EDU Regio

2

3.0 School and Classroom Kits

Actions for Schools

Participation in EU Code Week
Integrate coding in curricula

CodeWeek.EU

Annex: Learning Scenarios

The EDU Regio project is coordinated by Departament d'Educació de la Generalitat de Catalunya (Spain), together with European Schoolnet (Belgium). The project also involves four partners from four European regions: Junta Castilla y León (Spain), Provincia Autonoma di Trento (Italy), Göteborgsregionens kommunalförbund (Sweden), and Comunidade Intermunicipal da Região de Coimbra (CIMRC) (Portugal). This booklet has been curated collaboratively by their advisory teams. All the links have been checked at the time of publication

The work presented in this handbook is supported by the European Union's Erasmus+ Programme. The content of this handbook is the sole responsibility of the Partnership Members and it does not represent the opinion of the European Union and the European Union is not responsible or liable for any use that might be made of information contained herein.

Project EduRegio: Digital Regions for Education Agreement number: 2019-1-ES01-KA201-065608

Intellectual Output 2: Actions for Schools

PUBLISHER Direcció General d'Innovació, Digitalització i Recerca Educativa del Departament d'Educació de la Generalitat de Catalunya, Via Augusta 202-206 08021 Barcelona, Spain xtec.gencat.cat

PUBLISHED September 2021

PICTURE CREDITS Freepik

Co-funded by the Erasmus+ Programme of the European Union

Generalitat de Catalunya Departament d'Educació
European Schoolnet
Junta de Castilla y León Consejería de Educación
Provincia Autonoma di Trento
GÖTEBORGS REGIONEN
CIM RC COMUNIDADE INTERMUNICIPAL REGIÃO DE COIMBRA

Contents

About this handbook

2-Actions for Schools-Learning-Scenarios handbook contains a selection of the most suitable learning scenarios to implement coding, robotics and computational thinking in schools from a holistic point of view, and to participate in EU Code Week. These learning scenarios have been provided by 2034 teachers from all the world participating in the MOOC Course *Digitally Competent Teachers for Creative Digital Students*. This MOOC will remain open in European Schoolnet's Teacher Academy in the following link:
https://www.europeanschoolnetacademy.eu/courses/course-v1:EDURegio+DigitallyCompetent+2020/about

Learning Scenarios have been validated by teachers participating in the co-creation training sessions offered by the regional strategic association EduRegio: Digital Regions for Education and also in the multiplier events of the project.

They are all ready to use lesson plans suitable to be implemented in your everyday school practise. They may need reasonable adaptations depending on each classroom context.

We would also like to invite you to join our Facebook group Digitally Competent Teachers and to use the hashtag #EduRegio to share ideas, thoughts and experiences on Twitter and Instagram.

Acknowledgements

Teachers participating in MOOC Digitally Competent Teachers, EduHackathon, Learning Activity Digital Co-Creation Lab and Multiplier events:

Emma Abbate, Luís Almeida, Natia Akhvlediani, Nilgün Aktaş, Münire Alagoz, Bruno Alves, Andrei Daniela, Shahida Anthuparambil Backer, Shheba A Arakkal, Emine Arıcan, Tun Tun Aung, Kuşka Bal, Bălăşoiu Doinița, Rafael Baptista, Hayriye Başkan Doğru, Agustí Baubí Rovira, Jacopo Biancat, Donika Biba, Massimo Bossetti, Nurhan Boyacıoğlu, Nick Brackeva, Ana Catarina Branco, Alina Budica, Alessandro Buttitta, Mucahit Camnalbur, Irene Calvo, Eulàlia Canet Nebot, Petronela Colbea, Gonca Coşkun, Xavier Cortina Sagredo, Anabela Costa, María Inmaculada Cuéllar Montero, Tomás Cruz, Snježana Damjanović, Nurcan Değerli, Francisco Delgado Cecilia, Miriam Díaz Blanco, Denisa Ancuta Dumitriu, Cateluta Enciu, Miguela Fernandes, Jaume Ferré Algarra, Carla Ferreira, Javier García Luengo, María José García-Saavedra, Margareta Gašparović, Francesc Gassó Minguet, Adina Geczi, Mariarosa Gentile, Natalia Theokleia Georgitziki, Ghiban Anamaria, Ana Ghviniashvili, Giovanna Giannone Rendo, Leticia Pilar Gil Ramos, Oana Giubega, Andreea Goldschmidt, Carlos José Gonçalves Fernandes, Luis Gonçalves, Gina Hriscu, Enas Ismail, Pär Ivarsson, Maria Adelaide Jordão da Costa, Savi K K, Lissy KL., Dalia Kager, Eleni Kalesi, Büşra Kavan Alkan, Sabahat Kızıldağ, Mara Kolar, Dajana Jelavic, Jayasree L, Ksenija Lekić, Jolanta Leonavičienė, Helena Lopes, Marzia Lunardi, Ioanna Manafi, Sofronia Maravelaki, Lucia Marchi, Miral Marković, Andreea Maris, Helga Martínez-Ciprés, Ida Maiellaro, Alexandra Mavridou, Alessandra Menapace, Sónia Mendes, Fred Van Der Merwe, Massimiliano Minaudo, Izaskun Mitxitorena, Ciara Molloy, Zehra Müge, Monika Mužar-Kos, Elisabetta Nanni, Lidia Nistor, Rejhana Nuhanović Tadijan, Ignacio Javier Ortega García, Ayça Oğuz Karakadılar, Henriqueta Oliveira, Eulàlia Olivé Ollé, Nithya P. S, Praseetha P M, Ramsiya P Ramsiyahanu, Branimira Palić, Purvi Parekh, Marta Pena, Inma Pérez Sagarribay, Roxana Pérez Hidalgo, Reçi, Olga Pérez Soriano, Sandra Pereira, Maria Elisabetta Porcedda, Carlos Portela, Marc Portugal, Marija Pustišek, Nadia Richard, Elena Corina Rogoveanu, George Rouvas, Emiliana Rufo, Daniel Ruiz, Szilvia Salánkiné Knopfler, Margarita Samoutian, Claudia Santos, Maria Raquel dos Santos Pereira, Tania Santos, Paschalia Sarmi, Sonia Sartori, Sebastià Sastriques, Judit Serra Valbona, Mehmet Bora Sertkaya, Jannicq Sierens, Natalija Siladjev, Maria De Fátima Silva, Susana Silva, Aikaterini Spitsa, Sena Şimşek, Gastão Sousa, Stan Cristina, Jasmina Štefan, Mimoza Sulaj, Alia Syed, Gabriel Tanasescu, Marco Tassan, Rita Tomás, Amelia Torniero, Evangelia Triantafillou, Cristina De Vega Benavides, Elena Vercher Ribis, Jisha Verghese, Maria Lucia Vieira, Marijana Vuković, Hatice Yagci, Nasiye Yamac Sahin, Ana Belén Yuste, Silvia Valenciaga Sánchez, María Jesús Walías, Ana Carmen Zabalza.

How to apply the following learning scenarios for actions in schools?

According to teachers participating in EduRegio's learning actions, it's recommended teaching coding to kids of similar ages because of their specific features and needs. Also limiting classroom size to 8-10 students can work for younger pupils. Coding needs to be entertaining, especially for children, so don't be afraid to adjust your plans and add new tracks and options. What matters the most, is to motivate children, and get them to love coding.

The following learning scenarios can be directly used in primary and secondary schools by adapting them to your school's curriculum and learning objectives.

Little Geniuses Coding

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	Students will write their first algorithms unplugged coding activities, then the class will be opened in code.org. and will be completed the artificial intelligence for oceans course.
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	Preschool (6 years)
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstations etc.*	1. For unplugged coding; the space should have large area, coding carpet and arrows (at home or classroom) 2. For ai for oceans course; computer or tablet (at home or classroom)
Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	• Objective 1: learning the basic coding information (directions) • Objective 2: achieve technology readership • Objective 3: encouraging responsibility for environmental protection • Objective 4: raising awareness about climate change

Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	Coding pad, directions, (if possible bee bot) computer or tablet

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

We can replace some terms with new ones like "nature" and "air pollution" as an example, "ocean" and "plastic", etc.

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

Method	Details and description *Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.*	Time *Approximately, how long does this part of the lesson plan take?*
1. Introducing the directions	Students will be asked to show right, left forward, back concepts. and teach students who need support. the is playing game to move into the direction which is speech. who do wrong is eliminated.	20 min
2. Reaching the goal	Preparing coding pad. selection a goal and with directions attempted to reach the goal. after that, using bee bot to attempt to reach the goal. (we should prepare the pad about the environment, plastic and oceans etc.)	30 min

3. A discussion of environmental pollution and its effect on living	Asking students what they know about environmental pollution. and discussing what causes pollution and what role people play in this issue. what can be do to live in a better clean world	15 min
4. The effect of plastics on oceanian lives	Watching videos of how dirty the oceans and the effect of pollution on lives (fishes, birds, carettas, whales etc.	15 min
5. Cleaning the oceans from code.org	Giving to all students enter code to code.org “ai for oceans lesson” and clean the ocean with coding.	1 hour

Blended and remote learning environments

Can the activity be replicated in a blended learning environment (online and offline teaching combined) or in a remote learning scenario (fully online teaching)? If so, for which of these two learning environments can it be adapted, or both? Which tools and what preparations are necessary?

The activity certainly can be replicated in a blended learning environment (online and offline teaching combined) and in a remote learning scenario (fully online teaching). Especially these days because of the pandemic this activity is very suitable for online teaching. Due to the small age group, cooperation with the family is important.

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

It is possible to repeat the lesson plan in many subjects by changing the goals. For example, we can describe the concept of color by saying, "Let's save the red fish." or the “big fish” or “eatable fish”

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	code.org easily shows us which student is at which stage. The teacher can follow the status of the class from the view progress section. Also the students can do another lesson from code.org

Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	Can be designed a robot for environmental pollution

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

Students can do another lesson from code.org

Author: Hayriye Başkan Doğru
Country or region: Turkey

The Way to the Hour of Code

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	Preparing students to participate in The Hour of Code. This class will start from unplugged situations for the use of technology. With technology they will perform some exercises at the UBBU platform and Scratch platform.
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	Primary Education (8 to 12 years)
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstations etc.*	Computers room

Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	• Objective 1 - Decipher and create messages in the "Cipher of Cesar". • Objective 2 - Give clear and concise instructions for a colleague to execute them accurately. • Objective 3 - Create an optimized algorithm in order to perform some proposed tasks. • Objective 4 - Write and identify numbers in binary language. • Objective 5 - Perform some exercises on the UBBU platform. • Objective 6 - Create a simple Scratch project. • Objective 7 - Save the Scratch project in a Padlet.
Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	"Cipher of Cesar" - Caesar cipher - Wikipedia • Squared paper with the image of a car and the image of a repair shop. • Binary system numbers. • Computers • Projector • Internet access Links: https://play.ubbu.io/login#!/sign-in Scratch - Imagine, Program, Share (mit.edu) GnWO9PazIkb5YiV6&index=4 https://scratch.mit.edu/ https://padlet.com/ Quizizz — The world's most engaging learning platform

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

We can replace some terms with new ones like "nature" and "air pollution", as for example "ocean" and "plastic", etc.

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

Method	Details and description *Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.*	Time *Approximately, how long does this part of the lesson plan take?*
Conversation PPT presentation Paper and pen	This class will start from unplugged situations for the use of technology. So, at the beginning, students will decipher the question: "Do you want to participate in the Hour of Code?" written in Caesar's Cipher and then, in pairs, will create small messages in the same cipher.	15 min
Paired work: RPG game. One student plays a robot and the other plays the “game master”.	In pairs, a student will give orders to his colleague to perform a specific task (leave the room, turn on the lights, open a window, ...).	15 min
Squared paper with two images	Then, on graph paper, they will create an algorithm in order to drive a car to the repair shop.	5 min
PPP presentation	The teacher designs some letters with the binary code and asks: what is the letter that follows? After showing how some numbers are represented in binary code, he challenges students to build others.	15 min
UBBU	The teacher proposes to students to log in to the UBBU Platform and to perform some exercises to understand the functions of some programming blocks.	30 min
Video Scratch platform	After students view some videos in: Scratch - Imagine, Program, Share (mit.edu) will log in to the Scratch platform: https://scratch.mit.edu/	10 min
Save in Padlet	Students will build a small Scratch project and, at the end, keep the project link in the class Padlet.	30 min

Blended and remote learning environments

Can the activity be replicated in a blended learning environment (online and offline teaching combined) or in a remote learning scenario (fully online teaching)? If so, for which of these two learning environments can it be adapted, or both? Which tools and what preparations are necessary?

This activity can be replicated in a remote learning scenario (teaching entirely online) and the teacher can follow up and answer questions through Google Meet. In this case, it is necessary to share PPT presentations with students, for example: in Google Classroom and invite them to access the UBBU and Scratch platforms. At UBBU, the teacher has access to results of the activities carried out by the students. To know the degree of development in Scratch you need students to share the link of your project through the Padlet for example.

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	As homework students will be invited to see a playlist of videos about Scratch: Scratch - Imagine, Program, Share (mit.edu)
Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	The evaluation will be made based on the students' performances in the development of the proposed projects. If necessary, a quiz can be proposed to assess their knowledge about some scratch programming blocks.

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

The suggested time for completing the proposed tasks is not rigid.
This lesson plan starts from unplugged activities to activities that require the use of technology. On the other hand, the suggested materials are cheap and easy to build.
To be able to use the suggested applications, you must make a prior registration.

Author: Carlos José Gonçalves Fernandes
Country or region: Portugal

Let's Code

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	Use and navigate scratch to design, create and evaluate a game. Students will use block programming to create a game according to a number of required specifications and present it to the class.
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	Primary education (10-11 year olds)
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstation etc.*	The students classroom (homeroom-students have access to their own chromebooks in their desks)

Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	• Objective 1 Able to use Scratch to block programme; ➔ 2 Background (change) ➔ 3 Sprites ➔ Movement ➔ Sound ➔ 20 steps • Objective 2 Write a technical report include; ➔ What did I do today? ➔ What do I need to do for the next lesson? • Objective 3 Write down one problem/issue ➔ Suggest a solution and test it out solution ➔ Suggest further improvement • Objective 4 Able to explain 3 technological solutions and functions • Objective 5 Can explain how technology has developed over time and give three examples and reasons by explaining the advantages and disadvantages
Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	• Bread • Jam • Butter • Butter nice • Teaspoon • Plate • A4 plain paper • Chromebook

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

Method	Details and description	Time
	Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.	*Approximately, how long does this part of the lesson plan take?*

Introduction and discussion Presentation	Quick questionnaire (Can you code?) Assessing students' previous knowledge and ability of coding (student self-assessment). https://docs.google.com/forms/d/1apUUlXQ5VATJpyey1ZDsPftpa3xQjt1GHjznmZBJg44/edit What is programming? Introduce coding to the students https://www.khanacademy.org/computing/computer-programming/programming/intro-to-programming/v/programming-intro https://www.brainpop.com/math/dataanalysis/computerprogramming/	5-10 minu 15 min
Unplugged activity	Class activity: how to make a butter and jam sandwich Ask students to give you step by step instructions and follow them to make a butter and jam sandwich. If a student says to place butter and jam on the bread, then that's what you do, place the tub of butter and jar of jam on top of the bread, follow the instructions literally.	15 min
Unplugged activity Collaborative learning	Pair activity: paper airplane (step by step instructions) https://code.org/curriculum/course2/2/Activity2-RealLifeAlgorithms.pdf Plan: We will create an algorithm to help each other fold a paper airplane. Directions: 1. Cut out the steps for making a paper airplane (worksheet). 2. Choose the six correct steps from the nine total options. 3. Glue the six correct steps, in order, onto a separate piece of paper. 4. Swap your finished algorithm with another person and let them use it to make their plane! 5. Clean up 6. Give each other feedback on why you were successful or not successful Evaluate and Test paper airplanes	15 min 5-10 min
Presentation	Follow the presentation and go through the step by step guide on how to use “Scratch” and introduce the project to the students. https://docs.google.com/presentation/d/1M6RAeAzTAWVOhV4vS2BbWujwj5u69J5Vx2s55hnuG3E/edit?usp=sharing	1 hour
Lesson 3-4	Work on project	2 hours

Lesson 5 collaborative learning	Peer assessment	1 hour
Lesson 6	Evaluate and answer questions	1.5 hour

Blended and remote learning environments *Can the activity be replicated in a blended learning environment (online and offline teaching combined) or in a remote learning scenario (fully online teaching)? If so, for which of these two learning environments can it be adapted, or both? Which tools and what preparations are necessary?*
This lesson plan can be executed at home. When students are required to peer review each other's projects, they are able to share each other's projects with one another and write a report. Teachers are able to follow students' progress on google classroom.

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	Homework; What will you programme? (game, animation/story, card) Think about the background, characters, movement and sound.
Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	Students will present their projects to the class and present their ideas. Evaluation (student self-assessment) questionnaire: https://docs.google.com/forms/d/1PjgElMNOZ3Lj-LsXXPgIDNhRHAgISdhdugjxueYUphg/edit

Author: Enas Ismail
Country or region: Sweden

Comparing Numbers up to 5

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	The aim of the lesson is to practice comparing numbers up to 5 and the correct use of the signs <. > i =. • Outcomes: The pupil connects quantity and number. Compares relations between quantities and numbers, marks with mathematical sign =, <,>. It shows the same mathematical concepts in different ways (drawing, set, pictogram). • Tools: Genially (Interactive image), QR code Reader, Wordwall, Google Forms, BookWidgets
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	Primary education, 1st grade, age 7
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstations etc.*	Teaching place: classroom • Classroom is equipped with interactive whiteboard and wireless internet • All students have their own tablet, internet access is provided, the QR reader application is installed on the tablets

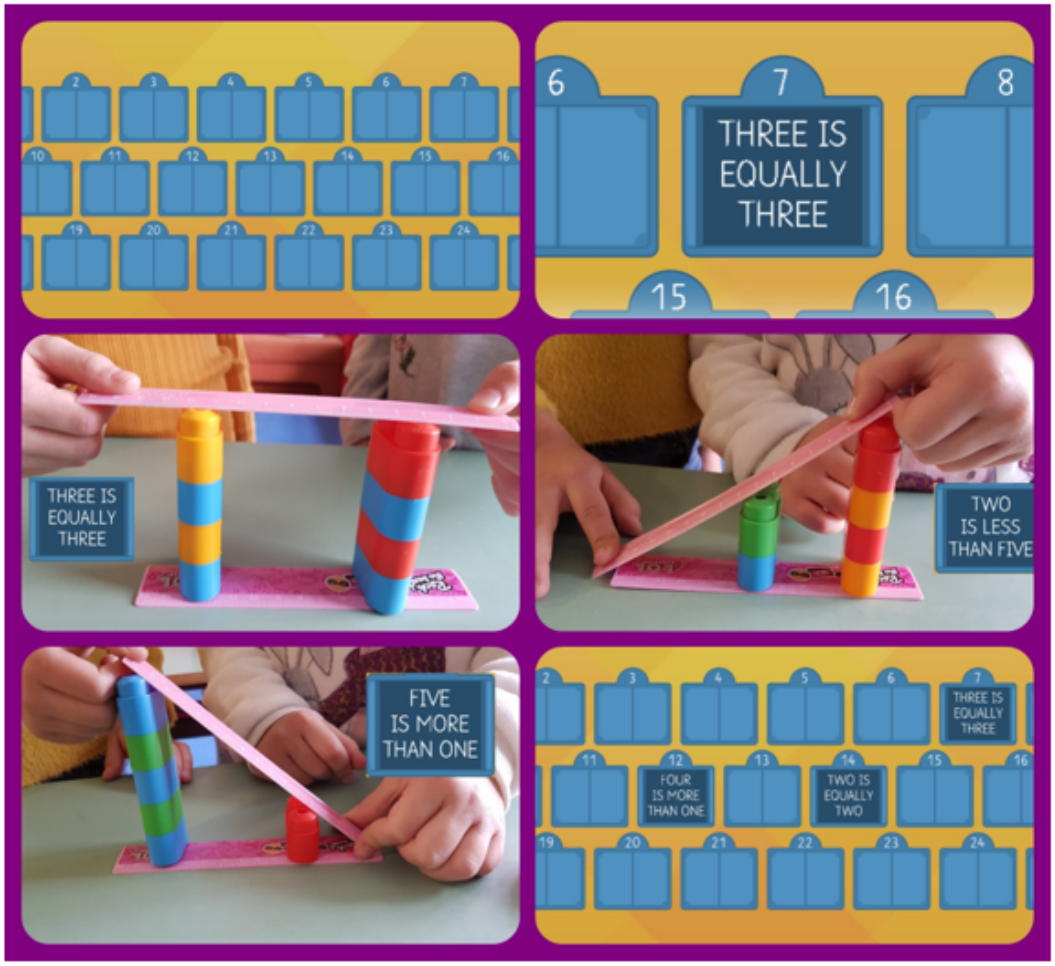
Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	• Linking quantity and number • Comparing numbers up to 5 and use of mathematical signs <,>, = • Representation of mathematical concepts by a pictogram • Correct and responsible use of ICT (Information and Communication Technologies)
Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	• colored pencils (5 pcs) • LEGO cubes, or some other cubes • 2 rulers • interactive (smart) board • projector • tablet • worksheet • self-assessment sheet

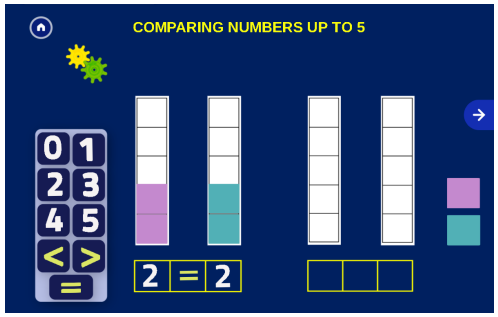
2. Developing the Lesson Plan

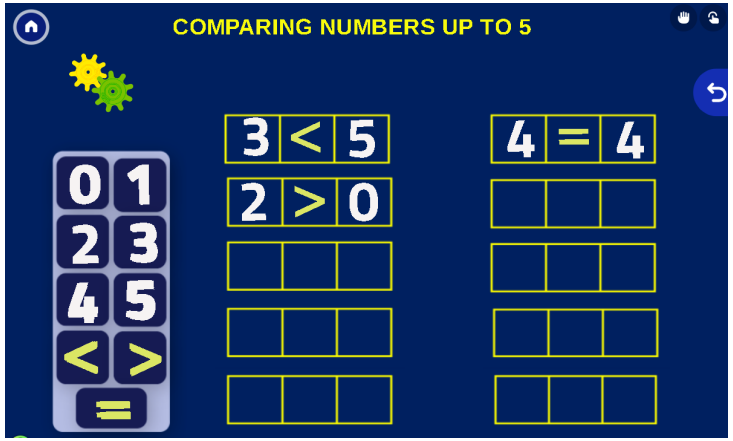
In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

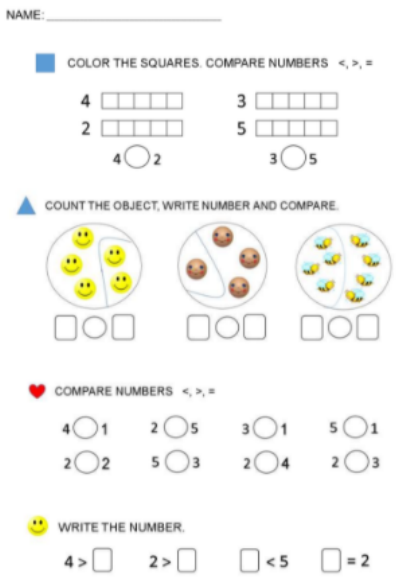
Method	Details and description *Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.*	Time *Approximately, how long does this part of the lesson plan take?*
INTERVIEW, DEMONSTRATION, PREPARATION FOR WORK frontal form of work	Repeating numbers up to 5, counting to 5 forwards and backwards, connecting numbers and quantities. Working with concrete materials - 5 colored pencils Example:	3 min

	The teacher holds three colored pencils in his hand and the students connect the given quantity with the corresponding number 3. Repeat the same activity with all numbers up to 5.	
PRACTICAL WORK work in pairs MOTIVATION	Each pair has a total of 10 LEGO (or some other cubes), 1 ruler and paper, on which they will write the compared quantities with mathematical signs, and 1 tablet with which they will read the QR code with the first activity. By random selection in the activity "Frame opening", https://wordwall.net/hr/resource/7335079 (authored work, Wordwall tool) Pupils should read the information, place the cubes, place a ruler on them, recognize the sign, and write the equality or inequality on paper with mathematical signs. Pupils access the activity by reading the QR code using the QR code Reader application which is installed on their tablets. Example: "Three is equally three." or "Four is more than two." Each pair needs to solve 5 randomly selected tasks, i.e. opened windows. The teacher checks their assignments. After the activity, students put away cubes and paper. They will need the tablet in the next activity.	7 min


6
7
8
THREE IS EQUALLY THREE
15
16
THREE IS EQUALLY THREE
TWO IS LESS THAN FIVE
FIVE IS MORE THAN ONE
THREE IS EQUALLY THREE
FOUR IS MORE THAN ONE
TWO IS EQUALLY TWO

DEMONSTRATION PRACTICAL WORK - frontally, individually REPETITION OF LEARNED CONTENT	Work on the interactive whiteboard and tablet Activity “COMPARING NUMBERS UP TO 5”, (authored work, Genially tool)   https://view.genial.ly/5fb2f155eb09630d182d8ff4 https://wordwall.net/hr/resource/7335079 Random selection of pupils (application in the e-directory) One pupil opens the frame in the task on the tablet, and the other sets the solution on the interactive whiteboard. It first determines and compares the quantities, and then “records” that relationship by dragging the elements on the interactive whiteboard. Other students check for accuracy. Set and solve 8 tasks. (depending on the number of pupils in the class)	15 min
EXERCISE - work in pairs	Pupils in the role of teachers - working on a tablet, drawing elements They access the task on the next page of Genially activity. One pupil sets the task orally, and the other pupil draws the elements and writes it down with mathematical signs. They should alternately solve 5 tasks. Example https://view.genial.ly/5fb2f155eb09630d182d8ff4	10 min

		
CHECKING - individual work	Pupils solve a worksheet	7 min

	 https://drive.google.com/file/d/1oxXlXH-Cy_9Qd03DWSR42gFG-3hcdPPF/view?usp=sharing If classes are held online, the worksheet can be created as a QUIZ in WordWall tool. QUIZ (authored work, Wordwall) https://wordwall.net/play/7442/768/738	
SELF ASSESSMENT	Pupils fill out a self-assessment form.	3 min

- individual work

NAME:_____

WRITE ✓	☺	😐	☹
I READ AND WRITE NUMBERS 1 2 3 4 5			
I KNOW MATHEMATICAL SIGNS < > =			
I COMPARE NUMBERS UP TO 5 5 > 4 3 = 3 1 < 2			

It can be printed and downloaded at the link
https://drive.google.com/file/d/1khOSrofZYChy_uLNwlx158DqChNKjSDf/view?usp=sharing

Depending on the teacher's wishes or the place of teaching, the teacher can create such a form in digital form (Google Forms or MS Forms, Kahoot, etc.)
Example - Google Forms https://forms.gle/ZZQq6FUGCs4PfYUb8

Pupils can access the form by reading the QR code

While pupils fill out a self-assessment sheet, the teacher checks the accuracy of the solved tasks in a worksheet.

Blended and remote learning environments

Can the activity be replicated in a blended learning environment (online and offline teaching combined) or in a remote learning scenario (fully online teaching)? If so, for which of these two learning environments can it be adapted, or both? Which tools and what preparations are necessary?
The activity can be held in a mixed form of teaching and as distance learning. In that case, the teacher records a video or audio instruction, describes step-by-step activities for the pupils and guides them through the lesson. He incorporates his audio or video into his lesson. I recommend OneNote, Google Sites, BookWidgets or Genially Templates. In addition to the recorded teacher's instructions, teaching activities can be inserted into the listed tools using a link or as an embed code </>.

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	For students who still want to practice or for homework https://view.genial.ly/5fbd1d7393901a0d1540101c
Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	Pupils express their satisfaction with the held lesson and the activities carried out on the Whiteboard. The teacher pre-creates a Whiteboard for his class and assigns the pupils an ENTER ROOM CODE. Each pupil should draw (or write) a symbol about how they liked the activities in class. They may draw a heart, a smile, a thumbs up, or give some negative feedback if they were not satisfied with the activities. https://whiteboard.fi/ Another option is to gather information using the BookWidgets survey. This is a link that teachers can download and rearrange and publish for their class. First they need to make a copy in the upper left corner. The survey form will appear in their BookWidgets account. https://www.bookwidgets.com/play/t:c7drhoATueYl_4Ijw7FtqkEnnT9KjMEVvUKTId0Sxq5HQlFFUEdW

Author: Ksenija Lekić
Country or region: Croatia

Shapes and the Solar System

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	This activity is aimed to present the evidence about the shape of the Solar System by Scratch.
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	Primary Education (6 to 10 years)
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstation etc.*	• Objective 1- Prepare a model for the shape of the Sun and the Planets. • Objective 2- She uses geometric and organic forms in her drawings based on observation of the phenomenon. • Objective 3- Gains new approaches with aesthetic point of view while encouraging students to think in three dimensions. • Objective 4- Digital competence

Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	• Objective 1- Prepare a model for the shape of the Solar System. • Objective 2- She uses geometric and organic forms in her drawings based on observation. • Objective 3- Gains new approaches with aesthetic point of view while encouraging students to think in three dimensions. • Objective 4- Digital competence
Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	• Online resources • Play dough • Computer

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

Method	Details and description *Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.*	Time *Approximately, how long does this part of the lesson plan take?*
Engage	Starting the lesson with a question is a good way to be engaging. So our first question is, "Does the earth revolve around the sun?" It will be. We should not give positive or negative feedback to answers at this stage. Because our aim is to check the previously learned information. After listening to all the answers, let's watch the video from the link below and get their ideas again. https://www.youtube.com/watch?v=F2prtmPEjQc	30 min
Explore	At this stage, your students are given a research task about scientists such as Thales, Pythagoras, Aristotle, Magellan, Biruni, Leonardo da Vinci (the genius).	60 + 60 min

	Students make poster design works on the website https://www.canva.com/ with the information they have learned. If you want, you can group your students in the exploration section and assign each of them a research task. Thus, by presenting the poster prepared by each group to the other group, you will ensure peer learning.	
Explain	At this point, you can explain the shape and layers of the planets to your students. A documentary on this topic will help your students learn new concepts. https://www.youtube.com/watch?v=MK5E_7hOi-k	30 min
Elaboration	Now is the time to delve into what we have learned. In this part of our study, we will do our work on the sphere model in the math lesson. By examining them, to better understand the structure of the planets, they will understand that the sphere has a curved surface and has no corners and edges. So, with our plasticine, we will talk about how we can make our model. We will meet with the groups of our students and send them to their desks to prepare it. Let's see how it's done. https://www.youtube.com/watch?v=nfJ7QtQpgaM	60 min
Technology integration	Finally, how about explaining all this with Scratch? Then these examples will be of great help to you. https://scratch.mit.edu/projects/89811578/ https://scratch.mit.edu/projects/1201967/	60 min

Blended and remote learning environments

Can the activity be replicated in a blended learning environment (online and offline teaching combined) or in a remote learning scenario (fully online teaching)? If so, for which of these two learning environments can it be adapted, or both? Which tools and what preparations are necessary?

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	Overview | Our Solar System Solar System Scope - Online Model of Solar System and Night Sky https://scratch.mit.edu/projects/2486677/
Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	After the lesson plan is applied, you can create a survey from the visuals of the products, present your survey to the participants and choose the most liked work. For the survey: Google Forms: Free Online Surveys for Personal Use http://drscratch.org/

Author: Massimiliano Minaudo
Country or region: Italy

Code Me; Battleship Challenge

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	Code Me is an innovative method of teaching coding that "coding by writing" should be taken as a basis for primary school students. It constitutes "learning with examples from real life" by creating scripts with “instructions and commands”. I use “Gamification” with some classical board games such as BattleShip. We discuss about “where can we use this code in real life?” with examples such as STEAM, robotics, transportation, as much as playful activities like orienteering. As we are doing these all, we get help from our best friend "Math"
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	Primary education (7-12 years old)
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstations etc.*	• The classroom, a garden or at home (online). • Any places that allow teamwork.

Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	• To teach students coding by simply combining commands and coordinates. • To reinforce the coding we have integrated with real life with enjoyable coding activities on robotics and basic programming base. • Supporting peer learning • Improve creative thinking skills by encourage students to think, design and produce,
Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	Paper, ruler, pencil (If there is a printer then we use it to print worksheets instead drawing them)

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

I am a teacher based on 21 years of experience and I observe that some "coding games" cause extremely wrong teaching on students. Nowadays the kids who take a "toy car" in hand think that they are doing coding or they suppose a simple electric on-off process is a coding. "Coding is not possible without writing!!!" Every mark you put on screen has a meaning. It is serious work, needs focus, needs attention with writing discipline. As primary school teachers, we can teach coding as how we teach the alphabet, to read and to write to our students. My aim is teaching students to emphasize that coding is not a game but it is a lot of fun.

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

Method	Details and description *Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.*	Time *Approximately, how long does this part of the lesson plan take?*

Preparation	The teacher makes an introduction that gives information about the BattleShip game. Actually when the teacher is explaining the game, he/she teaches horizontal -vertical axis and coordinates along with the "Tables and Graphs" in the Math curriculum. There are 2 ways to preparing the lesson 1- Given battleships worksheet copies to the students (Please check Follow up 1) 2- Asking for students to draw the game chart and thus do a math lesson (measuring – creating table – creating coordinate system etc) Battleship game is known worldwide as a pencil and paper game The board (paper) has 1 to 10 squares horizontal and A to J squares vertical. (For more information please check Follow up 2 “How to Play Battleship”)	20 min
Collaboration Game: BATTLESHIP Board Game	Teachers form one-man teams of students for the Battleship challenge. They can play the game in the classroom or online. (Please check Follow up 3) As students play the game, they can easily understand and practice the coordinating system, mark a point, and find a given point in an enjoyable way. This is the basic mentality of coding because if we can clearly specify the location of an object, we can easily direct it with simple commands.	30 min
Presentation: Commands and symbols	Teachers should describe some simple commands, definitions and symbols that we use in our lesson. Since we will use scripts at the beginning, students must know the programming language. The most important ones that we use at the beginning are definitions • target : to define the main object • commands • go to : to move the object • stop : no action • turn left : moving left side • turn right : moving right hand side • tell.target : command to main object • symbols • = : equal (to define the object) • “..“ : quotation marks (to define the movement) • (..) : brackets (to specify the movement) • x : multiplication sign (used for repetition)	30 min
Role-Play: Code Me	The teacher creates a role play drama in the lesson.	40 min

Using “tell.target” Action Script as command	In this activity, there is a “robot” that can only understand clear and direct commands. This robot can be the teacher or any student. Students will use some simple commands to the robot at the beginning. For example, ● Command : "Go to the window!" ● Robot should ask: "What is the window? Explain!" ● Command: Walk “here” ● Robot should ask: What is here? Explain!” Students have to use the coordinate system in order to move the robot from one place to another. Because the robot will not be able to understand other commands. In this way, student will learn that using coordinates and Math is the most important ● basis of coding. Marking Points such as A, B, C and they try to move the robot on these routes. ● target=Me ● tell.target how to go to the door by marking A and B points. ● Tell.target how to go to the room by marking A, B, C points. For example, The teacher draws something on the board and to clean the board he/she chooses a “duster” as a target. ● Mark A as a left side then B as a right side of the board. So, ● target=duster ● tell.target (go to “A”) ● stop ● tell.target (go to “B”) ● stop ● x10 (And here Math helping us to write this command 10 times instead)	
Discussion: Real Life Scenarios	Teacher gives examples “how do we use this simple script in real life?” Transportation: Ships, planes, trains that can go straight from A to B. Machines: sewing machine, drilling machine, belt mass production, that moves short distances A to B. Students can watch a movie and discuss where they can use this script? Some video links: https://www.youtube.com/watch?v=j_Zmkzlebr0&feature=youtu.be https://www.youtube.com/watch?v=tkP8Cwdgt_U	30 min
Assessment	Assessment and evaluation of the lesson can be done in many ways. 1- The easiest and the basic criteria is if the student can play a BattleShip game that means he/she knows what the mentally coordinate system is. 2- Peer reviews; their friends tell us that if he/she is a good player.	20 min

	3- Teachers can use some other classical board games for assessment. (For example Chess. The question is; if a horse is at B2 where can its possible next steps write the coordinates. 4- Teachers can also give some worksheets to support studies or evaluation. (Please check Follow up part for some worksheets)	

Blended and remote learning environments

Can the activity be replicated in a blended learning environment (online and offline teaching combined) or in a remote learning scenario (fully online teaching)? If so, for which of these two learning environments can it be adapted, or both? Which tools and what preparations are necessary?

Offline Teaching

I applied my lesson both in the classroom and online and I got very good feedback. Using symbols and commands in the classroom and asking students to "code me" by acting like a robot turns into a work that improves students' coordination skills.

Online Teaching

I was able to get efficiency from the lessons I made by applying many different methods in the online lessons we held as mandatory in the Covid period. For example, there are sites where students can play the BattleShip game against the computer or against each other.
https://www.battleshiponline.org/

Apart from that, just like in the classroom, coordinating can be established with imperative sentences established with direction and stepping. For example,
1- I asked students to write a code that will take them from their place to the kitchen, to the room and send it to me,

- target=me
- tell.target "stand"
- tell.target "turn left"
- go to "3 steps"
- stop
- turn right
- stop
- go to "7 steps"
- stop

2- Then I can track their movements with their mobile phones with the code I read to evaluate the code they wrote.
3- In other words, the study has been tried in every environment and satisfaction has been achieved.

Other

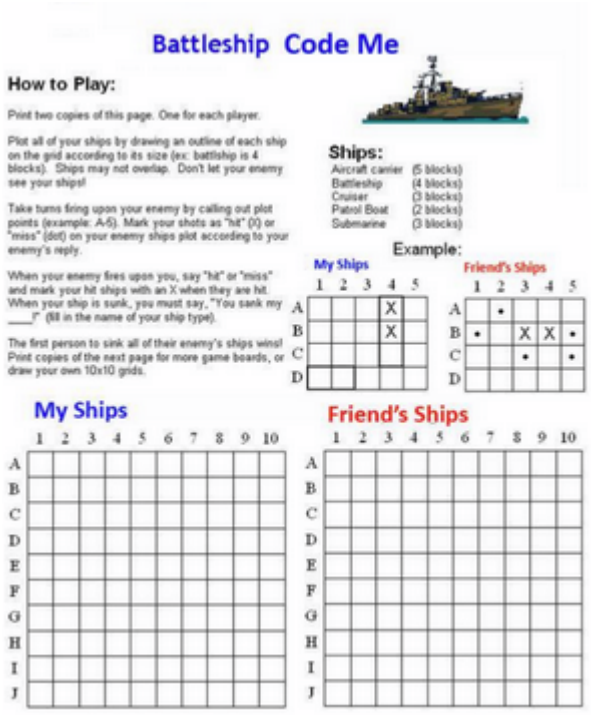
Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

1- The logic of the “Code Me” lesson is to create works that can be reflected in real life based on simple imperative sentences.
2- The stage of the lesson is to give motion to objects using coordinates. At this lesson we use ourselves as a “target”. We will role-play as a “robot.

3- Orienteering is the best outdoor activity to teach a coordinate system for students. We should mark some points on a map and ask to find the given point.

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework	1- Battleship Chart
Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.	

Battleship Code Me

How to Play:

Print two copies of this page. One for each player.

Plot all of your ships by drawing an outline of each ship on the grid according to its size (ex: battlship is 4 blocks). Ships may not overlap. Don't let your enemy see your ships!

Take turns firing upon your enemy by calling out plot points (example: A-5). Mark your shots as "hit" (X) or "miss" (dot) on your enemy ships plot according to your enemy's reply.

When your enemy fires upon you, say "hit" or "miss" and mark your hit ships with an X when they are hit. When your ship is sunk, you must say, "You sank my ____!" (fill in the name of your ship type).

The first person to sink all of their enemy's ships wins! Print copies of the next page for more game boards, or draw your own 10x10 grids.

Ships:

Aircraft carrier	(5 blocks)
Battleship	(4 blocks)
Cruiser	(3 blocks)
Patrol Boat	(2 blocks)
Submarine	(3 blocks)

Example:

My Ships

	1	2	3	4	5
A				X	
B				X	
C					
D					

Friend's Ships

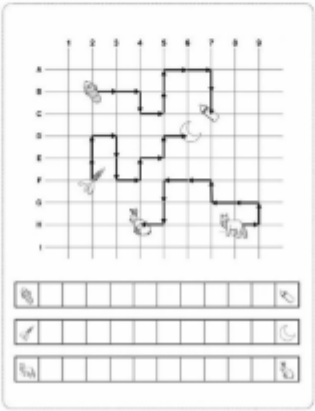
	1	2	3	4	5
A		•			
B	•		X	X	•
C			•		•
D					

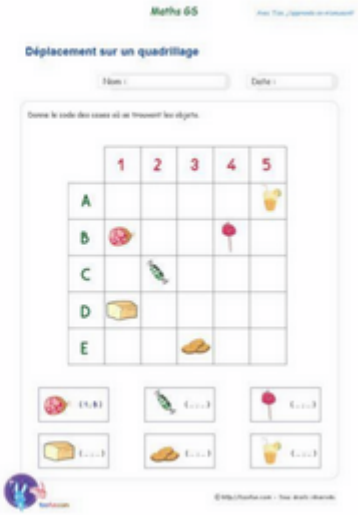
My Ships

	1	2	3	4	5	6	7	8	9	10
A										
B										
C										
D										
E										
F										
G										
H										
I										
J										

Friend's Ships

	1	2	3	4	5	6	7	8	9	10
A										
B										
C										
D										
E										
F										
G										
H										
I										
J										

	2- To learn how to play battleship: https://www.youtube.com/watch?v=RY4nAyRgkLo https://en.wikipedia.org/wiki/Battleship_(game) 3- Play Battleship online: https://www.battleshiponline.org/ 4- Worksheets for evaluation or homework    
Evaluation *You can suggest an activity or an exercise that the educator can*	We can practice or evaluate the given lesson with some worksheets. Such as:

propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.	  The easiest and the basic criteria is if the student can play a BattleShip game that means he/she knows what the mentally coordinate system is. 1- Peer reviews; their friends tell us that if he/she is a good player. 2- Teachers can use some other classical board games for assessment 3- Teachers can also give some worksheets to support studies or evaluation.

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

To follow for more worksheets you can visit my EU Codeweek Event website https://aycaoguz.com/codeweek/

Author: Ayça Oğuz Karakadılar
Country or region: Turkey

Coding with App Inventor for teaching sustainability and Nature based solutions

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	Students have been introduced to the use of App Inventor 2 (an intuitive, visual programming environment that allows students– even very young – to build fully functional apps for smartphones and tablets) in order to design their own App on the theme of eco-sustainable behaviour (a quiz game with pictures). The project is based on cooperative approach for the creation of an information app aimed at helping the user to gather knowledge on eco friendly behaviour to adopt at home for a more a sustainable lifestyle (such as reducing domestic electricity consumption or water waste)
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	Lower Secondary (14 to 16 years)
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstations etc.*	Computer room Lab. But it is also possible to work online: students can use remote learning platforms (such as Zoom) to virtually meet and work on their own devices from home.

Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	• Acquire information and develop a critical attitude on the problem of energy consumption and environmental pollution; • Design and implement an app; • Stimulate design thinking and creative skills; • Promote the development of soft skills (transversal competences), in particular analysis and design skills, problem solving, creativity, teamwork; • Increase interest in STEM (Science Technology Engineering Maths) subjects. • Enhance coding application in the classroom • Enhance students engagement and involvement through a gamified approach to study topics • Boost students curiosity towards nature based solutions encouraging to adopt eco friendly behaviours
Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	• Computer (one per participant); • App Inventor 2 (https://appinventor.mit.edu/). Free access (you only need to have a Gmail account) • EU Commission reports on Nature based solutions https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

Method	Details and description *Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.*	Time *Approximately, how long does this part of the lesson plan take?*

1. App Inventor Training	To create an App you can use "App Inventor", the online platform provided by the Institute of Technology of Massachusetts. App Inventor is available online at http://ai2.appinventor.mit.edu/. MIT App Inventor is a software dedicated exclusively to the Android platform: it has a graphical interface that allows even the less experienced users to organize every aspect of their app. At http://appinventor.mit.edu/explore/ai2/setup.html teacher can find all the information needed to prepare students' system to use this development environment, which it is possible to access with a Google account. The preparation lessons necessary to approach App Inventor, can be scheduled as follows: Here is the list of topics covered in the 12-hour introduction to App Inventor: Creating a Gmail account to associate with App Inventor (20 minutes) ● Introduction to the interface: Designer and Blocks (1 h) ● First app: text to speech (button to make the mobile phone talk) (40 minutes) ● Button formatting and use with sensors (accelerometer) (1 h) ● Drawing on canvas (paint pot) (2 h) ● Video game prototypes (Mole Mash) (2.5 h) ● Using the database (2 h) ● Interactive quiz to test your knowledge, using an online quiz generator like Kahoot (2.5 h)	12 hours
2. Content Acquisition To Build The App	It is necessary to make students aware of how important for their future lives the reduction of energy waste, especially in terms of: domestic consumption, clean and renewable energy sources. Students have to get acquainted with the benefits of adopting a more responsible and green lifestyle towards Nature in order to understand the advantages of smart, eco- friendly living standards. Therefore it is necessary to propose to the students, as a preparation for this educational path, the careful analysis of the resources on the European Commission's website dedicated to nature based solutions (https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en.)	3 hours
3. App Realization	Assigned Task Create a quiz game with App Inventor aimed at helping the user to acquire information on	2 hours

	a virtuous sustainable behaviour to adopt in everyday life (such as, for example, reducing home electricity consumption or water waste).	
4. Dissemination	Disseminate the students' experience and work during ONU and WWF Climate Action day online event	1 hour
Blended and remote learning environments		
The lessons can be easily replicated in a blended environment: students can work collaboratively from their home computer online using a distance meetings platform such as Zoom. Teacher may share a video tutorial on how to use the App inventor. For students used to Scratch and coding, the use of App Inventor will be very easy and intuitive. For the less expert students, forms of peer tutoring also from remote, can be implemented.		

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

This lesson is also aimed at promoting coding and STEM for girls, in order to encourage girls to study STEM subjects at University and to search for STEM jobs 'career opportunities.

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	It is possible to see see the download the apps realized from the students: http://ai2.appinventor.mit.edu/b/87zx https://drive.google.com/file/d/13yRwUNylCu6jBNS8bnG8H6fqTHUU1fJc/view?ts=5fa2f548 https://drive.google.com/file/d/1UpPM8QKTloX3lNzOCVV2eZTbHMpvUi_r/view?usp=sharing

	If you want to have and idea of the realized end products without downloading the Apps , you can see the screenshots of the quiz's questions in this shared directory: https://drive.google.com/drive/folders/1PhcT8hTWv3_pF9lf3h3uzKDqR5bxcdgL?usp=sharing
Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	The success of the project has been tested through specific Google questionnaires given to the students who have shown that they liked the activity because it allowed them to create an App from scratch. Multiple-choice tests were then administered to assess content learning (sustainability education and knowledge of forms of energy waste reduction). The results of the tests confirmed that students at the end of the activities: • learned the fundamental concepts of coding and programming; • designed and produced an app for smartphones; • improved their ability to work in teams, analysis, problem solving and design thinking; • knew the essential aspects of a sustainable life model; • developed a more critical attitude towards environmental and energy waste issues • experimented more reflective and constructive approaches in the relationship with nature and the use of energy sources

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

To give students the satisfaction they deserve for having created an APP on their own from scratch, I suggest choosing an event on the topic to give them the chance to share the results of the activity and showing the App to stakeholders. We have chosen the ONU and WWF Climate Action day online event , but also fairs, conferences and virtual schools meetings such as in Etwinning space, can be the right scenarios to make this experience available and replicable from the others.

Author: Emma Abate

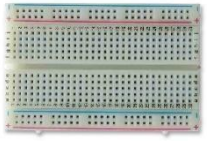
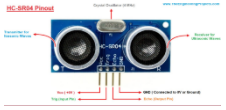
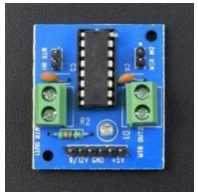
Country or region: Italy

Learning Physics Through Gamification

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	This lesson plan aims to bring out a maximum number of innovative projects from a lesson by the active participation of students using a variety of digital tools. This lesson plan explains how all the concepts in the chapter 'Force and Pressure' can be learnt through the activities they perform especially through gamification and other digital tools like Padlet, code.org, Google slides, Google forms, scratch, We video, Bitmoji, Audacity, and a master learning app –STEM A LAB in which all the above mentioned tools can be incorporated.
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	These activities are meant for Grade VIII Lower Secondary (12 to 16 years)
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstations etc.*	All the activities are time bound which has to be performed in a step by step manner to score maximum Reward points thereby developing a healthy competition and motivation among students.
Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	Preparing students to 4.0 workplaces and innovation. • Objective 1 : Students are given the opportunity to practise as a scientist by exploration –Claim, Evidence, Reasoning method (IBSE) • Objective 2: Students acquires scientific knowledge of the concept or theory involved and perform coding.,

	• Objective 3: The student develops the skill to draw schematic diagrams which helps in proper connection of hardware components, skill to build a prototype and coding skills. • Objective 4: The student develops empathy for the fellow beings and a positive attitude to solve any problem they have to face in future.
Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	Module 1 Materials required Arduino UNO board,  breadboard,  Ultrasonic sound sensor HCSR04,  Motor driver,L293D 

jumper wires, 

DC MOTORS 

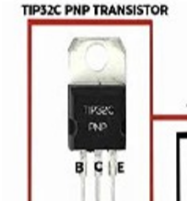
9V battery 

Laptop 

Module 2

(a)
Prototype of sensor based hand sanitizer dispenser
Materials:
PROXIMITY SENSOR,

TIP32C PNP TRANSISTOR,



USB Cable

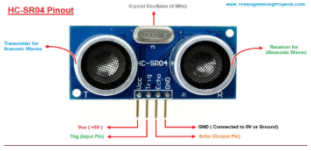
, 1 K Ohm resistor, 

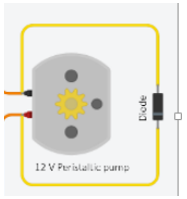
Mini Submersible Water pump,

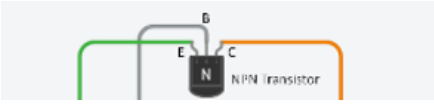
sanitizer bottle

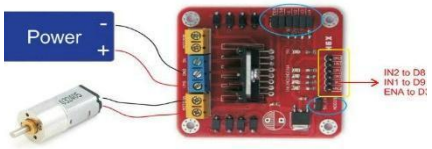
(b)
Automated Hand sanitiser

- Arduino UNO 

,Ultrasonic sensor HCSRO4, 

PN junction diode IN4007,12V Peristaltic pump 

	, NPN Transistor,  Laptop  MODULE 3 WALL CLIMBING ROBOT (a) For making a simple prototype Materials required: 45 rpm , 12 V Gear motor  Air suckers  Duct Fan  Acrylic sheet as the base.  (b) WALL CLIMBING ROBOT USING ARDUINO ARDUINO UNO  L298N MOTOR BOARD

	 MICROMOTOR1000:1 6V  JUMPER WIRES  LAPTOP 

Other

The lesson plan explains how the whole lesson can be completed using GAMIFICATION leading to innovations. This gives a chance for them to learn Robotics and use IoT in their projects thus familiarising themselves with the I 4.0 technologies at an early age. Though the lesson plan seems to be lengthy it needs to be completed within three months. But the experience they gain, the time they invest in learning becomes an asset for them. By cultivating a competitive spirit in them to do the projects by making use of the Reward point system they all become self-motivated. So any teacher wants to replicate the lesson in their class, I assure you full support. In my class the coding and programming is done by collaboration among students – by peer teaching and learning. It may seem to be non- achievable but I have the proof presented before you how the students of my class took up the challenge. It is attitude that makes a big difference.

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below.

For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

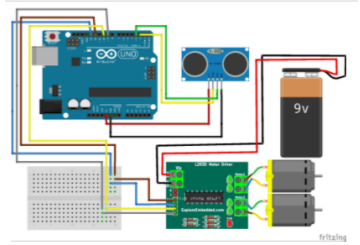
Method	Details and description *Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.*	Time *Approximately, how long does this part of the lesson plan take?*
Content-language integration method (presentation using Google slides/ Visual programming using scratch or by using audacity)	Chapter: Force and Pressure Grade VIII The whole chapter is divided into three modules which can be completed in a time bound manner ensuring tangible outcome of the concept learnt in each module using gamification. MODULE 1 TASK 1 TOPIC: Force-A push or a pull .The students are divided into groups of three. The concept 'Force' is introduced through the story of Jaggu's grandmother who finds it difficult to push a loaded trolley after shopping at the mall. It creates an important value – empathy in the minds of the students to find an alternative method to make the trolley move without manually pushing or pulling it. Jaggu's grandmother was fond of shopping. Jaggu used to accompany his grandmother to the shopping mall. Many times he had seen old people struggling to pull the trolley when fully loaded more than 15 kg and move forward At times it becomes necessary for them to turn the heavy trolley to a particular direction. Jaggu felt sad. He wanted to help his grandma and such old people. He started thinking. Can we make a trolley move in the way we like without pushing or pulling it manually? Can you help Jaggu? 	(1 month duration for each Module) Total: 3 Months
Gamification	Teacher has to divide the whole process into various steps as follows.	

STEP 1: Thorough study of the problem to be solved and to conduct a survey to find whether more people need a solution for the same problem
TIME ALLOTTED: 1 day
TOOL: Google form and compilation of data collected by each using Google sheet and upload it in STEM A LAB.

REWARD POINTS

Timely submission : 30
Late submission : Reduce 5

STEP2 : Study the existing solution to the problem, its principle of working, components used and their specifications and schematic diagram.



TOOL: Each member of the team prepares and uploads a presentation of the task using BITMOJI and discusses it with the teacher on G meet for clearing any doubt.

REWARD POINTS
Timely submission :30
Late submission:Reduce10

Step 3: Coding
The students who are good at coding prepare a video demonstrating the steps to be followed while coding and the YouTube link of the same is shared in the class.
.

	REWARD POINTS TIMELY SUBMISSION : 40 (30 for coding and 10 for updating the progress in STEM A LAB) Bonus of 30 POINTS for the student who demonstrates coding Late submission: Reduce 10 Code: https://docs.google.com/document/d/1orOTsJheRpKPnWlSPioK16Dbx-3kHL5KqlZHWINuKHk/edit?usp=sharing STEP 4 Make a prototype and test it. TOOLS: Video recording of assembling the prototype and working of the model using Wevideo. REWARD POINTS: Timely submission of the prototype made:40 Late submission: Reduce 10 .	


HEMANG G PAI , the coder.

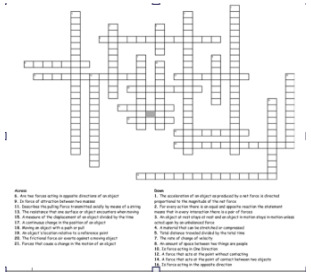
STEP 5: Final submission of the project and its presentation using digital tools

REWARD POINTS

TIMELY SUBMISSION:50
Bonus:10
Team can present it before the head of the school and other staff which serve as a source of motivation others .
Late submission :10

ASSESSMENT:

1. DIGITAL PORTFOLIO-showcasing the entire process to be uploaded on STEM A LAB.
2. The score obtained in Pre-assessment, Understanding questions after every topic done with the incentive of reward points (20M) and Post-assessment questions in STEM A LAB helps in self assessment for the student.

	   3. Google forms https://forms.gle/FTMMFcDjxpEp4Jze9 4. crossword puzzle  TOTAL REWARD POINTS :250 (MODULE 1)	
CLIL STORYTELLING A story making competition using Visual programming (SCRATCH)	MODULE 2 TASK 2 TOPIC : LIQUID PRESSURE PROBLEM STATEMENT OR PHENOMENON Jaggu's grandfather owns an antique shop in the heart of the town frequently visited by many usual customers. With the outbreak of COVID-19, the shop was left closed for months. After the lockdown period the shop was again open strictly adhering to the social distancing norms put forward by the government. One day Jaggu went along with his grandfather to the shop. He noticed that the hand sanitizer bottle had to be pressed by each customer. He feared that this would facilitate the spread of	

the disease. He thought very deeply about coming up with a practical solution to help his grandfather. Can you help Jaggu?

STEP1:
TOOL: Each group presented their story prepared in SCRATCH using STEM A LAB

REWARD POINTS :

Timely submission using scratch:20
Timely submission but not used scratch:10
Bonus points for the first team to present:10
Late submission : Reduce 5

STEP 2
Conduct a survey to find the places where an alternative solution is inevitable. Example :Foot operated hand sanitiser dispenser

TOOL: Google form and consolidation using Google sheet

REWARD POINTS
Timely submission:20
Bonus points for early submission :10M
Late submission: Reduce 5 marks.

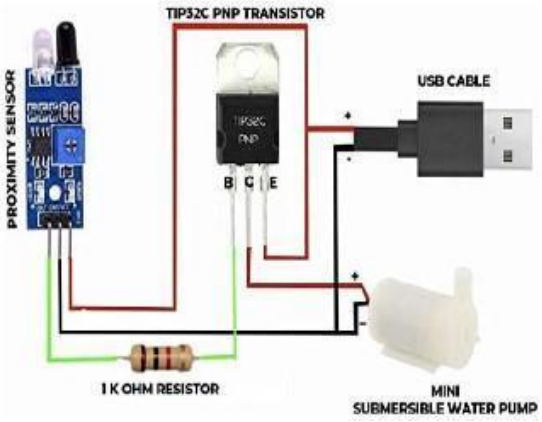
STEP3

A group discussion on ''COST EFFECTIVE INNOVATION TO REMOVE APPREHENSIONS ABOUT USING HAND SANITIZERS KEPT IN PUBLIC PLACES"
TOOL-G Meet platform.
PADLET

The main points of the discussion are digitally presented using any tool like Adobe post or flyer.

REWARD POINTS
Timely submission:30
Late submission : Reduce 10

STEP 4
MAKE A PROTOTYPE
The solution put forward by one of the team was to use a sensor to sense the presence of a hand and dispense the liquid.

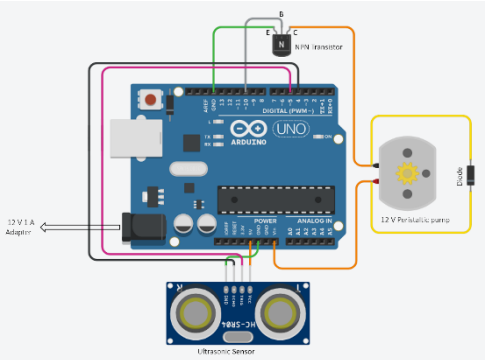


TOOLS: Video recording of assembling the prototype and working of the model using Wevideo

REWARD POINTS
Making of the prototype:50
Timely submission and updating the progress in STEMLAB :10
The team who first completes the work is given a reward point of 20. The team can present it online be
whole class.
Reduce 10 M on late submission.

Link of the video done by ABHISHEK N ANITH- the coder
https://drive.google.com/file/d/1qBptcUcZUAf-5UcdJXEz0uz1p1r1VV7c/view?usp=sharing

STEP 5 (CHALLENGE)
To make an automated hand sanitizer dispenser using arduino,



REWARD POINTS :
Timely submission:100

	ASSESSMENT: 1. Pre-assessment . Understanding questions from each topic and post-assessment is done using STEM A LAB. 2. Reward point of 30 is given to students who complete the understanding questions systematically. 3. Formative assessment methods like Google form, Google docs, feedback form are also used. TOTAL REWARD POINTS:300 (MODULE 2) MODULE 3 TASK 3 TOPIC :ATMOSPHERIC PRESSURE The students are divided into groups of three. The concept of atmospheric pressure is introduced through a story of Jaggu and friends going to his father's office and finding the glass walls of the multi-storeyed building full of dirt. On asking his father Jaggu comes to know about the reality of the non -availability of skilled workers to do life risky jobs. He wants to find a solution to this problem	

https://scratch.mit.edu/projects/443941384

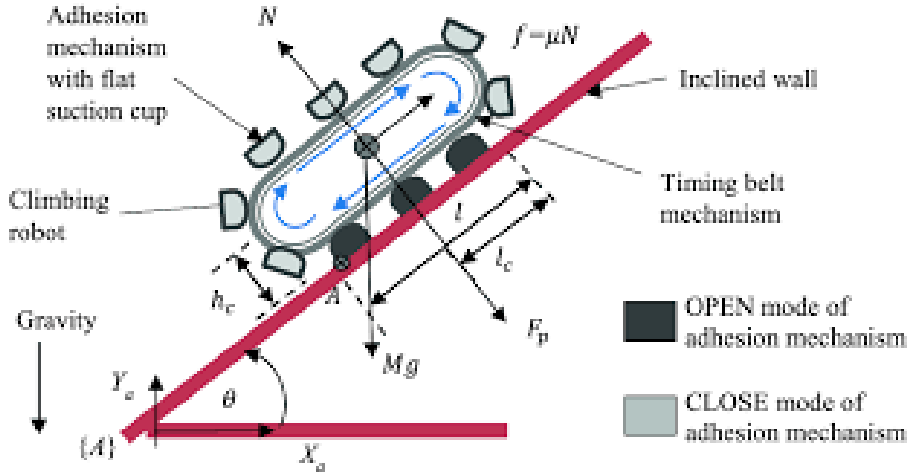
STEP 1
The students are asked to frame a story in scratch to introduce the topic.
Tools visual programming in SCRATCH.

REWARD POINTS
Timely submission::30
The first team to develop a sensible story related to the topic and uploaded to STEM A LAB is given an additional 20 points
Late submission (uploading of story): Reduce 10 .

STEP2
The students will conduct a survey to find the severity of the problem.
Tool: Google form and google sheet to consolidate the data.

REWARD POINTS
Timely submission:30
Late submission.: Reduce5

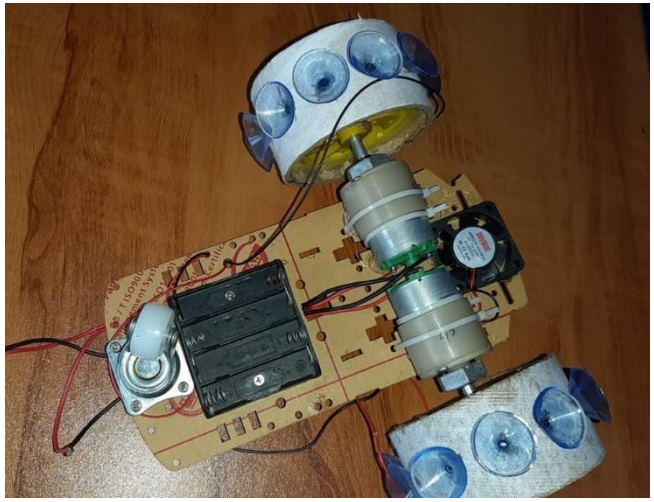
STEP 3
Study the existing solutions, working principle, components used, specification of components, and schematic diagram.



Update the findings of their investigative study (IBSE)in the STEM A LAB in the form of a presentation using BITMOJI where each team member has to explain at least one slide prepared using their BITMOJI
A group discussion with the teacher and group members to clarify their doubts is done on G Meet.

REWARD POINTS
Timely submission:50
Late submission: Reduce 10

STEP 4
To make a simple prototype and test it.



One of the teams came up with a wall-climbing robot using Biomimicry (wall climbing lizard).

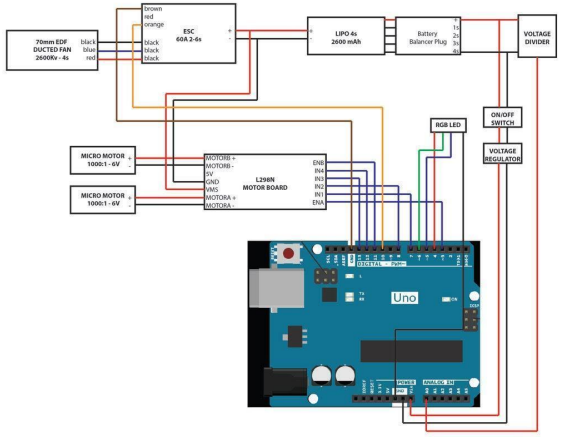
NIYAL B PATTELATH & ABHISHEK N ANITH demonstrating their prototype of a wall climbing robot

https://drive.google.com/file/d/1xxVwDaDn9e2SZ-4wG699lWZkFvgNSkvB/view?usp=sharing

TOOL: Video recording of how the prototype works and the explanation using Wevideo.

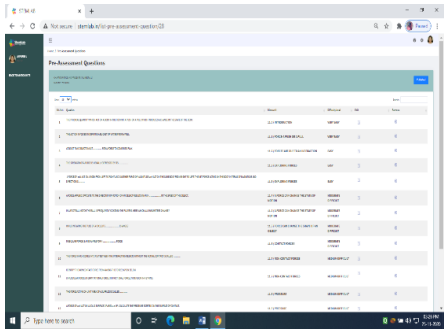
REWARD POINTS
Timely submission:50
Bonus point :20
(for the group which presents the idea first)
Late submission: Reduce 10

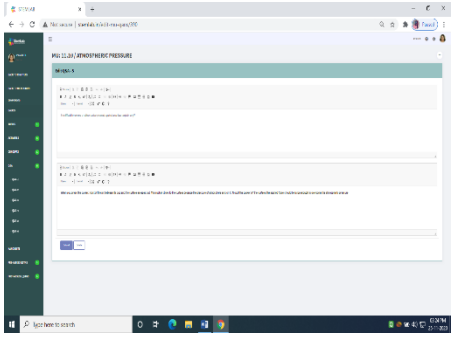
STEP5
To make an automated wall climbing robot (Challenge) using Arduino

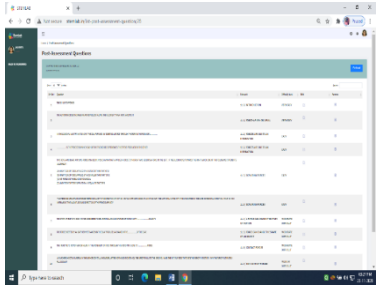


REWARD POINTS
Timely submission:150
Bonus points :30
(for the team who first demonstrates it.)

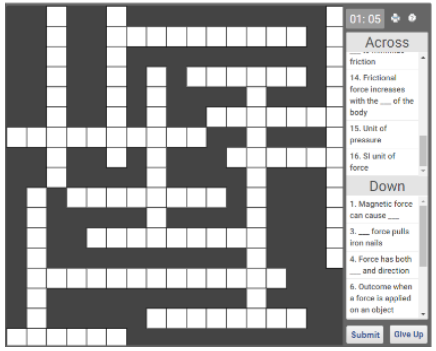
	TOOL: Wevideo to record the demonstration. STEP 6 FINAL PRESENTATION before the whole class on G meet using Google slides(BITMOJI) REWARD POINTS:50 TOTAL POINTS:450 (MODULE 3) ASSESSMENT: 4. DIGITAL PORTFOLIO-showcasing the entire process to be uploaded on STEM A LAB. The score obtained in Pre-assessment, Understanding questions after every topic done with the incentive of reward points (20M) and Post-assessment questions in STEM A LAB helps in self assessment for the student.	







Crossword puzzle



Google form

	https://forms.gle/XNzcFqv8Aa2goo129 REWARD POINTS: OVERALL POINTS FROM THE WHOLE LESSON :1000 The student who scores Maximum Individual points is given the badge :INNOVATOR CONCLUSION Through project based learning we can connect education to industry, develop the skills they need to excel at their workplace thus leading them to STEM CAREERS. ……..	
4. Dissemination	Disseminate the students' experience and work during ONU and WWF Climate Action day online event	1 hour

Blended and remote learning environments

The activity works much better in a blended learning environment as students can interact more freely and share their thoughts and express their opinion. In offline teaching environments teachers can interact and help the teams to complete the project in advance. It works in both environments well. Tools required are specified against each activity.. A motivational speech about the necessity to be digitally competent will help to prepare them mentally to take the project as a challenge and complete it successfully.

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

Nothing is impossible. If we are determined everything is possible.

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	Students are asked to bring innovation (something unique) in the product they have to make which is not seen in existing solutions of the problem and plan accordingly. To learn coding easily in Arduino, I suggest Tutorials by Paul Mc Whorter
Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	• There is a feedback form in STEM A LAB to be filled by the student after every lesson which conveys whether they enjoyed the lesson and which part of the lesson was found more interesting and why. • A Google form self -assessment is sent to students which rate the effectiveness of their learning on a five point scale.

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

I would like to see these activities replicated by all the teachers

Author: Jayasree L.

Country or region: India

Create Measuring devices with Micro:bit

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	Using Micro:bit in lessons is a fun and easy way to create interesting pieces. During this lesson, students will use and code micro:bit to create various measuring devices - timer, compass, thermometer, metal detector. Students will learn to code, the teacher will be able to integrate knowledge of STEM - Information and communications technology (ICT), Coding, Math and Physics.
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	Lower Secondary (12 to 16 years)
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstations etc.*	Activities take place in a computer classroom. Students use computers, the internet, micro:bit devices. No special preparation is required for the room.

Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	Objective 1 • Deepens knowledge of units of measurement and measuring instruments, is able to create a program of measuring instruments algorithm with BBC micro: bit; Objective 2 • They would gain the skills to perform a series of measurements with a device (micro:bit), measure the results obtained with a specific device and compare them. Objective 3 • Gain problem-solving, critical thinking, and creativity competencies: students will be involved in real-world data to solve significant problems. Objective 4 • Will develop collaboration and communication skills: students collaborate in a group, agree with others on role sharing, discuss and read a report.
Materials *Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.*	Offline: • Printed Cards for us, examples of Program Blocks, PC's, BBC micro:bit, mini speaker, ruler, satin, mechanical or electronic clocks, compass, building spirit level, magnet, paper, notebook, pencil. Online: • https://padlet.com • Microsoft's MakeCode editor https://microbit.org/lt/code/

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

Method	Details and description	Time
	Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.	*Approximately, how long does this part of the lesson plan take?*

1. Before the activity	• Students are distributed into groups of 2 or 3 persons. • Student groups receive one of the tasks: timer, thermometer, spirit level, angular gauge, compass, metal detector. • Groups explain the task, provide links with examples, allow the web to find examples themselves.	5 min
2. Discussion	• The teacher asks students to remember the sizes (time, path, temperature) learned in class 6 (or 7), devices for measuring them and in which situations they can be used in practice (examples from experience). • Reminds how the calculated velocity (measuring the path and time using the formula v = s / t or speedometer), as measured by the angle, reminds us how the compass of the Earth's magnetic field can determine the direction of the world (if not said by the students), shows compass, magnet. • Everyone is asking a problematic question (What kind of builders in their work use a device that allows you to build buildings exactly and for what? What should be the angle between the house walls and horizon?)	10 min
3. Coding	• Student groups in a program simulator compile team blocks, record the program into their micro:bits, test how it works. https://microbit.org/lt/code/	20 min
4. Research and practice	• Group representatives present their device, explain what they measure, share on PADLET how they were doing, what problems they encountered. • The teacher reminds students of the units of measurement (time, mass, distance, speed, etc.), their amplification and crushing, and who needs it.	10 min
5. Experiment	Groups perform measurements on the device they are producing and note the measurements in the notebook / paper: • Having a programmed "timer" - count the number of your heart beats per minute, Determine how fast you have been able to go and put on the corridor. Using the clock, compare the accuracy of the device you are making. • With "thermometer" - with micro: bit to measure the temperature in the classroom, corridor, your palm, etc. Compare the accuracy of the device (microbite) with the thermometer readings.	25 min

	• Those with a “spirit level” -find out whether benches, chairs, etc. can help levels in the classroom. things to confirm or deny using a building spirit. Grading with angles (0-90 degrees). • With “metal detectors” - find metal objects in the classroom that can be detected by a metal detector. This is confirmed or denied by using a permanent magnet, magnets. • Learned "compass" - to determine the direction of the world. Determine where, in relation to the current situation (yard, class), a building, a wardrobe, a board or the like is indicated. Confirm or deny this by using a compass.	
6. Presentation	Presentation of group measurement and conclusions about measurement accuracy. Each student speaks - what kind of instrument used, what measure it measured, what units measured, how accurate the measurements were, what difficulties they encountered and so on.	15 min
7. Student feedback	Discussion of measurement errors and precision errors: • What would be if we missed the area of the plot? to lie flatly on the wall of the house? Invalid flight timetable?	5 min
Blended and remote learning environments		
It is difficult to repeat this activity in a blended learning environment (both online and offline) or in a distance learning scenario (online learning). However, this can be adapted to both environments with special preparation in advance. Students studying online at home must have a micro:bit device at home. This device can be borrowed by the school or purchased by parents. Students must have beginner coding knowledge and skills. The teacher must use an online app for distance learning (ZOOM, MS TEAMS etc.) with the possibility to group students into virtual rooms.		

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

Teaching 12-13 years age students are better off offering them all to encode one device - a compass, timer or thermometer. For students 14-16 years age can be given to each group to code a different device.

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	Online teaching material: https://www.youtube.com/watch?v=HJ2jBW_BMpk https://www.youtube.com/watch?v=HJ2jBW_BMpk https://www.youtube.com/watch?v=tzK1AKUiGy0&t=359s https://www.element14.com/community/community/stem-academy/microbit/blog/2016/05/26/10-bbc-microbit-projects-in-ten-days
Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	

Other

Are there any comments or details you would like to add regarding this section, which would facilitate the replicability of the lesson plan? Write them below this text!

Author: Jolanta Leonavičienė

Country or region: Lithuania

Trafficoding

1. Preparing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion

Brief description *How would you summarize your lesson plan in a Tweet? In two or three lines briefly state the aim of the activity, the topics it covers, and the tools used.*	The aim of the lesson plan is to teach traffic education and coding principles. Through the use of coding exercises, unplugged activities and the adoption of gamification principles, students get to know the basic road signs, as well as learn to code with Scratch.
Age group *For which age group is the activity recommended? You can either narrow it down to a concrete age, or use the following categories: Preschool, Primary Education (6 to 12 years), Lower Secondary (12 to 16 years), and Upper Secondary (16 to 18/19 years)*	The lesson plan is recommended for Lower Secondary and Upper Secondary. Depending on the age group chosen, the activities could be differentiated.
Learning space *In what type of room or space should the activity take place? The classroom, the computer room, the gym, at home, etc. Does the space have any requirements or need any preparations? For instance, closing the curtains for a projection, or moving desks to free space, creating different workstations etc.*	The lessons take place at the classroom and the computer room, depending on the type of activity that takes place at any specific time. Regarding the classroom activities, some rearrangement of the desks may be required.
Learning Objectives *What are the goals of your lesson plan? Please, phrase them from the point of view of the learners: the knowledge learners would acquire, the skills they would gain, and the attitudes they would develop. Adhere to the SMART principle as much as possible and try to keep it simple with no more than four objectives.*	The students: • Learn the basic road signs and their meaning • Understand the importance of respecting the road signs when driving, cycling or even walking • Redefine their attitudes by adopting a responsible stance when on the road • Enhance their coding skills in particular and understanding of the algorithmic way of solving problems in general

Materials	
Which materials are required to carry out your lesson plan? Please, keep in mind that the less materials and the more affordable they are, the easier it will be to replicate your lesson plan. You can also list optional materials that are not required to successfully complete the lesson plan, but that would add value to the lesson.	Regarding materials, the following will be required: • Computers • An interactive board for an introductory presentation If not possible, the following could be used used to replace a computer room that does not exist: • Artistic and craft material, like crayons, scissors, cardboard paper, etc. to create unplugged games instead of code games in Scratch • Arduino and/or Raspberry Pi kit(s)

2. Developing the Lesson Plan

In order to replicate your lesson plan, other educators need to clearly understand each step of the process. Please, use clear language, add the necessary details, and make sure that a person who is not familiar with your teaching context and methods is able to replicate the lesson plan. We recommend dividing the lesson plan into steps, and to detail each step in one row of the table below. For instance, a simple lesson plan can be divided into an introduction, a game, and a debriefing discussion.

Method	Details and description *Provide details of the content of this activity. make sure that the lesson plan can be replicated by other educators by being detailed and using clear language. For instance, describe which materials are being used, whether students work individually or in groups (and the size of those groups), what is the teacher doing, which instructions are the students given, what contents are being covered, etc.*	Time *Approximately, how long does this part of the lesson plan take?*
1. Initial presentation	• The teacher begins by introducing the subject, clarifying the terms that will be used throughout the lesson, as well as presenting some statistical numbers to grab the attention of the students.	15 min
2. Discussion	• Students are encouraged to share good and bad experiences when on the road walking, running/exercising, cycling/skating and/or as passengers on a car/bus/etc. Through these discussions, students are encouraged to think about who acted/reacted well and who did not, as well as what might have been some disastrous consequences if things have followed a different path.	30 min
3. Main presentation	The teacher presents the basic road signs through an interactive presentation on the whiteboard. Their meaning is exemplified in a number of ways and means: through a text description, graphical depiction	20 min

	(e.g. a crossroad with a car, the relevant sign and an arrow which shows where the car is allowed to go, etc).	
4. Gamified assessment	Students are presented with a series of interactive assessment exercises in the form of traffic games where they are shown different scenarios with cars and road signs and they are asked to identify what the correct movement of each vehicle is.	25 min
5. Coding exercise	Based on the games the students where shown and played with in the previous activity, the class moves to the computer lab, they are divided in teams of 3-4 and they are asked to design and code on Scratch a game of their own. Students are given all the necessary sprites/images that will be required. Initially, they are asked to work collaboratively and on paper to design the activities, these are presented to the teacher who in turn inputs his own ideas, offers advice and/or guidance, as well as assistance in problems the teams face.	45 min
Blended and remote learning environments		
Given that much of the presentation material, assessment games and learning outcomes are in the form of digital materials, it goes without saying that some (or all) of these could be done in an online learning environment. Depending on the choice of the teacher or the specific circumstances, a blended approach or a fully remote scenario could be adopted. Regarding tools and preparations, the learning material would need some type of learning platform (e.g. Moodle) where they could be uploaded and accessed by the students. Depending on the preferences of the teacher, a synchronous means of remote education could also be used, e.g. for the two presentations or the discussion. This would add to the interaction potential of the scenario, otherwise the whole discussion part could be performed asynchronously in a forum.		

3. Follow up of the Lesson Plan

This section is optional, as not every topic or activity has materials available to complete this. However, we encourage you to try to find materials for follow up and to suggest an evaluation method of the lesson plan!

Follow material and/or homework *Help learners complete their learning process by suggesting materials the educator can suggest them to read or work on. This can be readings, exercises, websites, a more challenging level of the activity carried out in the lesson plan, etc. If you share any external resources, make sure you have the rights to share those resources.*	Regarding follow up, the Scratch games developed by the teams could be given to all students, whereas they could enhance them by including more functions, more advanced interaction, etc. Since traffic education is a major theme in primary and secondary education, there are a number of textbooks that the students could be directed to in order to learn more about the subject. As a more advanced “homework”, the students could be given one or more of past year traffic license papers, in order to evaluate their readiness. Since it is most certain that they will not do as well, as well as

	that they will be introduced to more advanced topics and road signs, this could fuel discussion, questions from their part, which inevitably leads to increased interest and better understanding of the complexity of the topic.
Evaluation *You can suggest an activity or an exercise that the educator can propose to their students to evaluate the lesson plan. This does not refer to your evaluation of the lesson plan.*	Regarding evaluation, this could be in the form of a questionnaire, which should include not only closed but also open-ended questions as well, for students to offer their proposals. In addition, a small amount of time could be devoted for the students to offer their opinion on the lesson plan orally. Another idea could be to use an online notice board tool like Padlet where students can express what they feel they have gained from the lesson plan, which could in turn be used in conjunction with the lesson plan's intended learning outcomes in order to evaluate its effectiveness.

Author: George Rouvas

Country or region: Thessaloniki, Greece

EduRegio: Digital Regions for Education Erasmus+ project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

EDU Regio 2 3.0 School and Classroom Kits
Actions for Schools

Participation in EU Code Week
Integrate coding in curricula

CodeWeek.

Project EduRegio: Digital Regions for Education

Agreement number: 2019-1-ES01-KA201-065608

Intellectual Output 2: School & Classroom Kit

Project website

fcl.eun.org/edu-regio

Digitally Competent Teachers

@Eduregio1 #EduRegio

Generalitat de Catalunya Departament d'Educació
European Schoolnet
Junta de Castilla y León Consejería de Educación
Provincia Autonoma di Trento
GÖTEBORGS REGIONEN
CIM RC COMUNIDADE INTERMUNICIPAL REGIÃO DE COIMBRA