



**MIND SAFETY**  
*safety matters!*

# **TEACHER'S GUIDE ON OCCUPATIONAL SAFETY AND HEALTH EDUCATION – EXPLORING “OSH! WHAT A BRIGHT IDEA!”**

**1<sup>st</sup> edition**



**universidade de aveiro**  
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### **Authors**

Fernanda Rodrigues, Mariana Ribeiro Clemente, Rui Vieira, Rui Neves, Ana Margarida Almeida, Luís Pedro, Joana Beja

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### **Authors**

Fernanda Rodrigues, Mariana Ribeiro Clemente, Rui Vieira, Rui Neves, Ana Margarida Almeida, Luís Pedro, Joana Beja

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**Mind Safety Project website:** <http://mindsafety.web.ua.pt/>

**Students' resource website:** <http://osh.act.gov.pt/>



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**EXPLORING "OSH! WHAT A BRIGHT IDEA!"**

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Exploring “OSH! What a bright idea!”**

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PROJECT  
PRESENTATION

## PROJECT PRESENTATION

The Mind Safety – Safety Matters (hereinafter referred to as MS-SM) project aim to improve and innovate methods of teaching safety and health issues in the classroom, motivating and preparing young people to work in safe conditions, encouraging them to be more aware about Occupational Safety and Health (hereinafter referred to as OSH) themes and to understand the need to know about safety and health.

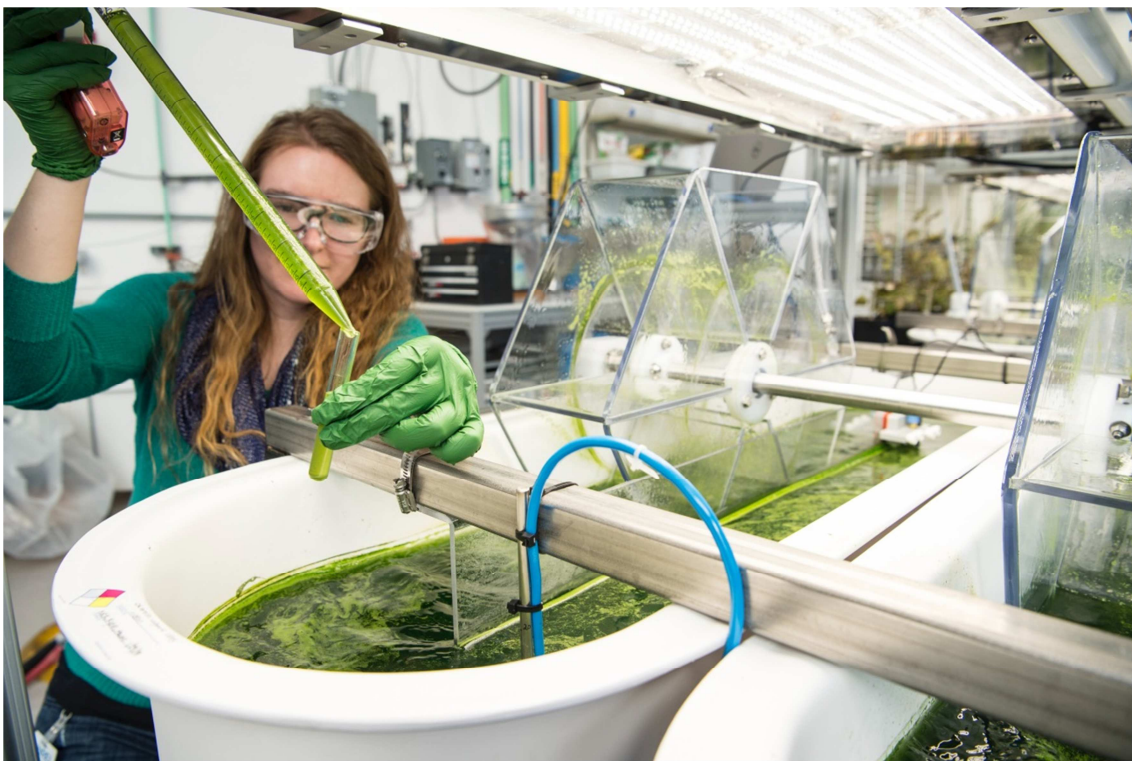


The activities of the project involve partners in a common purpose: developing and implementing innovating practices to improve teaching competences and abilities in order to deliver occupational safety and health issues, through interdisciplinary pedagogical approaches. The projects also promote teachers' active involvement and active participation in their own formation, exploring, developing and implementing methodologies and tools in schools.


Both MS – SM projects contribute to create a shared space for professionals and educators from various countries, by sustaining training and exchange of practices and ensuring free access to teaching/learning materials about OSH.

It is an integrated project based on the production of knowledge and the possibility of transferring it from school to the workplace, by giving teachers and professional trainers an important role as vehicles of that knowledge and as modellers for safety behaviours by young people/future workers, before they enter the labour market. It also places on students a special role, by developing resources that are youth friendly, such as the digital learning tool “OSH! What a bright idea!” and the Mind Safety “Learning Box” developed at the University of Aveiro in partnership with a Portuguese company (see annex 2).

Finally, other innovative aspects of the project are to facilitate free access to educational/training contexts and teaching tools, promoting non-formal education and training.







**INTRODUCING OSH IN  
THE PORTUGUESE  
EDUCATIONAL  
CONTEXT: LESSONS  
LEARNED**

## INTRODUCING OSH IN THE PORTUGUESE EDUCATIONAL CONTEXT: LESSONS LEARNED

*Looking back over the recent history of Mind Safety-Safety Matters I project (2015-2018), it is easy to realize that important lessons were learnt concerning the educational dimension of occupational safety and health and its adequacy and visibility in Portuguese school curriculum. Developing inclusive, accessible and curriculum-oriented activities while aiming to promote creative and critical thinking, privileging project-based learning and following hands-on approach was a real challenge.*

The first immediate task in the ambit of the development and imomentation of the Intellectual Output 1, “OSH! What a bright idea! – booklet for students and other educational content”, was to verify in the Portuguese school programmes and curricular goals of Basic Education if the OSH dimension was revealed and in which ways it was mentioned, searching in particular for *clues of curricular integration*. Health issues and health promotion were immediately found throughout the curriculum of basic education (7<sup>th</sup> - 9<sup>th</sup> grade, 3<sup>rd</sup> cycle), while safety awareness was less visible and somehow connected to risk prevention and safety measures concerning natural disasters such as earthquakes and/or tsunamis and fires, especially forest fires. The occupational dimension was less visible and explicit contents regarding jobs and youth safety and health in the workplace were optional, scarce or inexistent.

Considering the Portuguese curriculum, particularly for the 2<sup>nd</sup> Cycle, the 3<sup>rd</sup> Cycle and secondary education, the aforementioned topics are largely included in *Citizenship Education*, a non-mandatory subject which means that schools can decide whether to provide it as an independent subject or not. Defined by the Portuguese MEC (2012) as an educational process, Citizenship Education is committed to “contribute to the development of responsible, autonomous and solidary people that know and exercise

their rights and duties through dialogue and respect for others, with a democratic, pluralist, critical thinking and creative spirit” (p. 1).

According to the Strategy of Citizenship Education, there are three domains of Citizenship Education, being on the first domain that the *Health* topic is set, the *Risk* on the second domain and the *Working World* pertaining to the third domain. Whereas the implementation of the first domain is compulsory in all cycles, and the implementation of the second should be explored in at least two school cycles, the implementation of the last domain is optional.

There are a few *guiding documents delivered by the Portuguese Ministry of Education and Science* to help teachers develop their practices and build new educational resources. These documents provide theoretical and practical contents about Safety and Health placing it within the framework of Citizenship Education, particularly the Citizenship Education Guideline (MEC, 2013), the Referential to Risk Education (MEC, 2015), the National Strategy of Citizenship education (MEC, 2017), and the document focused on Citizenship and Development – organization, learning and assessment (MEC, 2018).

After reading these documents, it became clear that the occupational dimension of safety and health was optional or rather scarce or non-explicit as we mentioned before. In the Referential to Risk Education (MEC, 2015) the risk dimension was in fact dedicated to Civil Protection themes that would not be included in “OSH! What a bright idea!”, such as: civil protection, natural risks (earthquakes, tsunamis, erosion, etc.), technological risks (traffic accidents, accidents involving the transportation of dangerous substances, structural collapse, dams breakage, etc.), mixed risks (forest fires and pollution) and safety plan. Nevertheless, the topics explored in the Referential and the clear objective of the document to foster a safety culture helped us to set connections between the protection and prevention that every citizen needs to be aware of and the uniqueness of working contexts, emphasizing the school as one the first working environments with which children and youth contact with as well as the parents/families’ jobs. As an example of this, one may highlight the topic emergency plan and the need to understand the importance of knowing the school

emergency plan and identify the hazards and risks within the school environment and daily life, as it may be seen in the Hands-on activities of “OSH! What a bright idea!” developed for the theme General OSH topics (see Box 1). *To make visible and explicit the occupational dimension of hazards and risks contributing to raise a safety and health culture was the ultimate objective of the educational resource “OSH! What a bright idea!”.*

## **General OSH Topics**

### **Activity 1**

#### **Mapping hazards digital story**

The objective of this activity is to actively engage in the OSH theme producing a digital story where you construct a personal narrative about safety and health hazards in your daily life (example: home-school journey, daily routine, weekend routine).

You will need a smartphone/digital camera, computer, internet connection, school map, city map. Google Cardboard and Google Street View app may be useful too.

There are free storytelling applications available online. Digital storytelling is also possible with PowerPoint.

#### **Strategies and tips**

- Search for information about the topic you will write about.
- Start with a script of your story (what do you want to tell and how you will tell it).
- Then, using a mobile phone or digital camera, collect images and videos of places/objects/situations that somehow express your concern/critical remark with safety and health issues, identifying hazards and potential risks.
- You can add a meaningful soundtrack too (music or other sounds). You can also use graphics and/or maps and other visuals to value the meaning of your story. Through these resources you are supporting your story.
- Share your story with your teacher and colleagues.
- Pay attention to the digital stories of your colleagues and discuss with the class the different and similar points of view about the topic. Identify the overall concern and the reasons that support that concern.

Note: The “Mapping hazards digital story” activity may be combined with the “School’s working conditions project” global activity (see Activity 2).

### **Activity 2**

#### **Global Activity: School’s working and health conditions project**

##### **Project conception and development:**

- In small groups take a tour around your school building(s), classrooms, labs and exteriors/play areas;
- Take note of aspects concerned with safety, health and wellbeing that are relevant (positive aspects and less positive ones/gaps, hazards identification);
- Bring those notes to a place in the school’s outdoor and discuss with your teacher and with the other groups your findings and concerns;
- From the data you collected and the class discussion, ask and write down questions about your school’s safety, health and wellbeing;
- With your class, select a few challenging questions, list your top priorities, assign tasks and create a class intervention project able to minimize those less positive aspects and/or gaps and highlight the positive ones.
- To enrich your project, contact with school staff and/or local government institutions. You can conduct interviews and/or engage in your project’s tasks different participants, such as other teachers, school directors/managers/administrators, parents, municipalities, libraries, local companies, etc. Take your project outdoors!

##### **Project sharing:**

- Present your project to the (school) community and show what you have learnt about Safety and Health.
- Draw on your computer your OSH project concept map with your class. Explore free online tools to draw concept maps/knowledge maps.
- Adapt the digital map by using paper/cards and/or other materials to show the connections between concepts, ideas, activities and outcomes.

**Box 1: General OSH topics, activity Mapping hazards digital story (1) and School’s working and health conditions project (2)**

Other dimensions that were not explicitly explained or present throughout the referential documents and guidelines were the *Critical and Creative Thinking* dispositions and abilities. Critical thinking is defined as a type of thinking oriented to decision making and reasonable thinking while creative thinking, a divergent type of thinking, which could be summarized as the production of unusual, imaginative and alternative strategies and solutions to solve problems and/or answer questions (Ennis, 1985; Valente, 1989; Tenreiro-Vieira & Vieira, 2000; Halpern, 2001; Weisberg, 2003). These two types of thinking are thus related and are essential to live and cope with our complex world and in the workforce, therefore their intentional exploration in education since childhood becomes a requisite to promote the skills creativity and critical thinking encompass.

In “OSH! What a bright idea” the problem-based activities, school-community projects and debate moments (particularly the two dilemmas originally created for the educational resource) are an example of *classroom strategies used to foster critical and creative thinking also engaging the promotion of citizenship and interdisciplinary skills* (see Box 2 and Box 3).

### ***Biological Hazards: Thinking and Acting Challenge***

#### **Task 1**

Read the “Nurse dilemma” and answer the questions by the following order. Then discuss your answers to each question with your class:

A nurse works in a public hospital. Last shift the nurse had a new patient, a foreign woman that is staying in the country representing her company. The blood analysis of this woman reveals that she has a viral infection. Her condition is becoming progressively severe and she is now in the critical care unit. The doctors do not have yet accurate information about this resistant virus.

Meanwhile, the nurse is planning a vacation trip. She wants to travel to an exotic island with her husband this year. It is the only opportunity they have to travel during this year because they will not have jointly vacation opportunities. The nurse is not sure whether she might be infected or not.

1.1) Should the nurse travel or cancel her vacation trip? Why or why not?

1.2) What if it was not a vacation trip but a honeymoon trip? Should the nurse travel? Why or why not?

1.3) Imagine that the nurse is planning to travel to her home country to visit her mother which is actually fighting against a long term disease. In this case, should the nurse travel? Why or why not?

1.4) It was a legionella that the foreigner woman had contracted and the nurse had already travelled on a honeymoon when this result was confirmed. Should the nurse go to the nearest hospital to report the situation? Why or why not?

#### **Task 2**

Imagine now a different situation:

You are that nurse and have to travel to your home country to visit your mother which is actually fighting against her long term disease. In this case, should you travel?

#### **Box 2: Biological Hazards “Nurse’s dilemma”, a classroom activity to promote critical thinking and citizenship competences**

As we suggest in the Teachers’ Guide, included in the students’ digital resource, the teacher should be aware of moral reasoning and moral development levels and stages and its use in education, such as the framework of Jean Piaget and Lawrence Kohlberg, in order to fully explore the educational potential and richness of dilemmas. For instance, it is relevant to bear in mind that the sequence of the questions presented in the dilemmas is intentional in order to foster higher levels of reasoning and moral discussion as the students react to the questions. The teacher may use the moral development framework and the students’ reasoning results to aware the young learners of the importance of making ethical choices and decisions in their personal lives and in their future workplaces (Kiser, Morrison & Craven, 2009).

### **Work Organization Hazards: Create**

#### **Task 1**

What would be a good workplace design and organization?

Imagine that your class has won the opportunity to present to a European Institution an ideal workplace for the 21st century. Present a solution for the workplace design, i.e., the physical space and for the organization of the work routine (work routines, tasks, training, hierarchy, etc.).

With the help of your Arts, Physical Education, Language/Communication, Citizenship, Maths and Science teachers develop a model of what would be your ideal workplace. During the development of your model it would be helpful to create a social network platform to engage all the school and non-school participants.

#### **Tips**

- a) Brainstorm about it in groups of 4-5 students;
- b) Get in touch with the working world: listen to people who have different jobs, needs and expectations;
- c) Brainstorm again with your group;
- d) Pay particular attention to the promotion of a safety and health culture, to people management, to the coordination with others, to organization of training actions and to the development of the value of general wellbeing of the workers which includes not only the physical but also the psychosocial dimension: remember body and mind work in tandem;
- e) Search for **arbejdsglæde** concept and think in what ways it could be adapted to the cultural reality of your country and to diverse working environment.

**Box 3: Work Organization Hazards, Create an ideal workplace, a classroom activity to enhance critical, creative and interdisciplinary skills**

The activities mentioned in the previous paragraph ***aim to make students aware about the importance of working conditions and to the need to work in environments that promote safety, health and well-being.***

***The educational resource developed encompasses an understanding of occupational safety, health and well-being that includes not only the physical dimension but also the emotional, the intellectual and social, linking these dimensions to a holistic and interdisciplinary approach of citizenship education and following a whole-school approach.***

The activities presented so far illustrate well the vision of “OSH! What a bright idea” and its educational commitment to develop activities that should be as shown in Illustration 1: Multi- and interdisciplinary; Digital-based; Multimodal; Project-based learning and hands-on makers; Critical and creative thinking developers; Designed for



all: accessible and inclusive (following the Web Content Accessibility Guidelines, 2.1 (W3C, 2018)).

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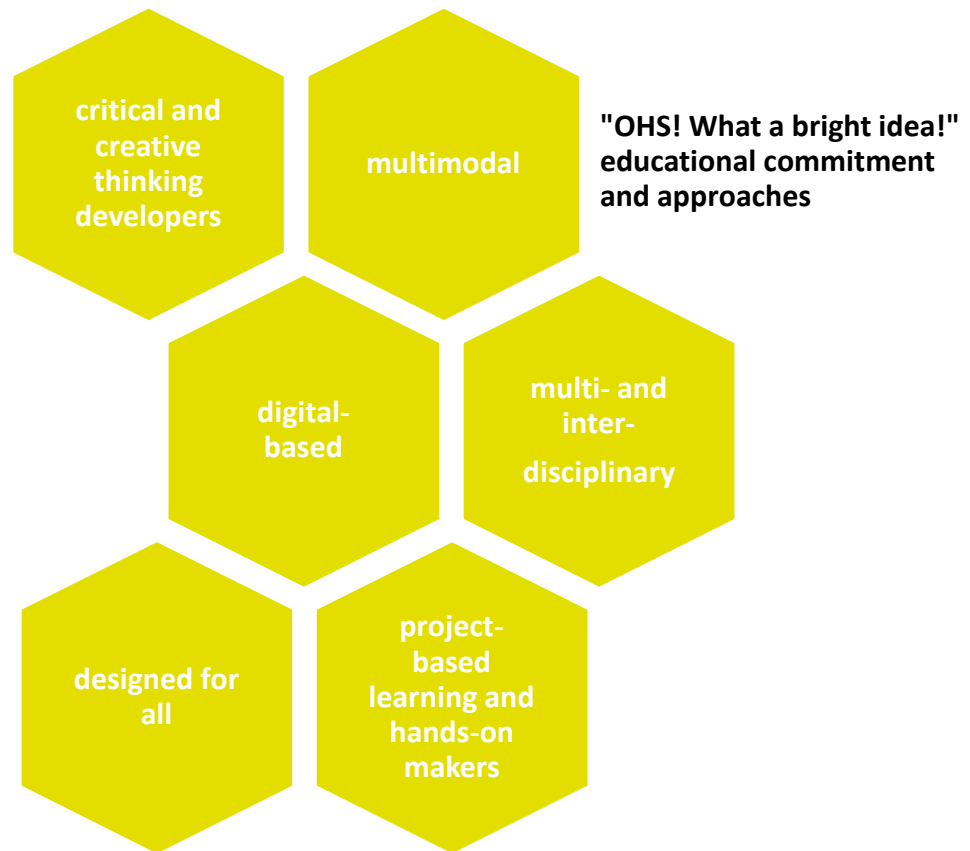


Illustration 1: "OHS! What a bright idea!" educational commitment and approaches

Given this scenario, the University of Aveiro team of researchers set the goal to find ***curriculum contents which may be used to make students aware of OSH*** themes and issues. In other words, our intention was to identify non explicit OSH contents that could be explored and discussed from a set of well identified curricular themes. The results of this search led us to compile all the information concerning the Portuguese curriculum and its OSH readiness from 7<sup>th</sup> to 9<sup>th</sup> grades as it may be read in Annex 1. ***The board created end up as a matrix that highlights some of the curricular opportunities to integrate and explore Safety and Health issues in daily school environment (that is also a work environment), raising awareness and linking them to other real work contexts, presenting examples of how to introduce OSH themes.*** We will present in the next paragraphs some of those curricular opportunities and OSH integration possibilities.

As far as OSH is concerned the topic Chemical Reactions in the 8<sup>th</sup> grade Sciences curriculum represents a selected content to address also the notions of chemical hazard and chemical risk, safety measures at the laboratory and at home, safety signs and labels, and personal protective equipment.

In the 8<sup>th</sup> grade Geography curriculum, one may find the topic of Industry Evolution and establish a set of links to explore the emergence of safety and health in the working world framing it in the Industrial Revolution, the working conditions and in the social context of the XIX century.

Other illustration one can highlight from the curricular matrix is the example of Forces and Motion topic, delivered in the 9<sup>th</sup> grade of the Physics and Chemistry subject. In this topic students should understand forces and motion, anticipate their effects applying Newton's laws and use Newton's laws to interpret motion. These contents can be reframed in the light of OSH by exploring occupational safety and health notions resulting from the intersection of Physical hazards with Ergonomics. More specifically, one can introduce the notions of force limits in pushing and pulling tasks (and correct posture), friction, gravity, inertia, motion and speed. The hands-on activity developed in "OSH! What a bright idea" may be read in Box 4.

#### *Physical Hazards: Play and Learn*

##### **Activity 1**

In group work, you will produce a video where you explain the Newton-Laplace's equation for calculating the speed of sound.

Note: You should include the history of the origins of the equation! You can choose between different strategies such as: Stop motion animation technique (also known as frame by frame or stop-action) or video sketches where you and your colleagues perform Newton and Laplace contributions.

For any of the above options you can follow the steps:

1. Brainstorm your images (define the focus, the progression of the images according to a story);
2. Create a storyboard (write a script; visualise your story);
3. Draw cartoons or shoot plans (the objective is to create and edit multiple image series; consider audio and final output).

**Box 4: Physical Hazards, Play and Learn - activity Forces and Motion.**

For the development of the educational resource during Mind Safety-Safety Matters I *OSH topics were grouped into two major set of contents*. The first set of contents, **General OSH topics**, included Safety and Health vocabulary and main concepts presentation; health promoting schools and its contribute to OSH awareness; information concerning individual and collective protective equipment, safety signs; rights and responsibilities of both employers and employees; principles of prevention; emergency plan attitudes; OSH history and evolution; action plans in case of medical emergency, fire, chemical spills and severe weather conditions. As for the second set of contents, the educational resource included **specific subjects that pertain to the OSH universe**: chemical hazards, biological hazards, physical hazards, work processes hazards, ergonomic hazards, work organization hazards and finally other hazards and risks, including in the last one topics such as nanotechnology, mechatronics and artificial intelligence.

As far as the *accessibility requirement and the design for all approach*, the educational resource contents had to be not only accessible to all users, including the ones with visual impairments, but also the learning activities had to be designed to both regular users and the ones with low vision or blind. The activities were then adapted into what one can refer to as *design for all hands-on learning approach*. For instance, drag and drop games were excluded. In fact, this represented the most challenging task, to develop innovative educational tasks to facilitate the mobilization of OSH into school curricula for 14-18 years old, meeting a complex set of educational requirements as the ones listed before.

While the “OSH! What a bright idea” educational resource was being developed the need to clarify and better contextualize the activities to teachers became more explicit. This is the reason why the booklet for students also includes a Teacher’s Guide. The main purpose of the “Teacher’s Guide on Occupational Safety and Health Education” is to provide a tool to better inform the teacher about the teaching and learning possibilities of the resource “OSH! What a bright idea”. The information to the teachers include: the purpose, structure and contents of the interactive booklet for students; the presentation of the educational approaches followed; and, for each theme, the objectives, the multi- and interdisciplinary possibilities; the description of

the activities, which includes the presentation and description of the activities and, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading to better explore the topic and additional content suggestions both for students and teachers (such as videos, websites, books, online tools, among others).

By the end of the project and as a result of the exploration of the educational resource “OSH! What a bright idea” in Portuguese schools *a set of implications for school practice and policy have emerged*, namely:

- **Teachers** may find in OSH themes particularly in Output 3 – “OSH! What a bright idea” *opportunities to innovate their practices*, following interdisciplinary approaches, benefiting problem-based learning approaches and including disabled learners.
- **School leaders** will be able to find in OSH issues and in the OSH educational resource strategies to *improve the school engagement with the wider community and foster a prevention culture*.
- **Vocational courses** can use the educational resource to *better articulate safety and health issues arising in daily life with work training contexts*, playing an important role in the transition of students into working life by improving their levels of awareness about OSH.
- **Learners with visual impairments** in particular and/or **workers with impairments in training contexts, as well as regular users, will benefit from an accessible resource** (suitable for smartphones, computers or tablet).

In *conclusion*, the lessons learned concerning the development the educational resource, tells us that the difficulty of exploring OSH themes in the classroom context and developing educational resources for young people that are able to motivate and aware them to the relevance of the topic, is most certainly related to the age adequacy and the theme presence in the universe of the youth major concerns and interests. This means that most of these 14-18 youngsters do not have any work experience due to their age and many of them do not know yet which jobs want or will have in the

future. Moreover, the optional character of the topic and its invisibility throughout the curriculum makes it more difficult to explore systematically and reach the school enthusiasm for the theme. Nevertheless, the recognized relevance of OSH in education feeds the research challenge to search for new solutions and suggestions to further explore it in better ways that may help to build safer work environments represented by aware and healthy workers.

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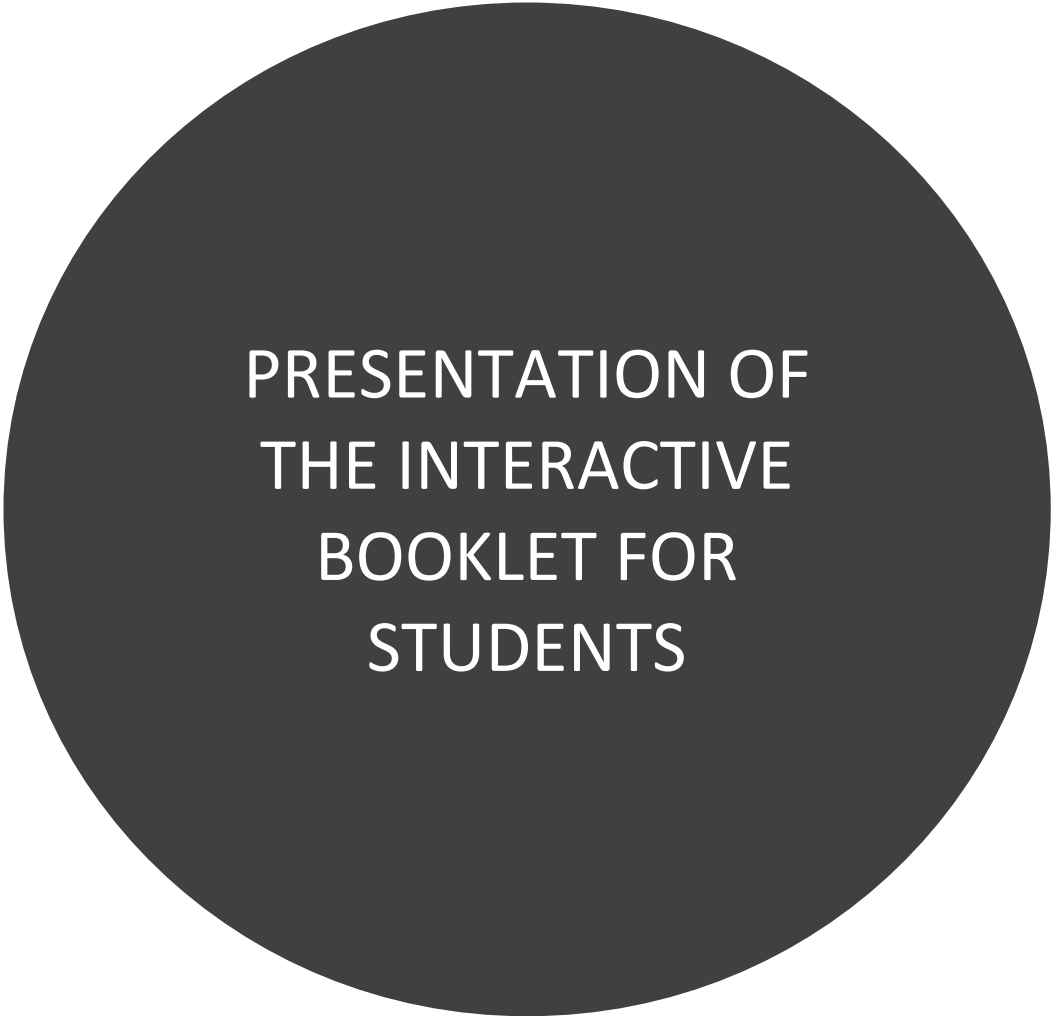
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PRESENTATION OF  
THE INTERACTIVE  
BOOKLET FOR  
STUDENTS

## PRESENTATION OF THE INTERACTIVE BOOKLET FOR STUDENTS

The interactive booklet “OSH! What a bright idea!” is one of the outputs of the Erasmus + project “Mind Safety - Safety Matters!” (2015-1-PT01-KA201-012921), the first of the two existing Mind Safety projects. It is aimed at young people aged 14-18 years old and addresses the issue of OSH among youth and young workers. The booklet is available at <http://www.act.gov.pt>.

The main purpose of the interactive booklet for students is to increase the awareness of OSH issues in daily and professional lives of young people and, in the long term, to raise levels of safety at work and to decrease the number of occupational accidents and diseases among young workers.

The booklet has been developed considering both regular users and blind and low vision ones, following the application of Web Content Accessibility Guidelines (W3C, 2008) with implemented features such as: text zoom in and zoom out, grayscale option, high contrast, colour invert, highlight links, keyboard navigation and audio description of audio-visual contents (see accessibility icon in Image 1 and 2).

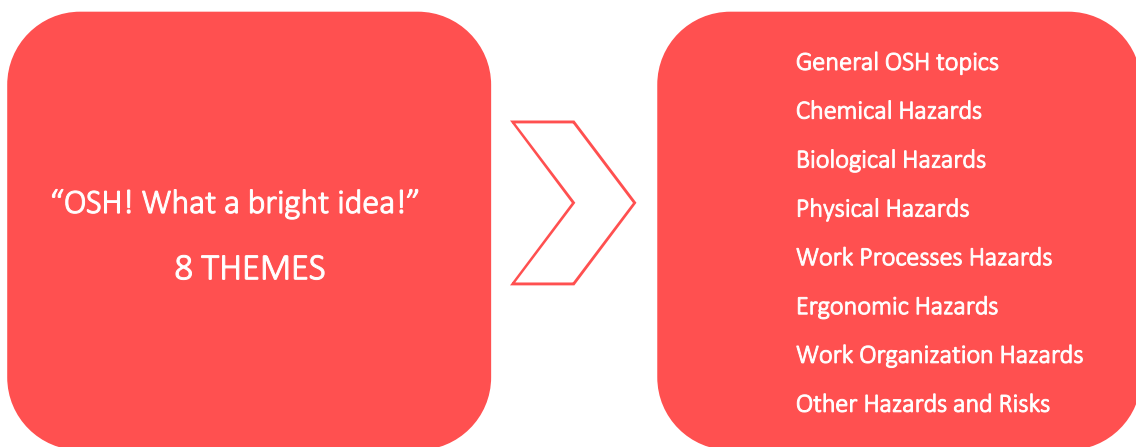


## THE STRUCTURE OF THE BOOKLET



Image 1: Home screen of the digital educational resource “OSH! What a bright idea!”

The interactive booklet for students is organized in 8 OSH themes:





Each theme has been divided into 6 menus. All the themes follow the same structure with the exception of General OSH Topics due to the particular nature of its contents:

- **Video:** an original video production aimed to introduce each OSH theme;
- **What you need to know:** key information about each theme;
- **Causes, effects, injuries:** the main characteristics of the selected hazards;
- **Safety rules/wear:** essential safety and health recommendations concerning each hazard context, including personal and collective protective equipment;
- **Know more about:** curiosities and/or additional information about each theme;
- **Hands on:** a set of diversified activities about each theme.



**INTRODUCTION TO  
TEACHER'S GUIDE ON  
OCCUPATIONAL SAFETY  
AND HEALTH EDUCATION –**

**EXPLORING "OSH! WHAT A BRIGHT IDEA!"**

## INTRODUCTION TO THE TEACHER’S GUIDE ON OCCUPATIONAL SAFETY AND HEALTH EDUCATION – EXPLORING “OSH! WHAT A BRIGHT IDEA!”

The aim of the “Teacher’s Guide on Occupational Safety and Health Education” is to provide the teacher a tool to better inform him/her about the teaching and learning possibilities of “OSH! What a bright idea!”.



Image 2: Screen page of the digital educational resource, theme General OSH Topics (video)

There are key aspects that the project “Mind Safety – Safety Matters!” is committed to achieve throughout the educational approach followed in the booklet for students and that this Guide emphasises:

1. To foster interdisciplinary teaching and learning approaches, proposing activities to be carried out not only in Science class but also in and/or with ICT, Arts, Maths, Philosophy, Languages and Communication, Citizenship, Health Education, Environmental Education, Education for Sustainable Development, and in non-formal and informal educational contexts.
2. To develop multiliteracies for the Digital Age by engaging students in activities which evoke interdisciplinary contents, multimodality, technology modes of representation and creative and critical thinking.

3. To improve students' creative and critical thinking, their autonomy and collaborative skills by presenting specific activities aimed at the promotion of these dispositions and skills.
4. To engage the school community, following a whole-school approach, and the wider local community in the debate about Occupational Safety and Health;
5. To contribute to Health and Safety Education, healthy and safe lifestyles, and inclusive practices in daily and work life.
6. To highlight teachers' professional development and collaborative opportunities suggesting fundamental topics that should be further studied and /or researched in order to improve teachers' development and content knowledge.

We hope that this resource becomes a helpful tool to guide teachers work to mainstream Occupational Safety and Health into education, particularly exploring "OSH! What a bright idea!".



Exploring “OSH! What a  
bright idea!”  
**GENERAL OSH TOPICS**

## Exploring “OSH! What a bright idea!”

### GENERAL OSH TOPICS

#### Objectives

- Engage students in the OSH theme, allowing them to work autonomously, express their position and critically consider the perspectives of others, and to raise awareness about school’s working conditions and the need for environments that promote safety, health and wellbeing.
- Engage students in the production of a digital story, creating a personal and multimodal narrative about safety and health hazards in their daily lives (example: home-school journey, daily routine, weekend routine).
- Develop autonomously an intervention project in order to solve real world problems concerning the school’s safety, health and wellbeing conditions.
- Understand that wellbeing is not only related to emotional, intellectual and social aspects but also to physical activity and active lifestyles.

#### Multi -and interdisciplinarity

- Science Education, Health education, Environmental education, Citizenship, Creative and Critical Thinking, Arts, ICT.

#### Activities’ description

In this section the teacher may find the presentation and description of the activities of the interactive booklet for students. Here are included, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading and additional content (videos, websites, books, online tools, etc.) suggestions both for students and teachers.

## 1. Mapping hazards digital story

- Give instructions to students to search for information about the topic they will write about before writing down their story storyboard/plan.
- There are free storytelling applications available online which are useful to incorporate technology and facilitate multimedia integration (Digital storytelling is also possible with PowerPoint).

Students may need/want to draw their brainstorming/storyboard on paper.

### ❖ Tips to cope with the students' remark "I don't know how to draw".

You can bring to class some useful books:

- *The back of the napkin*, Dan Roam, 2013, Portfolio/Penguin Ed. (<https://www.penguinrandomhouse.com/books/300247/the-back-of-the-napkin-by-dan-roam/9781591842699/>)
- *Show and Tell: How Everybody Can Make Extraordinary Presentations*, Dan Roam, 2016, Portfolio/Penguin Ed. (<https://www.penguinrandomhouse.com/books/315213/show-and-tell-by-dan-roam/>)

- The students' storyboard/plan should answer two questions: What to tell?, How to tell it?
- Recommend to students the exploration of the potentials of multimodal texts to support the meaning of digital stories. Students can add a meaningful soundtrack (music or other sounds), use graphics and/or maps and other visuals to add meaning of their stories.
- Create opportunities for your class to share their digital stories, followed by moments of group discussion. These moments are relevant in order to develop thinking skills about different perspectives (students should highlight different and similar points of view about the topic, identify the overall concern and the reasons that support that concern in others' perspective).

**NOTE:** The “Mapping hazards digital story” activity may be combined with the “School’s working conditions project” global activity (see activity 2.).

## **2. Global Activity: School’s occupational safety and health conditions project**

### **Moment 1: project conception**

- It is expected, from the beginning that students work in group autonomously in this project activity.
- Organize the class in groups of 4-5 elements to take them around the school building(s), classrooms, labs and exteriors/play areas. Students should take notes about safety, health and wellbeing inside the school perimeter, paying particular attention to both positive and negative aspects, and hazard identification (these notes can have multiple formats such as text, photos, videos, audio, etc.).
- After the observation moment, gather the class in the playground/outdoor area of the school to discuss the findings and major concerns.
- Since the project has a strong emphasis on real world problem solving, ask your students to ask questions about school’s safety, health and wellbeing that will guide their project development.
- Let students identify and choose their top priorities, assign their own tasks and create a class intervention project able to minimize those less positive aspects and/or gaps and highlight the positive ones. It may be useful to explore free online tools to draw concept and/project maps that also allow real time collaborative tasks (examples: Spiderscribe<sup>®</sup>, Stormboard<sup>®</sup>, Canva<sup>®</sup>, Mindmeister<sup>®</sup>, among others<sup>1</sup>).
- Encourage students to contact with the school community and/or local (government) institutions, engaging different participants throughout the

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<sup>1</sup> <https://www.spiderscribe.net/>; <https://stormboard.com/>; [https://www.canva.com/pt\\_pt/](https://www.canva.com/pt_pt/); <https://www.mindmeister.com/pt?r=117822>



project development, such as: teachers, school directors, parents, municipalities, libraries, local companies, etc.

### **Moment 2: Project sharing**

- It is expected that the students engage with the wider community during the project and that they share their findings about Safety and Health with the community once the project has ended;
- Ask the class to draw the OSH final project concept map. It may be useful to explore free online tools (some examples are listed above in Moment 1);
- Adapt the digital map by using paper/cards and/or other materials to show the connections between concepts, ideas, activities and outcomes.
- Encourage knowledge sharing! Ask students to display the map in a public area of your school or in a public area of the city.

### **Resources and materials recommended**

- Smartphone/digital camera, computer, Internet connection, school map, city map, Google Cardboard and Google Street View app, online mind mapping/storytelling/brainstorming tools.



Exploring “OSH! What a  
bright idea!”  
**CHEMICAL HAZARDS**

### Objectives

- To locate and identify various types of chemical hazards and risks inside the school’s chemical laboratory, understanding the need for applying safety rules.
- To relate and to draw conclusions about chemical hazards and risks to human beings and to ecosystems, creating awareness about the concept of sustainable development.

### Multi -and interdisciplinarity

- Science Education, Citizenship and Critical Thinking, Arts, ICT, Health education, Environmental education.

### Activities’ description

In this section the teacher may find the presentation and description of the activities of the interactive booklet for students. Here are included, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading and additional content (videos, websites, books, online tools, etc.) suggestions both for students and teachers.

#### 1. Chemistry lab safety and health quiz

- The “Chemistry lab safety and health quiz” activity may be carried out firstly in order to introduce the safety lab rules to students, evaluate their initial knowledge and lead to a class discussion about the importance of rules concerning the chemical lab.
- The activity consists on multiple choice questions that focus the main safety aspects that students and scientists must bear in mind during their experiments.
- The final score automatically displays 3 stages of assessment:

- 1<sup>st</sup> stage – Well done! You are a chemical lab safety expert!
  - 2<sup>nd</sup> stage – It's a good start. Keep on going your quest for safety matters!
  - 3<sup>rd</sup> stage – There's too much probability that a hazard becomes a risk in your lab. Read carefully lab safety rules.
- Nevertheless, you may as well carry the quiz by the end of the activities to allow the students to evaluate their knowledge on the lab safety topic.

## **2. Safety map**

- The main objective of this activity is to ask students to create a Sciences/Chemistry laboratory map using different visual sources.
- The class may be organized in groups of 4-5 elements. Increase diversity whenever possible and form heterogeneous groups (learning needs and styles, experiencing, gender, preferences/interests). Create an inclusive class environment.
- Students must identify and locate chemical hazards and risks in the map, use safety signs and hazard pictograms properly and interpret safety labelling.
- In order to improve the map and to ease the identification of the chemical hazards in the map, students should also search for and use different image sources (Internet images, newspaper/magazines clipping, pictures, illustration, etc.) to make those hazards visible. This may represent an opportunity to explore with students other issues, such as: rights, copyrights, licenses for using images, the ethics for using images, etc.
- Ask students to present their maps to the class. This presentation should be followed by a discussion where students explain the different hazards and risks identified. Aiming at the promotion of critical thinking skills, students should be asked to distinguish between causes, effects and injuries.
- It is relevant that students draw and write down conclusions.
- Students should write in a computer a safety and health rules board for the Science/Chemistry lab. Once it has been validated by the teacher, and if possible, this board should be printed and posted in the lab wall of the school.

### 3. Chemicals at home

- The 1<sup>st</sup> activity purpose is to produce an inventory of chemical labels commonly used at the students' home (example: house cleaning products, garden cleaning/maintenance products and/or pesticides).

Give instructions to students to read the labels and identify the meaning of the existing safety pictograms with their parents' supervision. They should note down the instructions and present the signs/pictograms. The safety measures concerning each product should be compared.

- The aim of the 2<sup>nd</sup> activity is to complete the label puzzle on the Booklet available online. Give instructions to students asking them to read the information and drag and drop each appropriate text box and safety pictogram to complete the traditional cleaning product label.

- The 3<sup>rd</sup> activity focuses specifically on safer and environmental friendly alternatives to household cleaning chemical products that one can buy in supermarket and/or drugstores.

Students should search on the Internet alternatives to home and garden chemical products that are safer for human beings and less harmful to the environment.

These alternatives ought to consider safer products, less toxic ingredients, more natural substances (example of home cleaning useful ingredients: water, lemon, distilled/white vinegar, sodium bicarbonate/baking soda, olive oil, essential oils, castile soap/laundry Offenbach soap, salt, etc.).

#### Resources and materials recommended

- Computer; Internet; printer; newspapers/magazines; pencils and colouring pencils; drawing paper; labels; digital camera; "OSH! What a bright idea!" booklet for students.



Exploring “OSH! What a  
bright idea!”  
**BIOLOGICAL HAZARDS**

### Objectives

- To identify various types of biological hazards and risks in daily life and work environments, understanding the need for applying prevention measures and safety procedures.
- To relate and to draw conclusions about biological hazards and risks to human beings and to ecosystems, including the new biological hazards, developing sustainable development awareness.
- To develop moral reasoning skills, such as critical thinking skills, namely by engaging in moral dilemmas.

### Multi- and interdisciplinarity

- Science Education, Citizenship and Critical Thinking, Philosophy, Arts, ICT, Languages and Communication, Health education, Environmental education.

### Activities’ description

In this section, the teacher may find the presentation and description of the activities of the interactive booklet for students. Here are included, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading and additional content (videos, websites, books, online tools, etc.) suggestions both for students and teachers.

#### 1. Get to know biological hazards

- Students can play a three-level game directly on the booklet for students. Throughout this game students can learn more about biological hazards, distinguish hazard from risk and become aware that time (among others) is a variable that affects bacteria growth.

## 2. The Nurse's dilemma

- The "Nurse's dilemma" should be individually answered in a first moment. Once all the students have written their answers, the teacher should moderate a group discussion about their answers, bearing in mind that the sequence of the questions is intentional in order to foster higher levels of reasoning and moral discussion.
- It would be an advantage for the teacher to read more information about moral reasoning and moral development levels and stages, such as the framework of Jean Piaget, Lawrence Kohlberg and others. Examples of more information can be found at:
  - <http://swppr.org/textbook/Ch%207%20Morality.pdf>
  - <https://www.psychologynotesHQ.com/kohlbergstheory/>
  - Gibbs, J. (2014). *Moral Development and Reality: Beyond the Theories of Kohlberg, Hoffman, and Haidt*. Oxford: University Press.
  - Killen, M. & Smetana, J. (2014). *Handbook of Moral Development*. New York: Psychology Press.

### Resources and materials recommended

- Computer; Internet; drawing paper to sketch the poster/visual presentation.





Exploring “OSH! What a  
bright idea!”  
**PHYSICAL HAZARDS**

#### Objectives

- To identify several types of physical hazards and risks in daily life and work environments, understanding the need for applying prevention measures and safety procedures.
- To understand the applications of safety and health concepts and measures in daily life and work regarding particular topics, such as noise and sound, extreme temperatures, electrical hazards and radiation.
- To develop multiliteracy skills, particularly creative thinking, Sciences, ICT, Arts and Maths skills, namely by engaging in *Play and Learn More* challenges and by developing autonomous creative tasks that include the production of interactive contents and data organization, and science investigation projects.
- To engage in problem-based research producing multimedia and/or visual products related to physical hazards, engaging themselves with the local community.
- To foster scientific work processes’ knowledge and develop research competences by conducting investigations and experimental activities about Sound.

#### Multi- and interdisciplinarity

- Science Education, Citizenship, Creative Thinking, Arts (Visual Arts, Drama and Performing Arts, Storytelling, Digital Arts, Media), Maths, ICT, Health education, Environmental education.

#### Activities’ description

In this section, the teacher may find the presentation and description of the activities of the interactive booklet for students. Here are included, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading and

additional content (videos, websites, books, online tools, etc.) suggestions both for students and teachers.

## 1. Noise & Sound

### 1.1 Noise: What's that sound?

- This activity should be carried out in the interactive booklet for students. Throughout this game students can learn more about the major differences between sound and noise.

### 1.2. Sound waves: research challenge

- Before carrying out this activity students should experience the “What's that noise?” activity (see 1.1) in order to allow them to understand the differences between sound and noise.
- Give instructions to students of how to use the sound level meter/noise meter to register the sound levels of different school places. After the instructions, students will register different sound levels in different school places.
- Once the students have registered the sound levels, give them new instructions to organize the data according to the categories of health risks and acoustic comfort. It is expected that students build a chart on computer displaying the results of sound intensity levels (dB (A) – decibels A).

### 1.3 Experimental OSH – Sound & Space

- Before carrying out this activity students would benefit from the discussion and results obtained in the last two activities (1.1 and 1.2).
- The interactive booklet offers a Planning Board to guide students throughout the scientific experiment allowing them to contact with an example of the scientific work process and develop further research competences in Sciences.
- The Planning Board can be used as well in other experimental activities in Science class (Physics, Chemistry, and Biology). In an experiment it is important to start by identifying the question-problem (*What we want to know?*), the dependent variable (*What will be measured/changed?*), the independent variable (*What is going to be changed?*), and controlled variables (the variable(s)

that will be kept constant or monitored; *What will be kept?*).

- Start the activity by exploring the preconceptions of students and arguments about likely results related to how space interferes with sound.

#### **1.4 Play and Learn more challenge: Newton-Laplace's equation**

- The activity is mainly concerned with the Newton-Laplace's equation for calculating the speed of sound and students are expected to creatively show and explain the equation.
- Once again, the activity is intended to promote interdisciplinary work involving different school subjects, particularly Arts, Sciences, Maths and ICT.
- Suggested strategies and techniques for creatively presenting the equation are stop motion animation technique (also known as frame by frame or stop-action) or to record video sketches where students perform Newton and Laplace contributions.
- There are a few steps to be followed independently of the creative options students decide to explore: to brainstorm, to create a storyboard and to shoot.
- There are free storytelling applications available online which are useful to incorporate technology and facilitate multimedia integration (Digital storytelling is also possible with PowerPoint).

#### **1.5 Play and Learn more challenge: Loudspeaker**

- Start by exploring the preconceptions of students with regards to which materials are best suited to build a loudspeaker and listen to their explanations.
- Students are expected to build a loudspeaker craft using different materials, such as glass, paper/card, metal and/or plastic.
- Ask students to write a science report on the different materials properties and their relation to the sound intensity.

## **2. Radiation**

### **2.1. Match the correct meaning of each warning safety sign.**

- This activity should be carried out in the interactive booklet for students. Throughout this task, students can learn more about the meaning of warning safety signs.

### **2.2. Research and share challenge: Warning and protection equipment**

- Throughout this activity, students should autonomously investigate how radiation protection technology and equipment are used to protect workers and/or the public in general or environment.
- The teacher should encourage students to learn more about three basic concepts of radiation protection that will be helpful to carry out the investigation: time, distance, shielding. Students are expected to do some research on the Internet and school library's physics books.
- Students would benefit from previously carrying out the Radiation Mini-Quiz (see 2.3) and further discuss in class the key issues and concepts associated with radiation.

### **2.3. Radiation Mini-Quiz**

- This activity is prepared to be carried out in the interactive booklet for students. Throughout this mini-quiz students can learn more about ionising and non-ionising radiation, electromagnetic fields and radiation protection.
- The main issues and concepts regarding radiation may be further explored by the teacher during and/or after the mini-quiz.

## **3. Thermal Environment**

### **3.1 Thermal environment: extreme temperatures**

- This activity should be carried out in the interactive booklet for students, filling the thermometer with information concerning working in the heat and cold environments.
- Its main purpose is to get students to know the effects of extreme temperatures (both cold and hot) on human body and be aware of preventive measures, such

as the buddy system and supervision.

### **3.2 Warning symptoms and prevention measures: make it visual!**

- The teacher should ask students to do an Internet and book search for the safety signs of cold and hot and prevention measures.
- Students are expected to list and organize the data found and then create an infographic aimed at warning local supermarket/restaurant workers about the specific working conditions under extremes temperatures whether hot or cold conditions. These work environments have hot and cold working areas in the kitchen and in the cold storage.
- The teacher should show infographic examples and available infographic free online tools. Consider the examples shown in the theme Work Processes Hazards, activity 1 “Safety and health rule board”.
- It would be interesting to strengthen the links between the school actions and the local community needs, fostering the opportunity to share students’ infographics with local supermarkets and/or restaurants.

## **4. Electrical hazards**

### **4.1 Where is the danger?**

- This activity should be carried out in the interactive booklet for students, identifying in the picture the five main dangers concerning electrical equipment:  
1. contact with water (example, spilled bottle of water in the floor); 2. poor or defective cables; 3. excessive extension and disorganised use of cables; 4. covered cords and wires; 5. damaged electric devices as plugs, cables and tools.

### **4.2 Interactive science lab wall: Electrifying knowledge and safety!**

- The teacher must encourage students to create an interactive lab wall displaying contents about electricity and its principles, including safety measures.
- The contents should be presented in diverse modes. Students can use written text (post-its, notes, key-words, headlines, abstracts, etc.), interactive content, such as QR codes, pictures, sensorial objects pertaining to electrical equipment (cables, cords, wires, lamps, circuits, etc.).

- The activity represents an opportunity to promote interdisciplinary work and school projects, involving particularly Sciences, Arts and ICT subjects.
- The teacher must be aware that the interactive wall may be an important instrument to foster engagement and collaboration among students and among teachers, contributing through the use of Arts, ICT and media to improve educational research activities and interdisciplinary projects. Moreover, it can be a powerful mode to communicate science and foster communication among peers. Thus, further reading/research on this topic will be helpful to maximize the potentials of the interactive wall for students and teacher professional development.

#### **Resources and materials recommended**

- **Computer**; Internet; drawing paper to sketch; free online tools; paper/ card/ glass/ metal/ plastic objects; electrical equipment.



Exploring “OSH! What a  
bright idea!”

**WORK PROCESSES  
HAZARDS**



## Exploring “OSH! What a bright idea!”

### WORK PROCESSES HAZARDS

#### Objectives

- To become aware of the importance of safety rules and recommendations and to understand that these rules vary according to the workplace.
- To produce multimodal texts, developing multiliteracy skills.

#### Multi- and interdisciplinarity

- Science Education, Languages and Communication, Citizenship, Creative and Critical Thinking, Arts, ICT, Health education, Environmental education.

#### Activities’ description

In this section, the teacher may find the presentation and description of the activities of the interactive booklet for students. Here are included, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading and additional content (videos, websites, books, online tools, etc.) suggestions both for students and teachers.


##### 1. Create a safety and health rule board

- **Previously:** According to the class size and the number of groups of 4-5 elements allowed, the teacher writes previously in small papers different work environments/jobs that will be explored by each group. These papers should be folded and kept inside a bowl or box.
- Before students start the activity, it would be useful for them to explore on the Internet different safety and health protocols and/or read the school/ science laboratory/ gym safety and health rules/recommendations. Here are some examples of written and infographic rules/recommendations:
  - <http://www.hse.gov.uk/risk/classroom-checklist.pdf>

- <https://www.ifc.org/wps/wcm/connect/8b796b004970c0199a7ada336b93d75f/DisERHandbook.pdf?MOD=AJPERES>
  - <http://www.woodlands.angus.sch.uk/Information/Policies/HealthandSafetyPolicy.pdf>
  - <http://www.visualistan.com/2015/12/slips-trips-falls-and-how-to-keep-your-workers-on-the-ball.html>
- 
- Divide the class into groups of 4-5 elements and let each group pick a paper from the bowl or box.
  - Encourage students to produce digital presentation of their safety rules board.
  - The teacher can add a game nature to the activity by proposing the groups to guess to which work environment the other boards are aimed at.
  - Emphasise the rules board content tips.

#### **Resources and materials recommended**

- Computer; Internet; drawing paper to sketch the poster/visual presentation.



Exploring “OSH! What a  
bright idea!”  
**ERGONOMIC  
HAZARDS**

### Objectives

- To become aware of the importance of ergonomics and safety rules and recommendations for ones’ wellbeing.
- To foster knowledge about common injuries in different workplaces including school.

### Multi- and interdisciplinarity

- ICT, Health education, Physical Education.

### Activities’ description


In this section, the teacher may find the presentation and description of the activities of the interactive booklet for students. Here are included, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading and additional content (videos, websites, books, online tools, etc.) suggestions both for students and teachers.

#### 1. Ergonomic quiz: Mind your body!

- This activity is to be carried out directly in the booklet for students.
- If the teacher considers it to be more appropriate, the activity may be carried out in groups.
- Additionally, each question may lead to research activities where students will autonomously and in groups search information and learn more about Ergonomics, such as safety and health in digital world and at school.

### Resources and materials recommended

- Computer; “OSH! What a bright idea!” booklet for students.



Exploring “OSH! What a  
bright idea!”

**WORK  
ORGANIZATION  
HAZARDS**

## Exploring “OSH! What a bright idea!”

### WORK ORGANIZATION HAZARDS

#### Objectives

- To become aware that occupational safety and health is not only concerned with the body’s safety and health but is also related with one’s mental wellbeing.
- To foster reasoning skills about common work issues, dilemmas and resolutions that may interfere not only with the individual but also with the group/team and superiors, contributing to empower students to take action and participate in decision-making processes.
- To promote students’ reflection, creative and interdisciplinary thinking about what would be a good workplace design and organization.
- To incorporate social network practices to improve the quality of tasks, creative thinking and wider community engagement.

#### Multi- and interdisciplinarity

- Health education, Citizenship, Critical and Creative Thinking, Philosophy, Language and Communication, ICT, Maths, Sciences, Arts, Physical Education.

#### Activities’ description

In this section, the teacher may find the presentation and description of the activities of the interactive booklet for students. Here are included, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading and additional content (videos, websites, books, online tools, etc.) suggestions both for students and teachers.

#### **1. A body and a mind: we are human beings at work. Empower and debate!**

- The “Empower and Debate” challenge should be individually answered in a first moment. Once all the students have written their answers, the teacher should

listen to the students' answers and moderate a group discussion about their perspectives, bearing in mind that the sequence of the questions is intentional in order to foster higher levels of reasoning and moral discussion.

- Important questions to the debate will arise from students' answers. Nevertheless, there are key issues to be discussed, such as:
  - Personal life-work balance achievement.
  - The nature of arguments used.
  - Responsibility, adaptability, the ability to negotiate with others and manage/process emotions (emotional intelligence).
  - Socio-cultural diversity awareness and respect and tolerance for others.
- It would be an advantage for the teacher to read more information about moral reasoning and moral development levels and stages, previously suggested in Biological Hazards theme.

## **2. Create! What would be a good workplace design and organization?**

- The core recommendation to perform this activity is to follow an interdisciplinary perspective. A whole-school approach will therefore be an advantage to improve students' achievements.
- The teacher should consider carrying out this activity using a class-project strategy, involving different teachers from other school subjects.
- It would be beneficial to be aware of the educational value of social networks and how to use this teaching & learning resource in order to improve higher levels of engagement.

### **Resources and materials recommended**

- Computer; other specific materials to develop the students' project.



Exploring “OSH! What a  
bright idea!”  
**OTHER HAZARDS AND  
RISKS**



## Exploring “OSH! What a bright idea!”

### OTHER HAZARDS AND RISKS

#### Objectives

- To become aware of the presence and commercial applications of nanotechnologies in modern life and of the potential health hazards associated, developing ICT and multimodal skills.
- To develop attitudes and values towards the otherness, in particular, to inclusion awareness.
- To foster reasoning and communication skills centred on artificial intelligence dilemmas and challenges that affect contemporary society.

#### Multi- and interdisciplinarity

- Health education, Citizenship, Critical and Creative thinking, Philosophy, Language and Communication, ICT.

#### Activities’ description

In this section, the teacher may find the presentation and description of the activities of the interactive booklet for students. Here are included, where appropriate, suggestions of how to carry out the tasks, sequence and articulation opportunities between different activities, school and the wider community engagement, further reading and additional content (videos, websites, books, online tools, etc.) suggestions both for students and teachers.

##### 1. Nanotechnologies: virtual reality expedition tour project

- Throughout this activity it is expected that students work autonomously, working in groups.
- There are a few suggested themes for the students “nanoworld expedition”: environmental pollution and protection (water, air), conservation of cultural heritage, cosmetics (sunscreen protection, soaps), defence and security, space and technology, textiles, sports equipment, food technology. It would be

helpful to provide the students with an overview of these topics to make them more aware of each theme, such as the TED x Innovation talks on how nanotechnology is changing the world:

- <https://tedxinnovations.ted.com/2016/10/05/7-talks-on-how-nanotechnology-is-changing-medicine-science-fashion-and-more/>
- Whether appropriate, teacher should emphasize the inclusive nature of the activity, advising students to adopt inclusive strategies such as audio-description and/or high contrast images.
- It would be beneficial for the teacher to be aware of the educational value of digital applications, such as Google Cardboard and Thinglink.

## **2. Artificial Intelligence. Debate challenge.**

- The “Debate challenge” should be individually answered in a first moment. Once all the students have written their answers, the teacher should moderate a group discussion about their answers.
- It would be an advantage for the teacher to read more information about moral reasoning and moral development levels and stages, such the framework of Lawrence Kohlberg (see activity 2, theme Biological Hazards).

### **Resources and materials recommended**

- computer; smartphone or tablet; Google Street View application and /or Google Cardboard application; paper sketch materials; other specific materials to develop the students project.

# ANNEXES



## ANNEX 1

### *OSH integration in Portuguese curriculum (3<sup>rd</sup> cycle, 12-15 years old)*

#### INTEGRAÇÃO CURRICULAR DE TEMAS DE SEGURANÇA E SAÚDE OCUPACIONAIS NO 3º CEB (PROGRAMAS E METAS CURRICULARES DO ENSINO BÁSICO)

Tópicos do recurso educativo “OSH! What a bright idea!”:

- **Grupo 1:** Tópicos Gerais de SSO (vocabulário e conceitos de SSO; Equipamento de Proteção Individual e Coletiva; Sinalização; Direitos e Deveres; Plano de Emergência; História da SSO (história e evolução)
- **Grupo 2:** Riscos Químicos, Riscos Biológicos, Riscos Físicos, Riscos no processo produtivo, Riscos Ergonómicos, Riscos Organizacionais, Riscos Psicossociais, Outros perigos e seus riscos

**Legenda:**

- **A vermelho:** Conteúdos de SSO não explícitos mas possíveis de abordar a partir de alguns temas do currículo

Áreas disciplinares	Ano de escolaridade	Domínio/subdomínio/objetivo	Tópicos “OSH! What a bright idea!” do projeto Mind Safety-Safety Matters I	Conteúdos SSO + conteúdos do currículo
<b>Matemática</b> (Programa e Metas Curriculares de Matemática do Ensino Básico, MEC, 2013)	<b>9º ano</b>	<b>Organização e tratamento de dados</b> Tempos Probabilidade - Experiências deterministas e aleatórias; universo dos resultados ou espaço amostral; casos possíveis; - Acontecimentos: casos favoráveis, acontecimento elementar, composto, certo, impossível; - Acontecimentos disjuntos ou incompatíveis e complementares; - Experiências aleatórias com acontecimentos elementares	Tópicos Gerais de SSO	<ul style="list-style-type: none"> <li>• <b>Noção de acidente de trabalho</b></li> <li>• <b>Estatísticas nacionais e europeias de acidentes de trabalho</b></li> <li>• <b>Análise e tratamento de dados</b></li> </ul>

		equiprováveis; - Definição de Laplace de probabilidade; propriedades e exemplos; - Problemas envolvendo a noção de probabilidade e a comparação de probabilidades de diferentes acontecimentos compostos, utilizando tabelas de dupla entrada e diagramas em árvore; - Comparação de probabilidades com frequências relativas em experiências aleatórias em que se presume equiprobabilidade dos casos possíveis.		
<b>Ciências Naturais</b>	<b>7º ano</b>	<b>Consequências da dinâmica interna da Terra</b> 11. Compreender a atividade sísmica como uma consequência da dinâmica interna da Terra	Tópicos Gerais de SSO Riscos Biológicos	<ul style="list-style-type: none"> <li>Programas de Emergência, Regulamentos de Emergência em edifícios</li> </ul>

(Metas Curriculares de Ciências Naturais do ensino Básico, MEC, 2013)	8º ano	<p>Gestão sustentável dos recursos</p> <p>17. Relacionar a gestão de resíduos e da água com o desenvolvimento sustentável</p> <p><b>Ecossistemas</b></p> <p>12. Sintetizar medidas de proteção dos ecossistemas</p> <p>12.1. Indicar três medidas que visem diminuir os impactos das catástrofes de origem natural e de origem antrópica nos seres vivos e no ambiente.</p> <p>12.2. Categorizar informação sobre riscos naturais e de ocupação antrópica existentes na região onde a escola se localiza, recolhida com base em pesquisa orientada.</p> <p>12.3. Identificar medidas de proteção dos seres vivos e do ambiente num ecossistema próximo da região onde a escola se localiza.</p> <p><b>Gestão sustentável dos recursos</b></p> <p>17. Relacionar a gestão de resíduos e da água com o desenvolvimento sustentável</p> <p>17.5. Propor medidas de redução de riscos e de minimização de danos relativos à contaminação da água procedente da ação humana.</p> <p>17.1. Distinguir os diversos tipos de resíduos.</p>	Riscos Biológicos	
	9º ano	<p>Saúde individual e comunitária</p> <p>1. Compreender a importância da saúde individual e comunitária na qualidade de vida da população</p> <p>2. Sintetizar as estratégias de promoção da saúde</p>	<p>Tópicos Gerais de SSO</p> <p>+</p> <p>Riscos Biológicos</p> <p>Riscos Químicos</p> <p>Riscos Físicos</p> <p>Riscos no processo produtivo</p> <p>Riscos organizacionais</p> <p>Riscos Ergonómicos</p> <p>Riscos psicossociais</p>	<ul style="list-style-type: none"> <li>• Problemática das doenças profissionais e dos acidentes de trabalho relacionando com as suas causas;</li> <li>• A atitude individual na construção da saúde coletiva.</li> <li>• A valorização das pequenas decisões das rotinas diárias para a promoção da saúde</li> </ul>

				e a QV.
<b>Geografia</b> (Metas Curriculares de Geografia do Ensino Básico, MEC, 2013/2014)	<b>8º ano</b>	<b>Indústria</b> 1. Compreender o aparecimento e a evolução da indústria	Tópicos Gerais de SSO	<ul style="list-style-type: none"> <li>• <b>Evolução histórica da Segurança e saúde no trabalho relacionada com a evolução da indústria - a evolução da PRP</b></li> </ul> (exemplo: revolução Industrial e condições de trabalho, saúde e segurança ocupacionais)
	9º ano	Riscos, ambiente e sociedade Riscos naturais Riscos mistos Proteção, controlo e gestão ambiental para o desenvolvimento sustentável	Riscos Biológicos	<ul style="list-style-type: none"> <li>• <b>Associar a:</b>  Riscos Acidentais  Riscos criminais  Riscos tecnológicos  Riscos ocupacionais</li> </ul>
<b>Físico-Química</b> (Metas Curriculares de Físico-Química do Ensino Básico, MEC, 2013)	<b>7º ano</b>	<b>Materiais</b> Constituição do mundo material Substâncias e misturas Transformações físicas e químicas Propriedades físicas e químicas dos materiais Separação das substâncias de uma mistura	Riscos Químicos Riscos Físicos Tópicos Gerais de SSO	1. <b>Reconhecer a enorme variedade de materiais com diferentes propriedades e usos, assim como o papel da química na identificação e transformação desses materiais.</b>  2. <b>Compreender a classificação dos materiais em substâncias e misturas.</b>  Caracterizar, qualitativa e quantitativamente, uma solução e preparar laboratorialmente, em segurança, soluções aquosas de uma dada



				<p>concentração, em massa.</p> <p>características dos materiais e dos produtos manipulados e suas implicações de associação</p> <p>reconhecer transformações físicas e químicas e concluir que as transformações de substâncias podem envolver absorção ou liberação de energia.</p> <ul style="list-style-type: none"> <li>• Noção de perigo</li> <li>• Noção de risco</li> <li>• Noção de dose</li> <li>• Noção de prevenção</li> <li>• Noção de Proteção</li> <li>• Medidas de proteção Individual e coletiva</li> <li>• Rotulagem</li> <li>• Sinalização de segurança</li> </ul> <p>1. Reconhecer que a energia está associada a sistemas, que se transfere conservando-se globalmente, que as fontes de energia são relevantes na sociedade e que há vários processos de transferência de energia. (radiação)</p>
	8º ano	<p><b>Reações químicas</b></p> <p>Explicação e representação de reações químicas</p> <p>Tipos de reações químicas</p> <p>Velocidade das reações químicas</p>	Riscos Químicos	<ul style="list-style-type: none"> <li>• Agentes químicos</li> <li>• Noção de perigo e risco químico</li> </ul>

		<p><b>Som</b> Atributos do som e sua detecção pelo ser humano</p>	Riscos Físicos	<ul style="list-style-type: none"> <li>• Consequências para a saúde</li> <li>• Medidas de segurança num laboratório</li> <li>• Segurança em casa</li> <li>• Produtos químicos, segurança e desenvolvimento sustentável</li> <li>• Ruído: Relação do ruído e o espaço; Perigos e riscos de exposição ao ruído no local de trabalho.</li> <li>• Som e ondas</li> <li>• Vibrações</li> <li>• Exposição a ultrassons e segurança (aplicações na medicina, ecografias)</li> </ul>
9º ano	Forças e Movimentos	<p>Eletricidade Corrente elétrica e circuitos elétricos Efeitos da corrente elétrica e energia elétrica</p>	Riscos Ergonómicos Riscos Físicos	<p>2. Compreender a ação das forças, prever os seus efeitos usando as leis da dinâmica de Newton e aplicar essas leis na interpretação de movimentos (segurança ocupacional, quantidade e limites de força exercida – “pushing and pulling” tasks)</p> <p>2. Conhecer e compreender os efeitos da corrente elétrica, relacionando-a com a energia, e aplicar esse conhecimento.</p> <ul style="list-style-type: none"> <li>• Eletricidade: Perigos e riscos para o homem quando contacta com energia elétrica - atividades do dia-a-dia e no local de trabalho</li> </ul>

				<ul style="list-style-type: none"> <li>• Radiações</li> <li>• Iluminação</li> <li>• Ambiente térmico</li> <li>• Incêndio e explosão</li> </ul>
<b>Educação Visual</b> (Metas Curriculares de Educação Visual do Ensino Básico, MEC, 2012)	8º ano	<b>Reconhecer signos visuais, o poder das imagens e a imagem publicitária.</b> 9.1: Identificar signos da comunicação visual quotidiana (significante, significado, emissor, mensagem, meio de comunicação, recetor, ruído, resultado da comunicação, código, ícone, sinal, sinalética, símbolo, logótipo, mapas, diagramas, esquemas).	Tópicos Gerais de SSO	<ul style="list-style-type: none"> <li>• Sinalização de segurança: visual, acústica e gestual</li> <li>• Análise e interpretação da sinalização de segurança no local de trabalho (visual, acústica)</li> </ul>
	9º ano	Aplicar princípios básicos da Engenharia na resolução de problemas. 12.1: Distinguir e analisar diversas áreas da engenharia (civil, geológica, eletrotécnica, química, mecânica, aeronáutica). 12.2: Desenvolver soluções criativas no âmbito da engenharia, aplicando os seus princípios básicos na criação de uma maqueta de uma habitação nómada, valorizando materiais sustentáveis..	Riscos Organizacionais Riscos Ergonómicos	<ul style="list-style-type: none"> <li>• Ergonomia: desenho do posto de trabalho, trabalho com ecrãs</li> </ul>
<b>Educação Física</b> (Programa de Educação Física do 3º Ciclo do Ensino Básico (Reajustamento), MEC, 2001)		Participar ativamente em todas as situações e procurar o êxito pessoal e do grupo: - Relacionando-se com cordialidade e respeito pelos seus companheiros, quer no papel de parceiros quer no de adversários; - Aceitando o apoio dos companheiros nos esforços de aperfeiçoamento próprio, bem como as opções do(s) outro(s) e as dificuldades reveladas por eles; - Interessando-se e apoiando os esforços dos companheiros com oportunidade, promovendo a entajuda para favorecer o aperfeiçoamento e satisfação própria e do(s) outro(s); - Cooperando nas situações de aprendizagem e de organização, escolhendo as ações favoráveis ao êxito,	Riscos Organizacionais Riscos Ergonómicos	<ul style="list-style-type: none"> <li>• Ergonomia: atitudes posturais, movimentação manual de cargas, equilíbrio corporal</li> <li>• Trabalho com ecrãs</li> </ul>

		<p>segurança e bom ambiente relacional, na atividade da turma;</p> <ul style="list-style-type: none"> <li>- Assumindo compromissos e responsabilidades de organização e preparação das atividades individuais e ou de grupo, cumprindo com empenho e brio as tarefas inerentes.</li> <li>• Analisar e interpretar a realização das atividades físicas selecionadas, aplicando os conhecimentos sobre técnica, organização e participação, ética desportiva, etc.</li> <li>• Interpretar crítica e corretamente os acontecimentos na esfera da Cultura Física, compreendendo as atividades físicas e as condições da sua prática e aperfeiçoamento como elementos de elevação cultural dos praticantes e da comunidade em geral.</li> <li>• Identificar e interpretar os fenómenos da industrialização, urbanismo e poluição como fatores limitativos da Aptidão Física das populações e das possibilidades de prática das modalidades da Cultura Física.</li> <li>• Conhecer e aplicar diversos processos de elevação e manutenção da Condição Física de uma forma autónoma no seu quotidiano.</li> <li>• Conhecer e interpretar fatores de saúde e risco associados à prática das atividades físicas e aplicar regras de higiene e de segurança.</li> </ul>		
<b>TIC</b> (Metas Curriculares de TIC do Ensino Básico, MEC, 2012)	<b>7º e 8º ano</b>	<b>(i) Dados e estatísticas</b>	Riscos Organizacionais Riscos Ergonómicos	<ul style="list-style-type: none"> <li>• <b>Ergonomia: trabalho com ecrãs</b></li> </ul>
<b>História</b> (Metas Curriculares de História do 3º Ciclo do Ensino Básico, MEC, 201/2014)	<b>8º ano</b>	<p><b>Contexto europeu dos séculos XVII e XVIII</b> Um século de mudanças (século XVIII)</p> <p>2. Conhecer e compreender a realidade portuguesa na segunda metade do século XVIII</p> <p>4. Integrar o projeto urbanístico de Lisboa, após o terramoto de 1755, no contexto da governação pombalina.</p> <p><b>O arranque da “Revolução Industrial” e o triunfo dos regimes liberais conservadores</b></p> <p>3. Conhecer e compreender as implicações ambientais da atividade das comunidades humanas e, em particular, das sociedades industrializadas</p>	Tópicos Gerais de SSO  Riscos Organizacionais Riscos Ergonómicos Riscos Psicossociais	<ul style="list-style-type: none"> <li>• <b>Evolução histórica da Segurança e saúde no trabalho relacionada com a evolução da indústria - a evolução da PRP</b></li> </ul> <p>(exemplo: revolução Industrial e condições de trabalho, saúde e segurança ocupacionais)</p>

		2. Relacionar industrialização com agravamento de condições de higiene e segurança no trabalho, com poluição e com degradação das condições de vida em geral.		
<b>Português</b> (Programa e Metas de Português do Ensino Básico, MEC, 2015)	<b>7º - 9º ano</b>	<b>Oralidade</b> Interação discursiva Interpretação de texto Produção de texto <b>Leitura</b> Interpretação de texto Organização e tratamento da informação <b>Escrita</b> Produção escrita Planificação, textualização e revisão	Transversal	<ul style="list-style-type: none"> <li>• Transversal</li> </ul>
<b>Inglês</b>	<b>9º ano</b>	<b>Domínio Intercultural/Intercultural Domain ID9</b> 3. Identificar transformações no modo de estar e de viver (saúde, trabalho, lazer, tecnologia).	Tópicos Gerais de SSO	<ul style="list-style-type: none"> <li>• ler, interpretar e/ou produzir textos cuja área vocabular seja OSH</li> </ul>
<b>Língua Estrangeira II</b> <b>a. Francês</b>	<b>7º ano</b>  <b>9º ano</b>	<b>Viagens</b> Trabalho sazonal <b>A vida económica</b> Agricultura, indústria, comércio, energia	Tópicos Gerais de SSO	<ul style="list-style-type: none"> <li>• ler, interpretar e/ou produzir textos cuja área vocabular seja OSH</li> <li>• OSH nos empregos temporários para jovens (ocupações de férias)</li> </ul>
<b>Língua Estrangeira II</b> <b>b. Espanhol</b>	<b>7º ano + 8º ano</b> <b>9º ano</b>	<b>Compreensão da leitura</b> Compreender normas redigidas com clareza (sobre segurança, comportamentos e responsabilidades na aula, conselhos para viagens...) Compreender instruções extensas e complexas que estejam dentro do contexto do aluno sempre que possa voltar a ler as secções difíceis.	Tópicos Gerais de SSO	<ul style="list-style-type: none"> <li>• ler, interpretar e/ou produzir textos cuja área vocabular seja OSH</li> </ul> <p>Áreas socioculturais e temáticas:</p> <ul style="list-style-type: none"> <li>• As profissões (7º ano)</li> <li>• O trabalho (8º ano)</li> <li>• A saúde e as doenças (8º ano)</li> <li>• A atividade profissional (9º ano)</li> </ul>

Área disciplinar Cidadania e Desenvolvimento (CeD)	Ano de escolaridade	Domínios CeD relacionados com SSO (a)	Tópicos OSH Mind Safety	Conteúdos SSO + conteúdos do currículo (domínios CeD)
Cidadania e Desenvolvimento (enquanto disciplina autónoma)	7º-9º ano	<p><b>1.º Grupo (obrigatório):</b> Direitos Humanos (civis e políticos, económicos, sociais e culturais e de solidariedade); Educação Ambiental; Desenvolvimento Sustentável; Saúde (promoção da saúde, saúde pública, alimentação, exercício físico).</p> <p><b>2.º Grupo (pelo menos em 2 ciclos do Ensino Básico):</b> Risco.</p> <p><b>3.º Grupo (opcional):</b> Empreendedorismo (nas vertentes económica e social); Mundo do Trabalho.</p>	Transversal	<ul style="list-style-type: none"> <li>• Direitos Humanos e História da evolução da SSO (direitos dos trabalhadores, condições de trabalho pós Revolução Industrial)</li> <li>• Saúde no Trabalho</li> <li>• O meio ambiente e as diferentes ocupações profissionais (exemplo: Resíduos com risco biológico)</li> <li>• Os novos riscos biológicos e a educação para a SSO (exemplo: viagens internacionais, novas estirpes microbianas, mudanças climáticas/aquecimento global, comércio global, resistência microbiana)</li> <li>• Noção de Risco, Perigo e Segurança.</li> <li>• Atitudes preventivas individuais e coletivas</li> <li>• A Segurança e a Saúde no Mundo do trabalho</li> <li>• Criação por parte dos alunos de propostas de um local de trabalho ideal e de uma melhor escola do ponto de vista da Segurança e Saúde e da sustentabilidade (empreendedorismo)</li> <li>• Promoção de práticas que liguem a comunidade escolar à comunidade local.</li> </ul>

(a) According to the document focused on the Portuguese national strategy concerning the delivery of Citizenship Education (Estratégia Nacional de Educação para a Cidadania, MEC, 2017) available at

[https://dge.mec.pt/sites/default/files/Projetos\\_Curriculares/Aprendizagens\\_Essenciais/estrategia\\_cidadania\\_original.pdf](https://dge.mec.pt/sites/default/files/Projetos_Curriculares/Aprendizagens_Essenciais/estrategia_cidadania_original.pdf).

## ANNEX 2

### *The Mind Safety Learning Box*



The *Mind Safety Learning Box* was originally created in association with the Portuguese company PECOL. The aim of the *Learning Box* is to make available for schools a set of examples of personal protective equipment to be explored with students. It is an educational tool conceived to be easily updated as the Mind Safety project expands and new activities are created.

The *Mind Safety Learning Box* includes the following personal protective equipment items: latex gloves, scenic safety goggles, protective ear plugs, wired ear protector 26dB, disposable mask, coveralls, biodegradable nitrile gloves, welding glasses, welding gloves. This *Learning Box* also includes the Teacher's Guide to help the teachers throughout the exploration of "OSH! What a bright idea!".



**MIND SAFETY**  
*safety matters!*