials, applying personal safety and risk prevention safety and risk prevention (use of the magnifying glass).</li> <li>4. To communicate the results of the work carried out, completing their minibook journals with pictures of the cycle of life of the butterfly.</li> <li>5. To create an ebook with the pictures of the lifecycle of the butterfly to write its biography.</li> </ol>	<b>Learning outcomes:</b> <ol style="list-style-type: none"> <li>1.1 Pupils associate pictures to classify invertebrate.</li> <li>2.1 Pupils discuss about the sustainability of eating insects.</li> <li>3.1 Pupils hypothesize, observe and collect data of the cycle of life of the butterfly, using a magnifying glass.</li> <li>4.1 Pupils reflect how things went and what we can do with what we have learned.</li> <li>5.1. Pupils use Storyjumper to create ebooks from their experiments telling the story of a butterfly.</li> </ol>
<b>CULTURE</b>	
<b>Learning goals:</b> <ol style="list-style-type: none"> <li>6. To be aware of different insects eaten in different countries.</li> </ol>	<b>Learning outcomes:</b> <ol style="list-style-type: none"> <li>6.1 To label dishes based on insects.</li> <li>6.2 To reflect on the reasons why insects are eaten.</li> </ol>
<b>COMMUNICATION</b>	
<b>Language of learning:</b>	

- Vertebrates: mammals, birds, reptiles, fish, amphibious, squirrel, frog, chicken, snake, salmon.
- Invertebrates: butterfly, worm, mollusc, arthropod, oyster, snail.
- Habitats: forest, river, ocean, pond, farm, countryside.
- Genre: A biography of an animal.

Connectors: At the beginning, the first stage, then.

Language structures:

- Butterflies have four life stages, the egg, the larva (caterpillar), the pupa (chrysalis), and the adult.
- Squirrels are mammals.
- Vertebrates have bones.
- There are three kinds of invertebrates.
- Frogs live in ponds.
- Chickens live in farms.

**Language for learning:**

- Reflecting about their experiences with animals and where they can find those animals: Where do salmon live? What is the habitat of ...? What is a mammal? How many kinds of...? What do vertebrates have in common?
- Presenting their research results: After observing the butterfly...
- Sharing orally their experiences: We have discovered...
- Asking and answering questions: Classroom language: What's a mollusc? I don't understand; how do you say in English ...?

**Language through learning:**

Discuss about invertebrates; Reflecting about their experiences with the butterfly; Formulating questions about their interests; peer interaction, teamwork, use of ICT and books.

## ASSESSMENT

- **Of language:**
  - Teacher's oral language modelling on spot.
  - Feedback of activities using short answers, thumbs up/down.
- **Of content:**
  - Teacher checklist for active observation of group research.
  - Boardgame.
  - Teacher oral and written feedback on the activities about the butterfly.
  - Teacher rubric for active observation.
  - Teacher oral and written feedback on the activities
  - Rubric to assess the research process.
  - Summary of students' self-evaluation.
- **Of process:**
  - Learning intentions wall
  - Teacher checklist for active observation while Ss are doing the activities.
  - Class minibook journal.

**Evaluation criteria:**

1. Listen to and read a story about scientists and animals.

<ol style="list-style-type: none"> <li>2. Know the structure of living beings: cells, tissues, types, organs, devices and systems: identifying the main characteristics and functions.</li> <li>3. Know different levels of classification of living beings, taking into account their characteristics and types.</li> <li>4. Know the characteristics and components of an ecosystem.</li> <li>5. Use technological means, respecting the rules of use, safety and maintenance of observation instruments and work materials, showing interest in the observation of the cycle life of a butterfly with respect and care.</li> </ol> <p><b>STEM content evaluation criteria:</b></p> <ol style="list-style-type: none"> <li>6. Obtain relevant information on the cycle of life of a butterfly, making predictions about natural events, integrating direct and indirect observation data from the consultation of direct and indirect sources and communicating the results.</li> <li>7. Communicate orally and in writing the results obtained after carrying out various experiences, presenting them with graphic supports.</li> <li>8. Work cooperatively to take care of a butterfly and create a boardgame, taking care of tools and making proper use of materials.</li> </ol>	
<b>ATTENTION TO DIVERSITY</b>	
<p><b>LOTS to HOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils search about what kind of scientist you would like to become.</li> </ul>	<p><b>HOTS to LOTS</b></p> <ul style="list-style-type: none"> <li>• Pupils circle the pictures of some invertebrate /invertebrate animals in a worksheet.</li> </ul>

## 5 CONCLUSIONS

After finishing my End-of-Degree Project, I can confirm the initial hypothesis I had at the beginning of this adventure, “this will entail a considerable effort, but the reward will be worthy”. STEM education is regarded as a valuable approach to engage students in essential scientific and technological contents and strategies for the 21st century from a transversal and interdisciplinary perspective. Motivating young boys and girls to experiment, to formulate questions, to make decisions and solve problems can help them develop a positive attitude towards the role of science in their personal, academic, and professional lives. In this sense, increasing the number of female scientists should be one of the priorities for the future to reduce the current gender gap and raise the number of girls involved in careers in STEM fields (Stoet & Geary, 2028; OECD, 2019).

Nevertheless, as research demonstrates (Li, Froyed, & Wang, 2019), key concepts related to STEM education are not yet well-defined or developed in practical terms, which

adds further complexity when designing a syllabus for Primary Education. The transversal character of STEM requires to design and apply interdisciplinary strategies and contents in an engaging and coherent way in the classroom. One of the most significant difficulties that I had to face during the development of the syllabus was to integrate STEM in the design of the didactic units and projects for a year-year group of Primary Education. The result has been very rewarding.

From the beginning I also knew that I was entering an unknown field of knowledge, since it was a matter of months since I had begun to learn about the CLIL approach. To implement this dual-focused approach implies to integrate content subjects and language, in this case, English as the first foreign language, in an integrated way within a meaningful framework. It means that when designing a project and its corresponding didactic units and sessions, the specific STEM and language contents were the starting point along with the related key competences. Those contents guided the selection of learning goals and learning outcomes regarding cognition, culture, and communication and its linguistic demands. Finally, assessment and attention to diversity had to be coherent with the whole CLIL framework. Therefore, when designing a project there are lots of components to take into account to make the final result coherent, relevant and engaging for students, since they acquire an active role in their learning process. Even though there is a wide range of resources and materials available to help us generate ideas, it is necessary to adapt them to our teaching context.

Nevertheless, as I was gaining progressively further knowledge and experience on the subject, I saw the relationship of this approach with everything I have been taught during the Degree. Still, it has been a significant challenge to research and write in English, and to apply the CLIL principles to STEM education. I was confident in the benefits that would come from this extra effort. I can confirm that this Project has taught me a lot, not only about education, learning about the CLIL approach and the strategies used in STEM, but I have also been able to introspect my profile as a teacher. I have long valued the profession, but it is not until I have started writing down an annual syllabus design that I have really realized the tremendous motivation that teachers must have and the importance of their professional development. A syllabus design offers the chance to focus on the learner and the learning process to put into practice my philosophy as a teacher.

Finally, the development of this Annual Syllabus Design Project has taught me how to investigate and select relevant information and sources, to design and create activities and materials, applying different strategies and approaches to develop the knowledge acquired throughout all these years. This Project clearly reflects the type of education I believe in, an education in which students are placed in the center and the educational community and the didactic and pedagogical decisions revolve around their characteristics and needs.

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## 7 APPENDICES

### 7.1 Appendix A: Language of learning

#### 7.1.1 Figure 1. Nutrition vocabulary sentence cards.

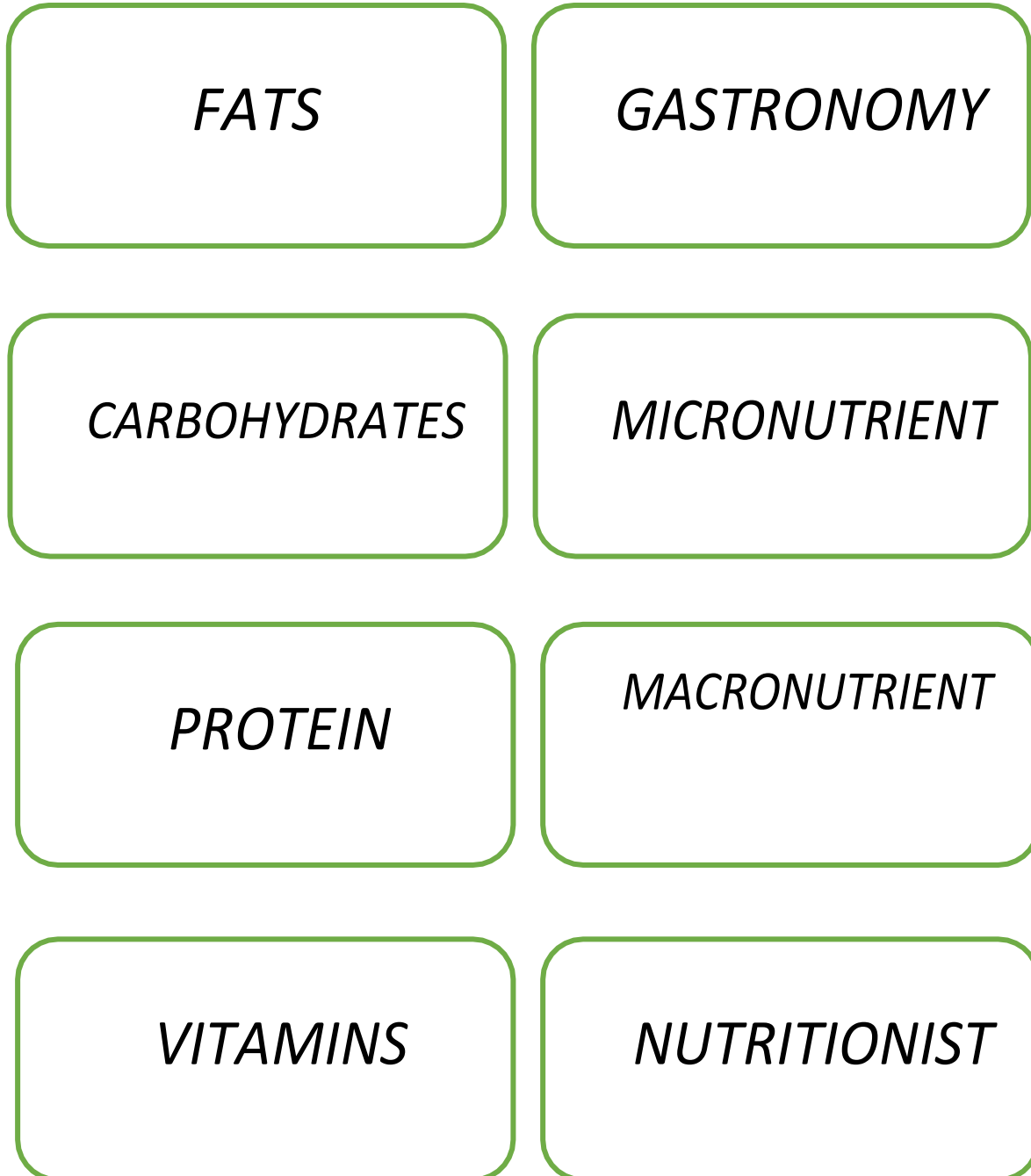


Figure 1. Nutrition vocabulary sentence cards.

7.1.2 Figure 2. Nutrition vocabulary, definitions.

Micronutrients are essential elements that living beings, including humans, need.

A substance found in foods such as sugar, bread, and potatoes. Carbohydrates supply your body with heat and energy.

A type of food (e.g., fat, protein, carbohydrate) required in large amounts in the diet.

A food substance like oil that is used by the body for energy.

A kind of micronutrient, which is essential for normal growth and nutrition and is required in small quantities.

Kind of macronutrient important in the development of tissues such as muscles.

A person who studies or is an expert in nutrition.

The practice or art of choosing, cooking, and eating good food. The cooking of a particular area.

Figure 2. Nutrition vocabulary, definitions.

7.1.3 Figure 3. Identifying macronutrients and vitamins in food.

Avocados have fat

Proteins are in meat, fish, soy...

Some fruit has vitamin C

Carrots have vitamin A

Figure 3. Identifying macronutrients and vitamins in food.












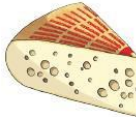


7.1.4 Figure 4. Food game, taken from twinkl.

**Food**

p	b	c	d	n	e	k	c	i	h	c	l
i	s	o	a	q	g	s	t	u	i	w	x
z	z	a	b	k	g	e	f	g	c	i	j
z	l	m	n	o	e	q	r	s	e	u	v
a	x	y	b	d	b	c	d	e	c	g	h
i	a	k	r	m	w	o	p	q	r	s	e
u	t	w	e	y	z	i	b	c	e	e	g
g	s	i	a	k	l	m	c	o	a	q	a
s	a	u	d	w	x	y	z	h	m	c	s
e	p	c	h	e	e	s	e	m	n	o	u
h	a	m	b	u	r	g	e	r	z	a	a
c	d	e	f	r	e	t	t	u	b	m	s

1. sandwich
2. pizza
3. ice cream
4. cheese
5. cake
6. hamburger
7. bread
8. butter
9. egg
10. sausage
11. chicken
12. pasta

Find the food and write the words under the pictures:

		
_____	_____	_____
		
_____	_____	_____
		
_____	_____	_____
		
_____	_____	_____



visit [twinkl.es](https://www.twinkl.es)



Figure 4. Food game, taken from twinkl.

7.1.5 Figure 5. Food vocabulary, taken from twinkl.

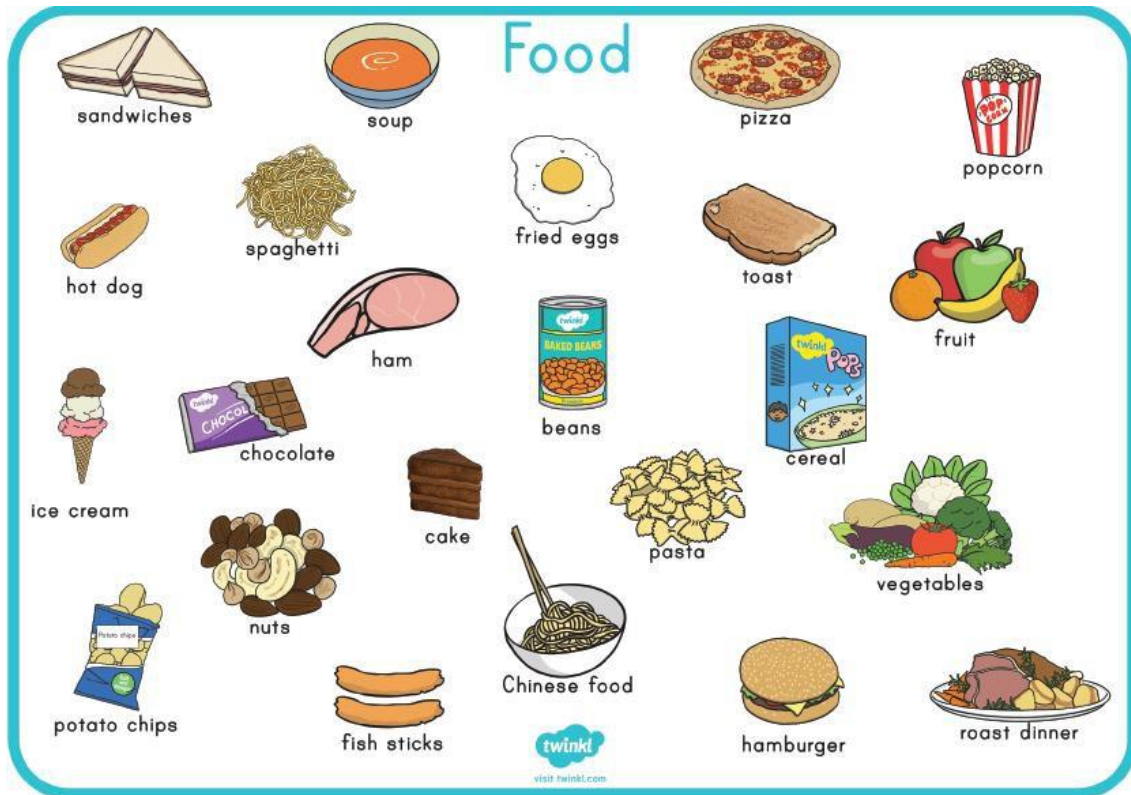


Figure 5. Food vocabulary, taken from twinkl.

7.1.6 *Figure 6. Matching food and culture, taken from twinkl.*

## Matching Food and Its Country of Origin

Here you have some traditional dishes from different countries.  
Can you guess where they come from?

couscous ●	● United States
meat pie ●	● Ireland
fish and rice ●	● Greece
Peking duck ●	● England
fish and chips ●	● Bangladesh
crepes ●	● Algeria
moussaka ●	● Spain
goulash ●	● Sri Lanka
chelo kebab ●	● China
Irish stew ●	● Australia
falafel and hummus ●	● Switzerland
polenta ●	● Hungary
rice and curry ●	● France
sushi ●	● Scotland
taco ●	● Sweden
haggis ●	● Iran
paella ●	● Israel
Swedish meatballs ●	● Italy
rosti ●	● Japan
hot dog ●	● Mexico

*Figure 6. Matching food and culture, taken from twinkl.*

## 7.2 Appendix B: Language for learning

### 7.2.1 Figure 7. Language for learning.

Eating vegetables is healthier than eating cakes.

Drink water; don't drink sodas, limit food with sugar.

It means a style of cooking or eating.

Choose a variety of protein food (seafood, meat, eggs, beans).

Eat a variety of vegetables and fruits.

In my opinion, Mediterranean diet is healthier than American diet because it has more vegetables and fruits.

Figure 7. Language for learning.

### 7.3 Appendix C: Classroom language

#### 7.3.1 Figure 8. Classroom language.

Which topic will your group report on?

Who would like to start?

Listen to the recording, please.

*Figure 8. Classroom language.*

## 7.4 Appendix D: Minibook Journal Activities

### 7.4.1 Figure 9. Minibook Journal.

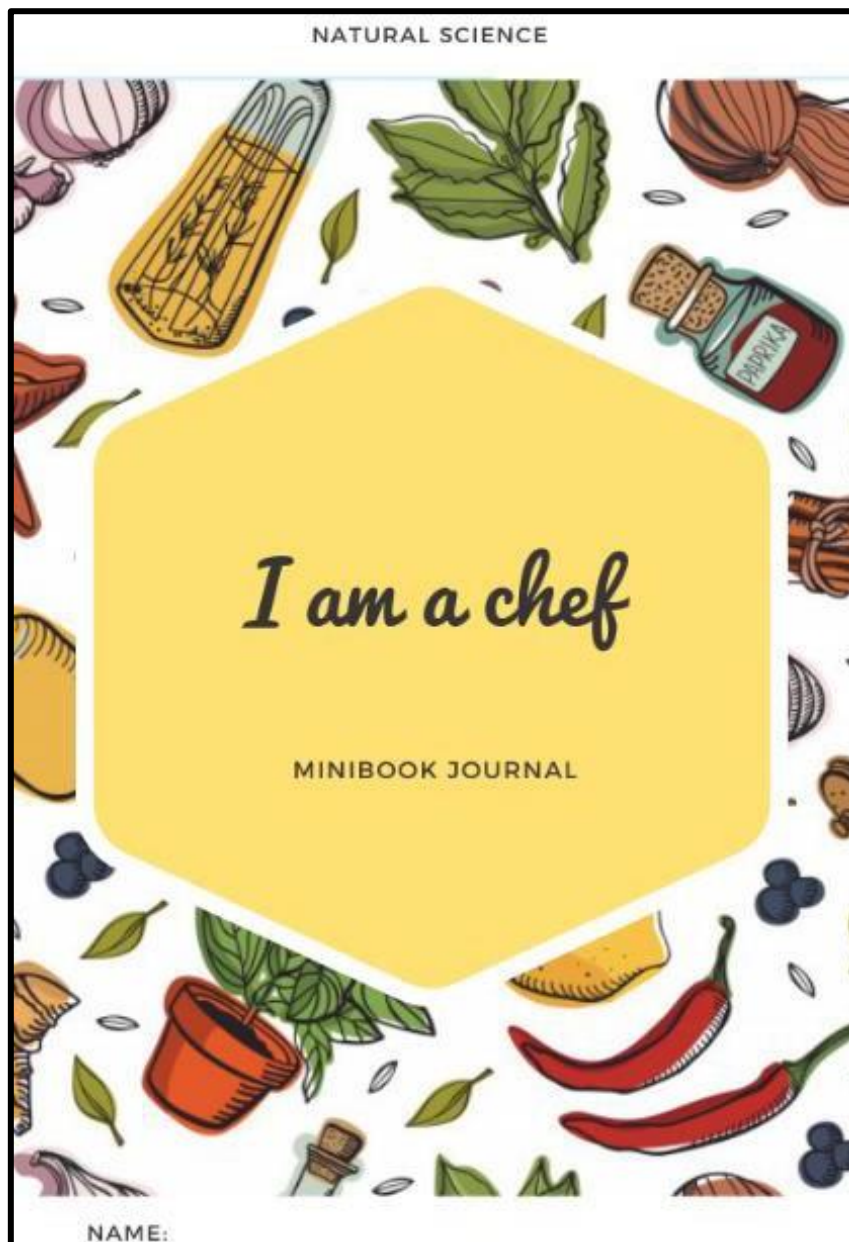
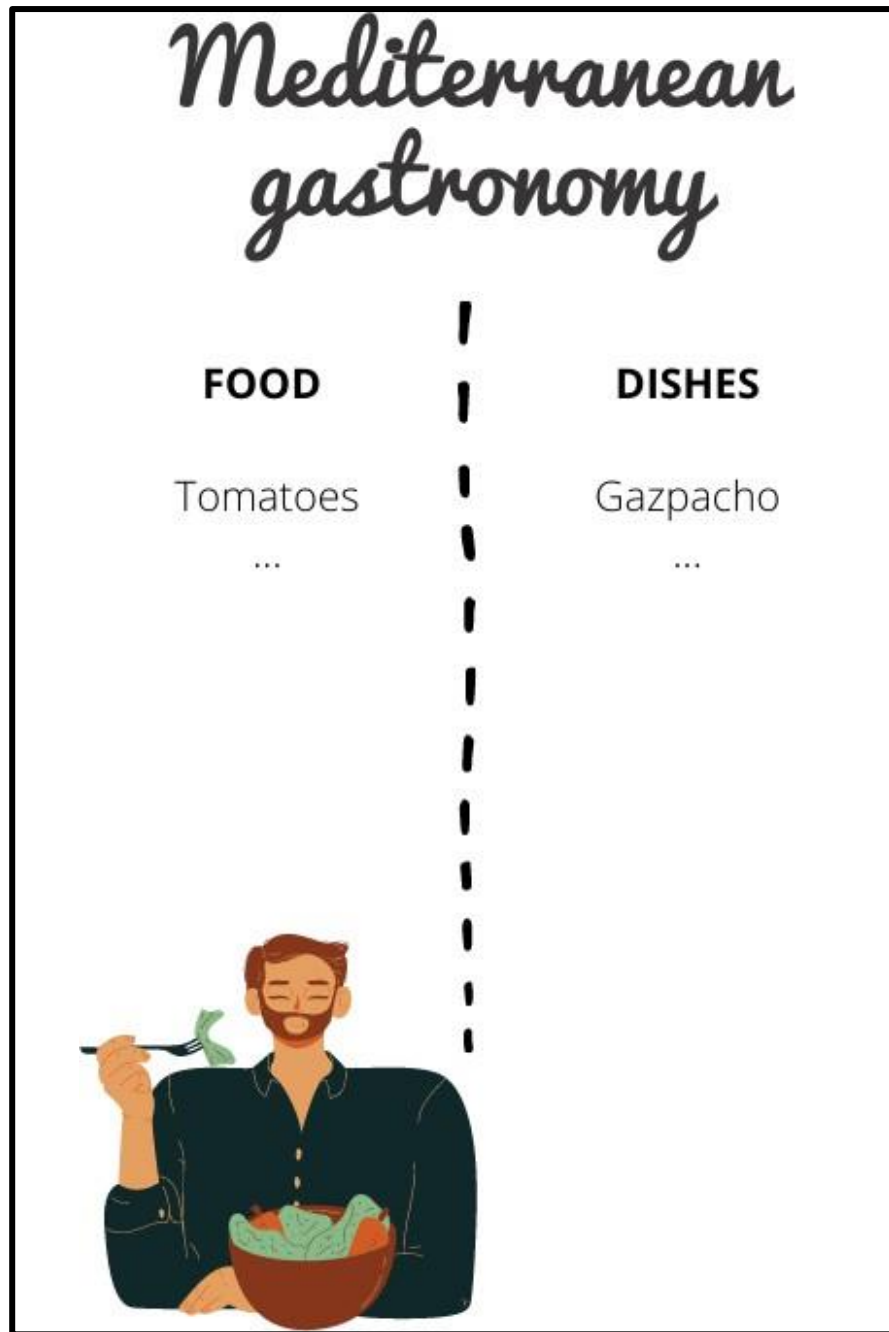


Figure 9. Minibook Journal.

7.4.2 Figure 10. Mediterranean gastronomy.



*Figure 10. Mediterranean gastronomy.*



7.4.3 Figure 11. Writing model for definitions.

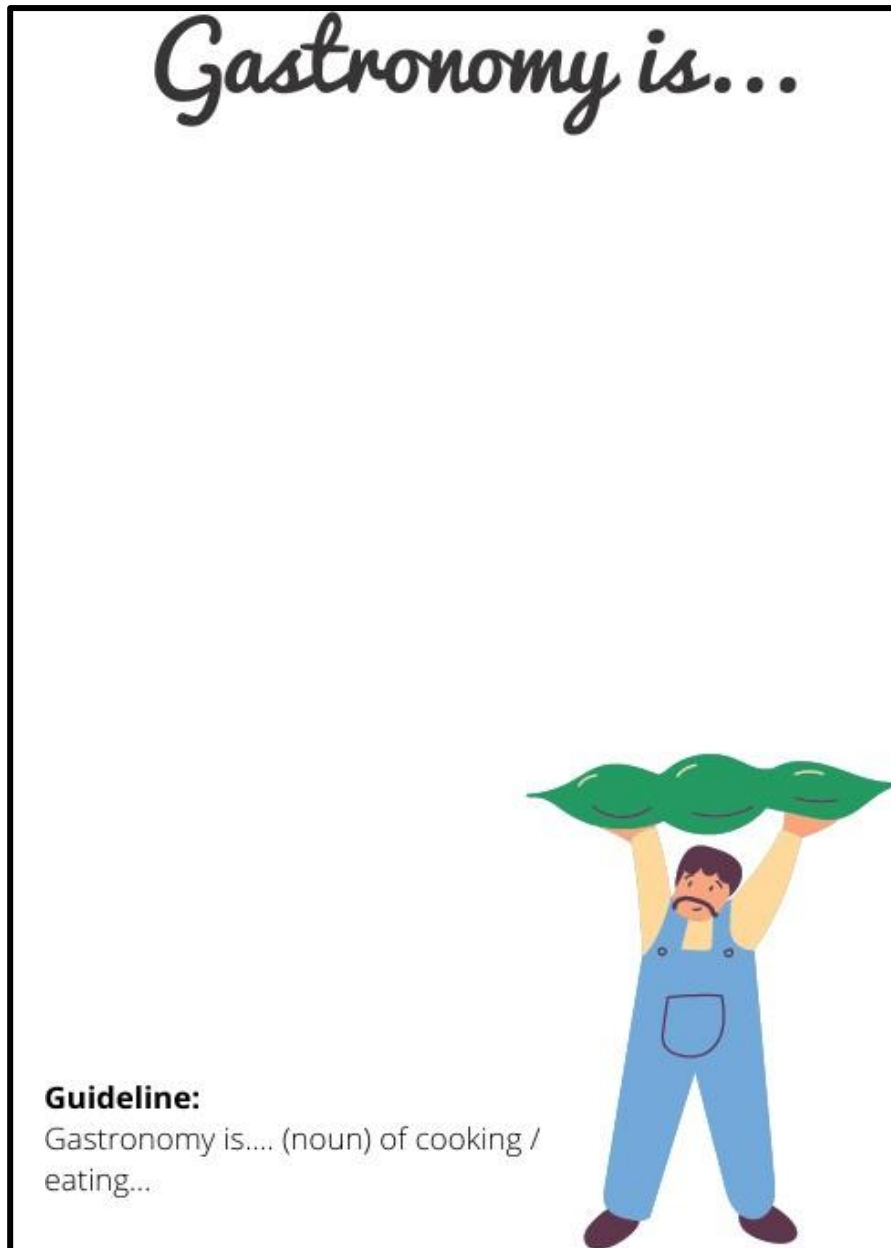


Figure 11. Writing model for definitions.



7.4.4 Figure 12. Hypotheses.

# What is a balanced diet?

My hypotheses are....

- Eating healthy fats
- Including more veggies
- 
- 
- 
- 
- 
- ...




Figure 12. Hypotheses.

7.4.5 Figure 13. Foods for our pyramid.

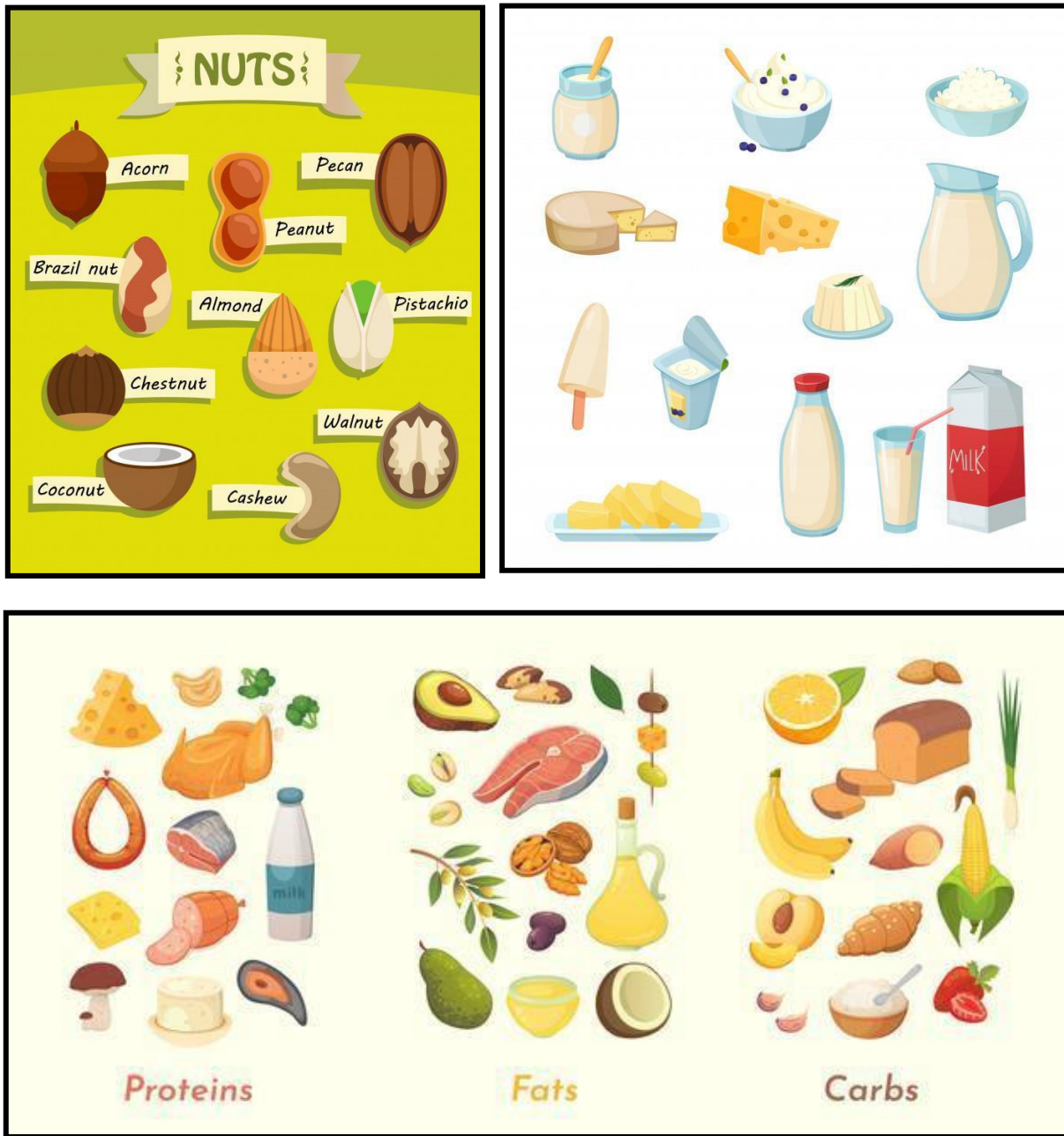


Figure 13. Foods for our pyramid.


7.4.6 Figure 14. Comparing macronutrients.

■ Protein

■ Carbohydrates

■ Fat

# Balanced macronutrients



**List of dishes:** Chorizo sandwich, paella, bolognese pasta, chickpeas soup, toast with tomatoe and jam, stuffed pepper, fried anchovies, torrijas.



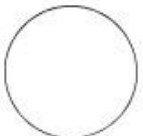

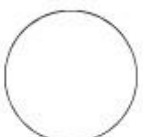



<b>BALANCED</b>		<b>UNBALANCED</b>
 <p>Potato omelette</p>		<p>Fried potatoes</p> 
		
		
		

Figure 14. Comparing macronutrients.

7.4.7 Figure 15. Salad presentation card.



*Figure 15.* Salad presentation card.



7.4.8 Figure 16. Chinese menu, taken from twinkl.

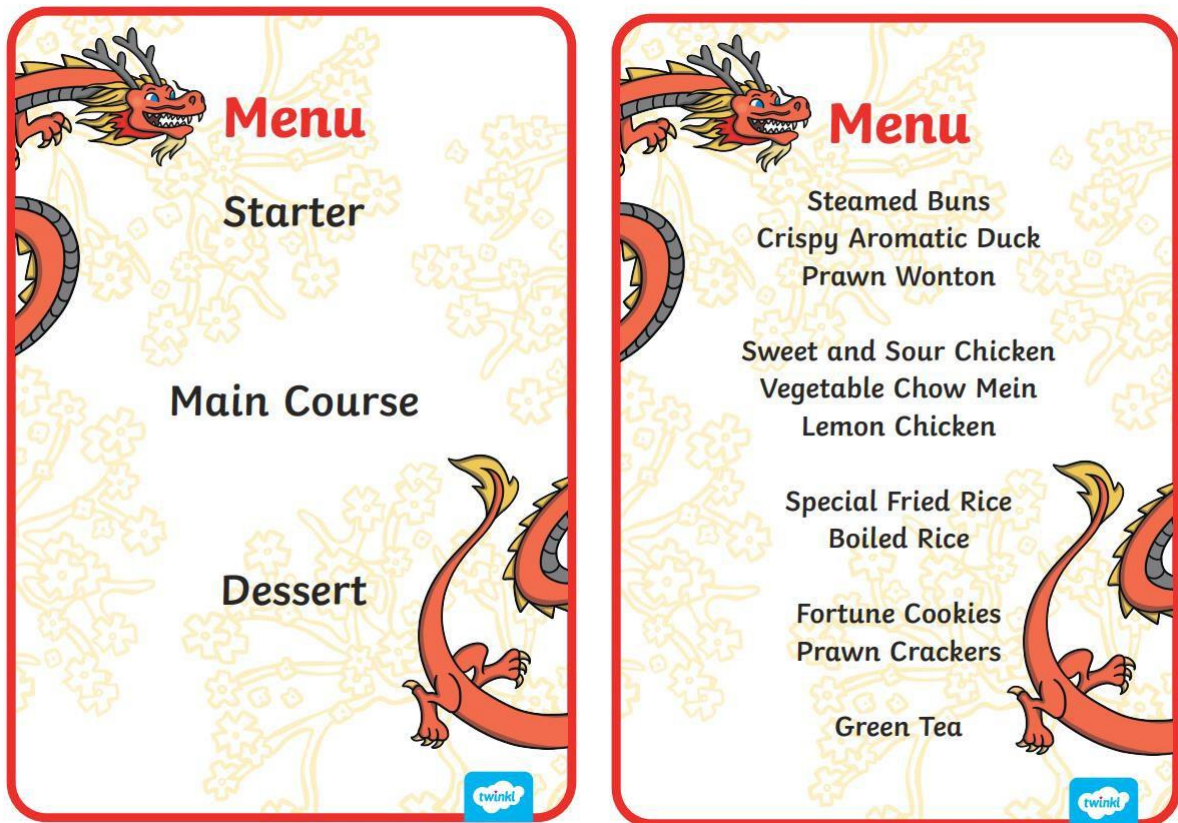


Figure 16. Chinese menu, taken from twinkl.

7.4.9 Figure 17. List of restaurants.

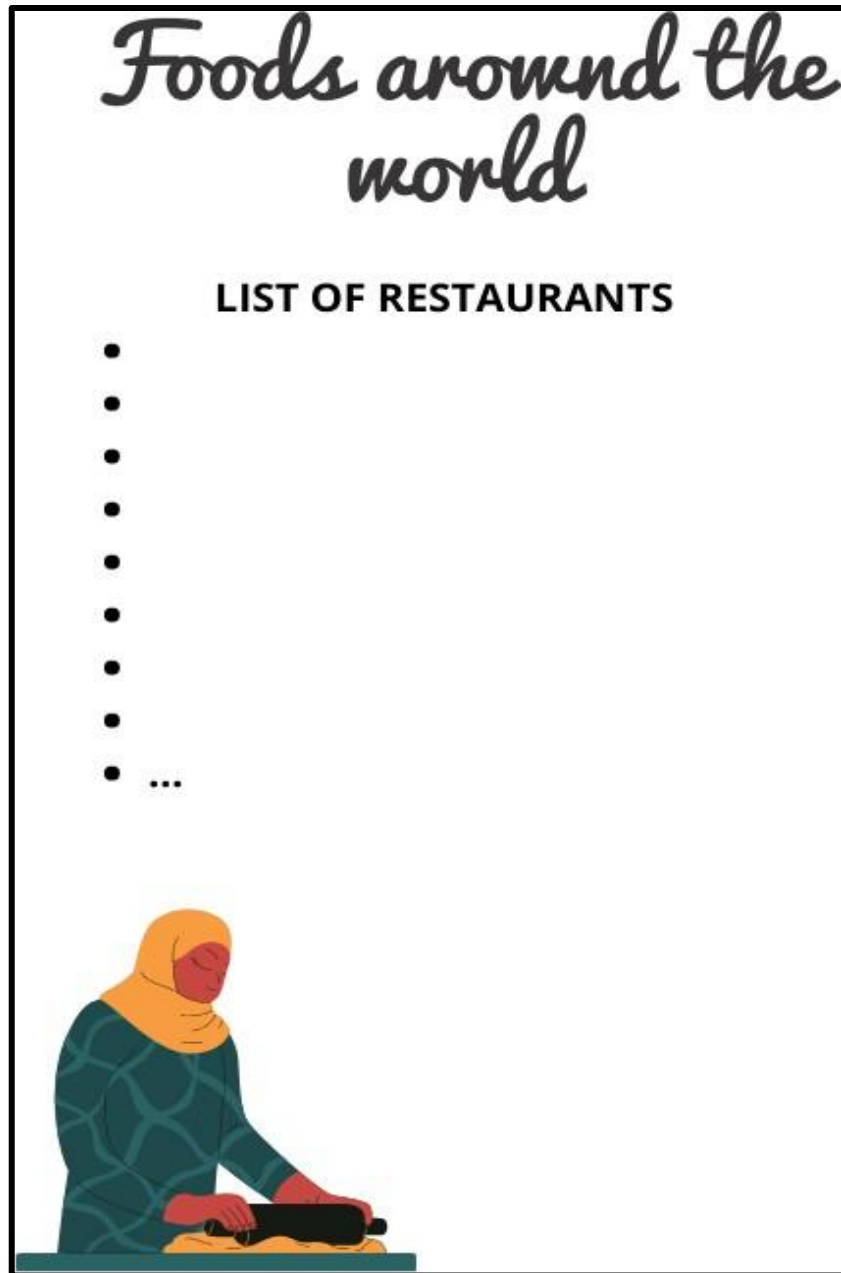


Figure 17. List of restaurants.

7.4.10 Figure 18. Nutritional pyramid of other cultures.

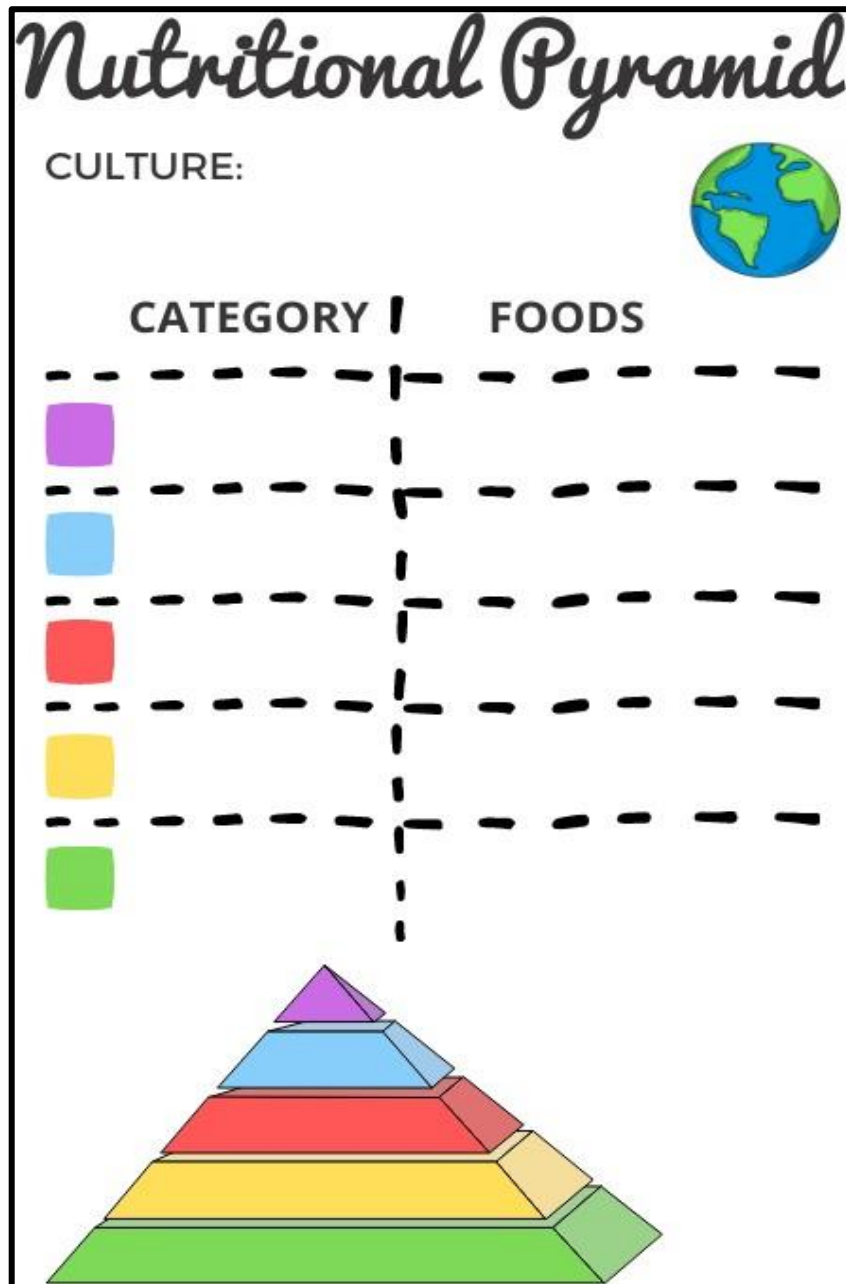


Figure 18. Nutritional pyramid of other cultures.

7.4.11 Figure 19. Foods with vitamins, taken from Freepik.

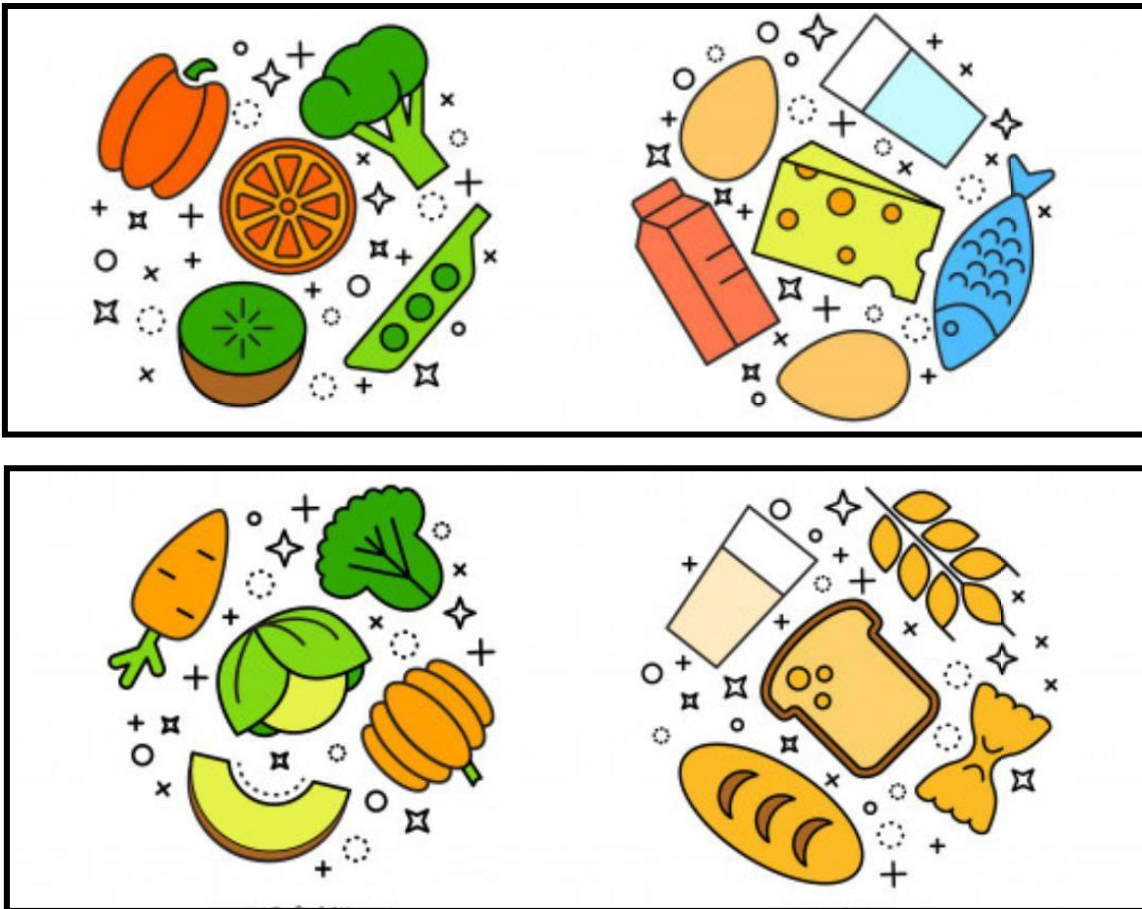


Figure 19. Foods with vitamins, taken from Freepik.



7.4.12 Figure 20. Solution of activity “foods with vitamins”, taken from Freepik.

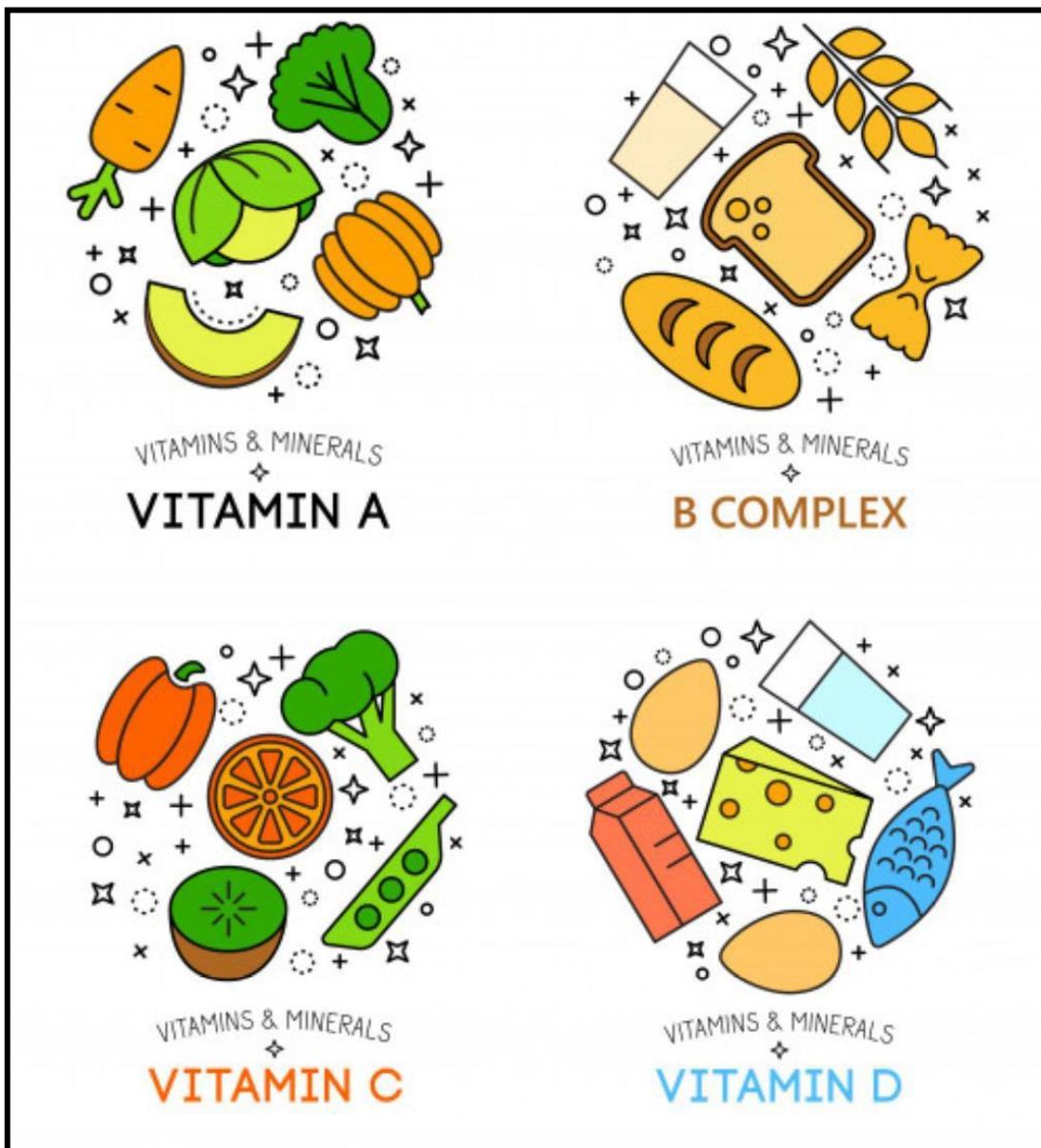


Figure 20. Solution of activity “foods with vitamins”, taken from Freepik.

7.4.13 Figure 21. Writing about vitamins.



Figure 21. Writing about vitamins.

7.4.14 Figure 22. Defining a micronutrient.



Figure 22. Defining a micronutrient.

7.4.15 Figure 23. Podcast script.

# Podcast script

What is your vitamin?

Where do we find it?

Why is it good for?

**Guideline**  
We find vitamin A in carrots, tuna fish and broccoli. It is good for our eyes and skin.




Figure 23. Podcast script.

7.4.16 Figure 24. Checklist of the podcast.

# Checklist of the podcast

I am assessing:

CATEGORY	YES	NO
Name the vitamin.		
Name foods where to find it.		
Explain the function of the vitamin in our body.		
Language understandable.		




Figure 24. Checklist of the podcast.

7.4.17 Figure 25. Healthy dish.

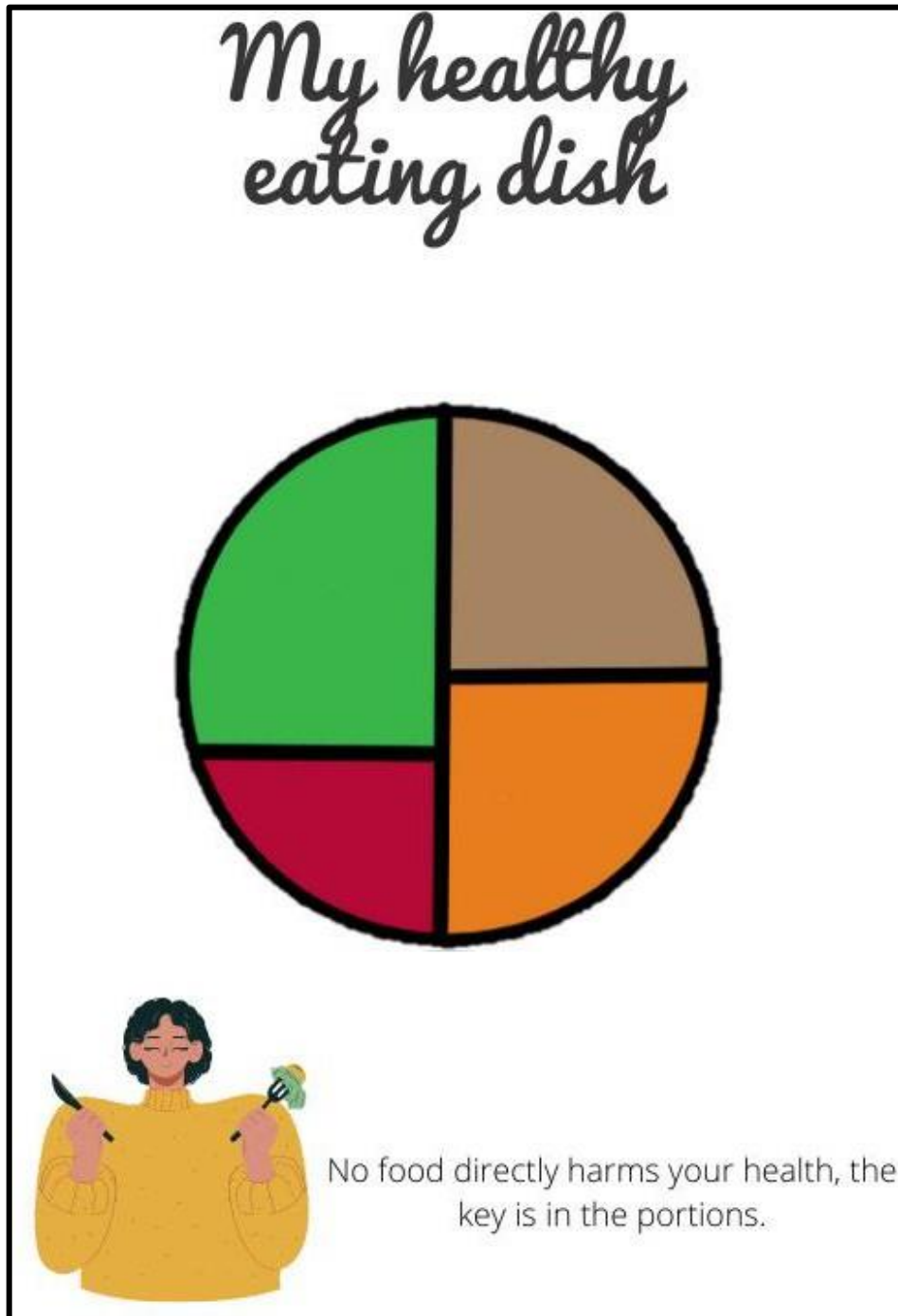


Figure 25. Healthy dish.

7.4.18 Figure 26. Checklist of healthy dish.

# Checklist of the healthy dish

I am assessing:

CATEGORY	YES	NO
Veggies are most of the dish.		
There is a piece of fruit included.		
It has some protein.		
Include carbohydrates as whole grains.		
Spelling is correct.		




Figure 26. Checklist of healthy dish.

7.4.19 Figure 27. Nutritional report model: example of healthy dish.

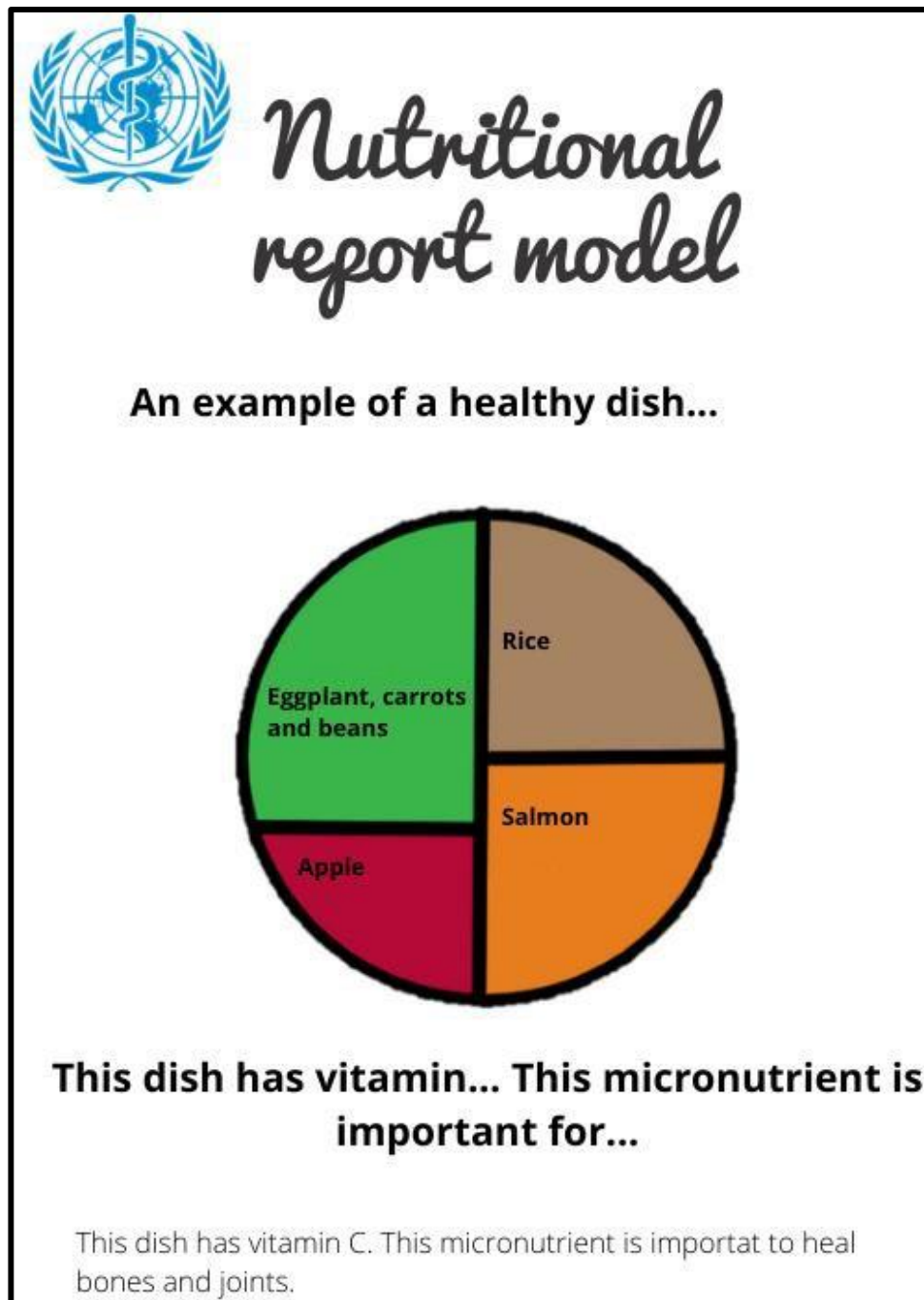
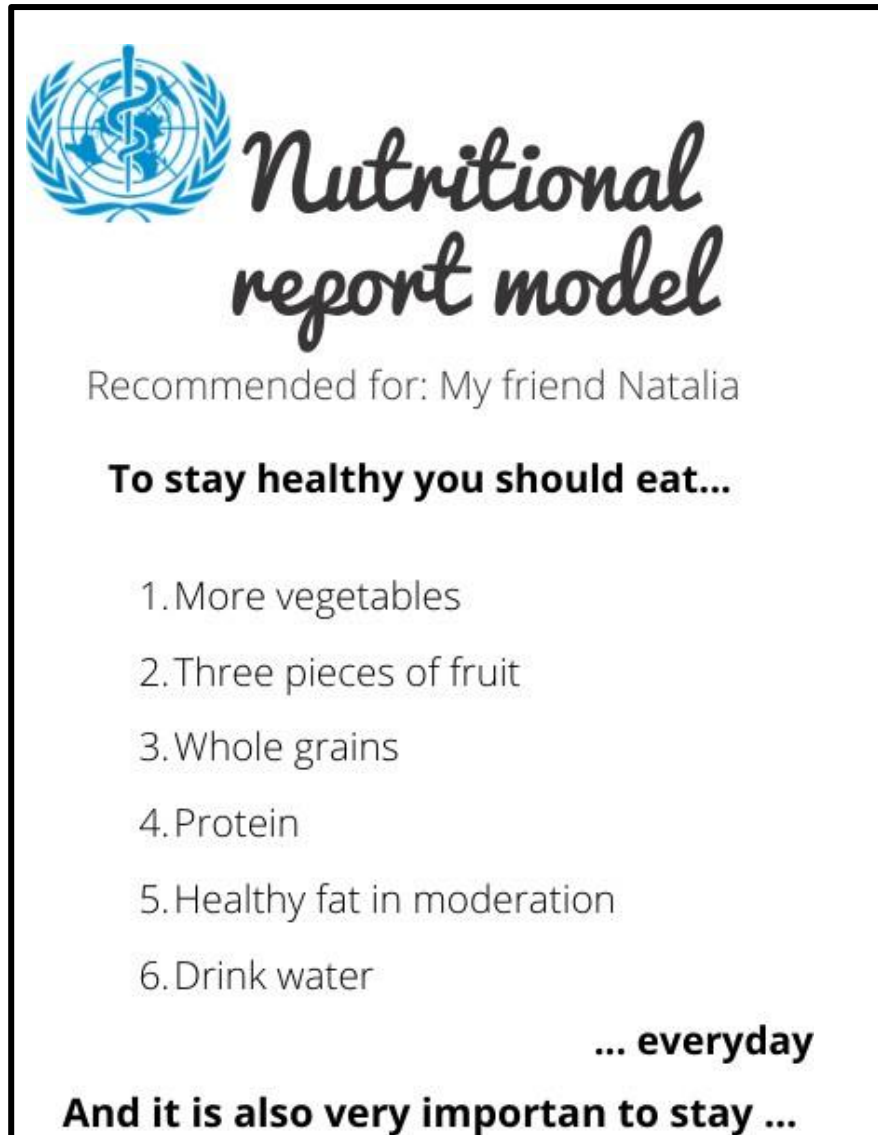


Figure 27. Nutritional report model: example of healthy dish.



7.4.20 Figure 28. Nutritional report model.



The graphic is enclosed in a black rectangular border. At the top left is a blue logo featuring a caduceus (a staff with two snakes) superimposed on a globe, surrounded by a laurel wreath. To the right of the logo, the title "Nutritional report model" is written in a large, black, cursive font. Below the title, the text "Recommended for: My friend Natalia" is written in a smaller, black, sans-serif font. Underneath that, the heading "To stay healthy you should eat..." is written in a bold, black, sans-serif font. A numbered list follows, with each item on a new line: "1. More vegetables", "2. Three pieces of fruit", "3. Whole grains", "4. Protein", "5. Healthy fat in moderation", and "6. Drink water". To the right of the list, the text "... everyday" is written in a bold, black, sans-serif font. At the bottom of the graphic, the text "And it is also very important to stay ..." is written in a bold, black, sans-serif font.

 **Nutritional  
report model**

Recommended for: My friend Natalia

**To stay healthy you should eat...**

1. More vegetables
2. Three pieces of fruit
3. Whole grains
4. Protein
5. Healthy fat in moderation
6. Drink water

**... everyday**

**And it is also very important to stay ...**

Figure 28. Nutritional report model.

7.4.21 Figure 29. Recommended nutritional report.

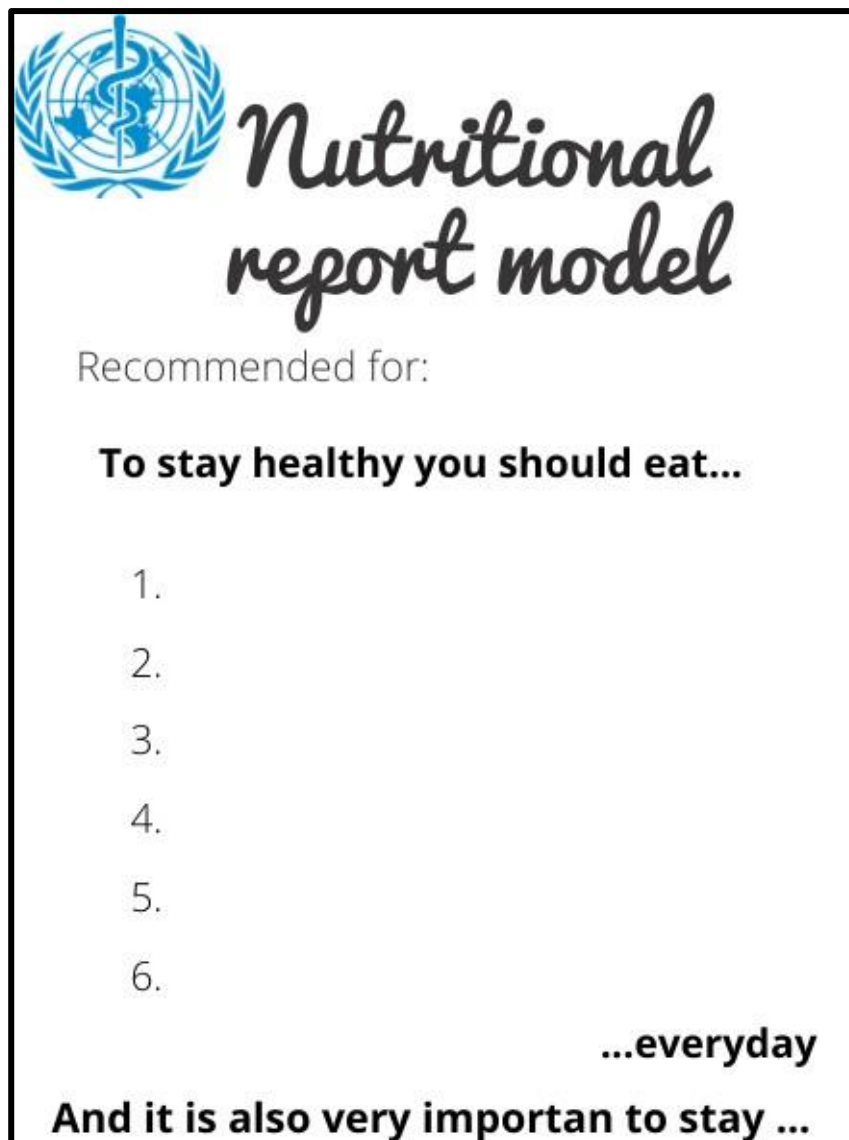
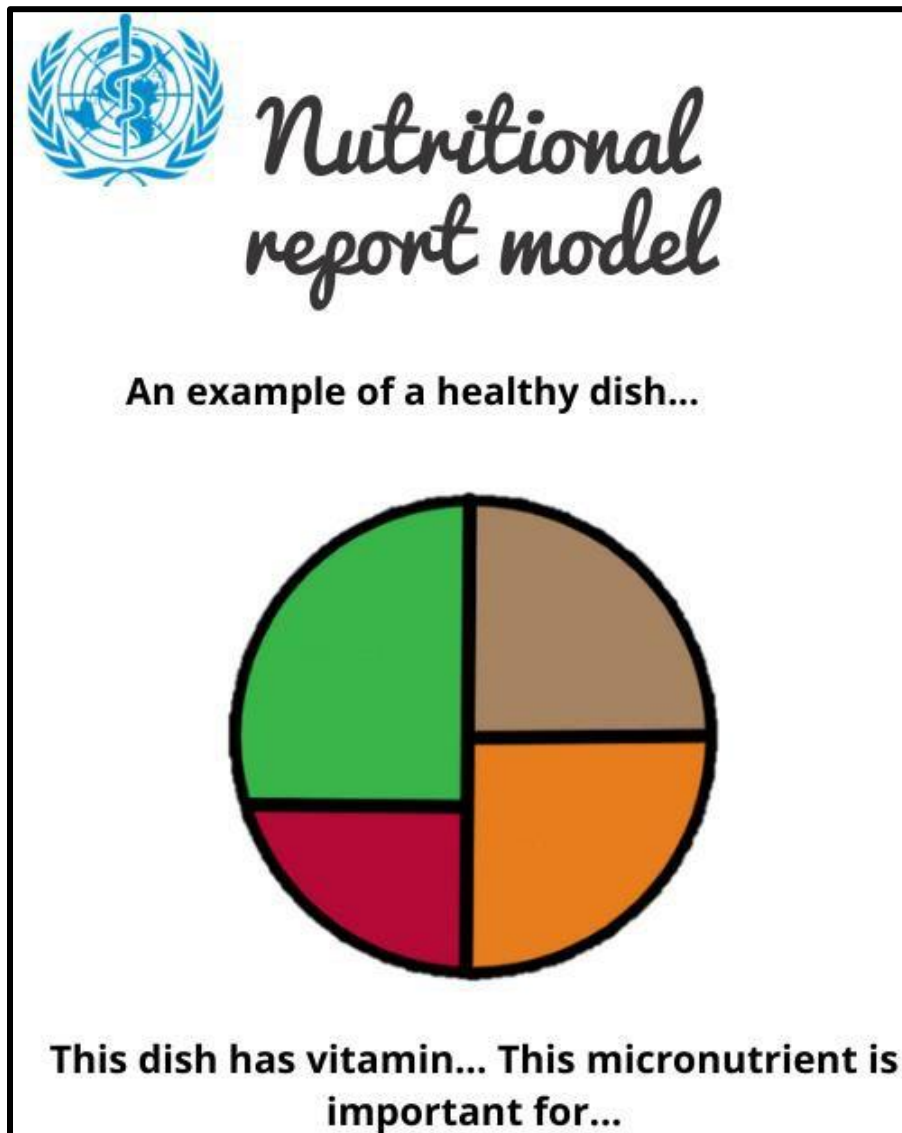


Figure 29. Recommended nutritional report.

7.4.22 Figure 30. Recommended nutritional report: healthy dish.



*Figure 30. Recommended nutritional report: healthy dish.*

7.4.23 Figure 31. Rubric for own nutritional report.

# Rubric for own nutritional report

I am assessing:

CATEGORY	BETTER THAN EXPECTED	GETS THE DEGREE	NEEDS SUPPORT
Recommendation of diet and habits.	7 recommendations.	5-6 recommendations.	0-4 recommendations.
Healthy eating dish.	The dish is complete.	One part of the dish is missing.	More than one part of the dish is missing.
Vitamins.	Identify the vitamin and the function in our body.	Identify the vitamin but not the function in our body.	Does not identify the vitamin or the function in our body.




Figure 31. Rubric for own nutritional report.

## 8 ANNEXES

### 8.1 Annex 1. Table 4. Primary Education objectives for bilingual schools, Community of Madrid

<p><b>Overall Objectives</b> <i>ORDEN 5958/2010, de 7 de diciembre, por la que se regulan los colegios públicos bilingües de la Comunidad de Madrid.</i></p>	<p><b>By the end of Primary Education, students will be able to:</b></p> <ul style="list-style-type: none"> <li>- use two languages competently: English and Spanish, across different subjects in the curriculum; acquire new knowledge through the instrumental use of English.</li> <li>- value English and other languages in general as a means of communicating and understanding people from different places and cultures, and thus gain cultural awareness.</li> <li>- use previous experiences in other languages to acquire English language skills more quickly, efficiently, and autonomously.</li> <li>- demonstrate a willingness to learn.</li> <li>- build up their confidence in their ability to learn and communicate in English.</li> <li>- use different resources, including ICT, with increasing autonomy to obtain information and to communicate in English.</li> <li>- assess their progress in their learning process, building on achievements in previous years and through the different subjects taught in English.</li> </ul>
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## 8.2 Annex 2. Table 5. Primary Education curriculum

<p><b>Real Decreto 126/2014, de 28 de febrero, por el que se establece el currículo básico de la Educación Primaria.</b></p>	<p>a) Conocer y apreciar los valores y las normas de convivencia, aprender a obrar de acuerdo con ellas, prepararse para el ejercicio activo de la ciudadanía y respetar los derechos humanos, así como el pluralismo propio de una sociedad democrática.</p> <p>b) Desarrollar hábitos de trabajo individual y de equipo, de esfuerzo y de responsabilidad en el estudio, así como actitudes de confianza en sí mismo, sentido crítico, iniciativa personal, curiosidad, interés y creatividad en el aprendizaje, y espíritu emprendedor.</p> <p>c) Adquirir habilidades para la prevención y para la resolución pacífica de conflictos, que les permitan desenvolverse con autonomía en el ámbito familiar y doméstico, así como en los grupos sociales con los que se relacionan.</p> <p>d) Conocer, comprender y respetar las diferentes culturas y las diferencias entre las personas, la igualdad de derechos y oportunidades de hombres y mujeres y la no discriminación de personas con discapacidad.</p> <p>e) Conocer y utilizar de manera apropiada la lengua castellana y, si la hubiere, la lengua cooficial de la Comunidad Autónoma y desarrollar hábitos de lectura.</p> <p>f) Adquirir en, al menos, una lengua extranjera la competencia comunicativa básica que les permita expresar y comprender mensajes sencillos y desenvolverse en situaciones cotidianas.</p> <p>g) Desarrollar las competencias matemáticas básicas e iniciarse en la resolución de problemas que requieran la realización de operaciones elementales de cálculo, conocimientos geométricos y estimaciones, así como ser capaces de aplicarlos a las situaciones de su vida cotidiana.</p> <p>h) Conocer los aspectos fundamentales de las Ciencias de la Naturaleza, las Ciencias Sociales, la Geografía, la Historia y la Cultura.</p> <p>i) Iniciarse en la utilización, para el aprendizaje, de las Tecnologías de la Información y la Comunicación desarrollando un espíritu crítico ante los mensajes que reciben y elaboran.</p> <p>j) Utilizar diferentes representaciones y expresiones artísticas e iniciarse en la construcción de propuestas visuales y audiovisuales.</p> <p>k) Valorar la higiene y la salud, aceptar el propio cuerpo y el de los otros, respetar las diferencias y utilizar la educación física y el deporte como medios para favorecer el desarrollo personal y social.</p> <p>l) Conocer y valorar los animales más próximos al ser humano y adoptar modos de comportamiento que favorezcan su cuidado.</p> <p>m) Desarrollar sus capacidades afectivas en todos los ámbitos de la personalidad y en sus relaciones con los demás, así como una actitud contraria a la violencia, a los prejuicios de cualquier tipo y a los estereotipos sexistas.</p> <p>n) Fomentar la educación vial y actitudes de respeto que incidan en la prevención de los accidentes de tráfico.</p>
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### 8.3 Annex 3. Table 6. Third grade Science objectives

<p><b>Third grade Science objectives</b> <b>BOCM (DECRETO 89/2014,</b> <i>de 24 de julio, del Consejo de Gobierno, por el que se establece para la Comunidad de Madrid el Currículo de la Educación Primaria).</i></p>	<p>El ser humano y la salud</p> <p>Las funciones vitales del ser humano.</p> <ol style="list-style-type: none"> <li>1. Conoce los aparatos implicados en las funciones de relación (órganos de los sentidos, aparato locomotor y sistema nervioso), nutrición (aparato respiratorio, digestivo, circulatorio y excretor) y reproducción (aparato reproductor). Los sentidos.</li> <li>2. Conoce el funcionamiento de los órganos de los sentidos, sus posibles alteraciones y los cuidados que precisan. El aparato digestivo.</li> <li>3. Describe las principales características del aparato digestivo.</li> <li>4. Identifica y localiza los órganos que lo constituyen (boca, esófago, estómago, intestino delgado e intestino grueso). Salud y enfermedad.</li> <li>5. Reconoce la importancia de una alimentación sana.</li> <li>6. Conoce los principios de una dieta equilibrada. Los seres vivos Los animales vertebrados e invertebrados. Clasificación y características.</li> </ol> <p>Las plantas. Estructura y fisiología.</p> <ol style="list-style-type: none"> <li>7. Observa e identifica las características de los distintos grupos de plantas. Observación y estudio de los animales y plantas.</li> <li>8. Hace uso de la lupa en los diferentes trabajos que realiza.</li> <li>9. Utiliza guías para observar las características y formas de vida de diferentes tipos de animales y plantas.</li> <li>10. Utiliza los instrumentos y los medios audiovisuales y tecnológicos apropiados para el estudio de animales y plantas.</li> <li>11. Comunica de manera oral y escrita los resultados de los trabajos realizados.</li> <li>12. Elabora fichas y cuadernos de campo. Seguridad personal y prevención de riesgos.</li> <li>13. Conoce y respeta las normas de uso, de seguridad y de mantenimiento de los instrumentos de observación y de los materiales de trabajo.</li> </ol> <p>Materia y energía. Tecnología, objetos y máquinas Estados de la materia.</p> <ol style="list-style-type: none"> <li>14. Observa las propiedades de sólidos, líquidos y gases.</li> <li>15. Identifica el agua en los tres estados. La energía. La electricidad.</li> <li>16. Explica el efecto del calor sobre diferentes materiales.</li> <li>17. Distingue conductores y aislantes.</li> </ol> <p>Sustancias puras y mezclas.</p> <ol style="list-style-type: none"> <li>18. Realiza algunas mezclas y explica sus características. Máquinas y aparatos en la vida cotidiana. Importantes inventos y descubrimientos.</li> <li>19. Describe alguna máquina y aparato de la vida cotidiana explicando sus componentes, funcionamiento y utilidad.</li> <li>20. Identifica la importancia de la invención de la máquina de vapor y del telégrafo.</li> </ol>
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