CodeWeek
Build your digital future

Practical Skills - VET Toolkit

Deliverable 4.4

A Practical Toolkit for Educators on organising Vocational Educational lessons and activities for Code Week

Funded by the European Union

Table of Contents

Funded by the European Union

Funded by
the European Union

About the Code4Europe Project

With 2030 rapidly approaching and the digital decade target of 20 million ICT professionals in Europe still far out of reach, now is the time to bring together all of Europe's digital skills stakeholders from Youth Education, Civil Society, Digital Industry and Government to implement innovative new approaches to the digital upskilling of young people.

Code4Europe envisions to create a hugely successful, sustainable, and scalable digital education and upskilling initiative that will empower all young Europeans to embrace digital technologies and pursue a highly rewarding career in Digital. We intend to reach this goal by reimagining and growing EU Code Week, giving it a mandate to

- drive real change in digital education throughout Europe
- a focus on vastly increasing the number of young people who choose digital careers, and
- an emphasis on engaging the entire digital skills ecosystem in a common mission to close the digital skills gap in Europe by tackling the problem at its source.

Code4Europe will massively scale EU Code Week aiming to impact 25 million young people over the period of 2 years (01/07/2024 – 30/06/2026). We will maintain and build on the grassroots nature of the initiative, embrace and empower the existing Code Week community, and stay fully aligned with its core values. In order to implement our vision, we have created a Consortium of 45 committed and passionate organisations representing all the Digital Education & Skills Stakeholder groups needed to grow EU Code Week to unprecedented levels. Led by Junior Achievement Europe, Code4Europe will unite European Education and Digital Skills Communities within one integrated EU Code Week programme.

Scope of this Deliverable

Work Package 4 Careers in Digital of the Code4Europe project aims to achieve the following objectives:

- Encourage millions of young Europeans to study STEM subjects and pursue a career in Digital.
- Develop a programme to help Universities arrange school visits & attract students into IT.
- Defining Career Pathways into Digital and organising career days for students, parents & teachers.
- Creating a wide network of Inspirational Role Models from Industry & Education across Europe.
- Define and promote VET Training and Apprenticeship pathways into different digital careers.
- Promote Digital Entrepreneurship pathways to inspire young people to create Tech start-ups

This deliverable focuses on developing a toolkit for VET education to support teaching and learning activities for students between 13 and 18 years of age. The toolkit leverages the Creative Learning approach to help students develop digital skills, acquire social and emotional competencies, and stay motivated to pursue careers in the digital field.

Funded by the European Union

Links to Resources

Direct links to the resources	
Create Cards and Educator Guides	
1. Create a 3D project with Tinkercad	
a. Create Cards	>> Click
b. Educator Guide	>> Click
c. Tinkercad 3D Quick Start Guide	>> Click
Create an inclusive learning environment	
1. Create your Playground	>> Click
Cisco Networking Academy courses	
1. Introduction to IoT	>> Click
2. Introduction to Data Science	>> Click
3. Introduction to Cybersecurity	>> Click
4. Introduction to Modern AI	>> Click
5. Digital Awareness	>> Click
6. Computer Hardware Basics	>> Click
Cisco Networking Academy	
1. Become a Cisco Networking Academy	>> Click
2. Orientation Course for Instructors	>> Click

Funded by
the European Union

The context - Introduction

This toolkit has been created as part of the **EU initiative Code Week** and the objective of the toolkit is to support educators to facilitate **VET learning activities** for students between **13 and 18** years of age. The toolkit leverages the **Creative Learning** approach to help students develop digital skills, acquire social and emotional competencies, and stay motivated to pursue careers in the digital field.

To measure success, we ask that all educators record their VET activities on the **Code Week Activity Map** thank you!

The need for the VET Toolkit

In today's rapidly evolving technological landscape, it is crucial to equip Vocational Education and Training (VET) students not only with **technical competencies**—such as coding, 3D modelling, and the Internet of Things (IoT)—but also with essential **social skills**, including collaboration, problem-solving, and creativity. These skills are not just valuable for those pursuing a career in the tech industry but can open doors to a wide range of opportunities across various fields.

To support this vision, the **VET Toolkit** offers a practical starting point, enabling students and educators to explore technology and apply it in innovative and creative ways. While coding, 3D modelling, and IoT serve as initial foundation, **this toolkit is just the beginning! It will continue to grow and evolve, driven by the feedback of those who use it and share their experiences with us—so let us know how it goes!**

Designed as a comprehensive resource for teachers and educators, the VET Toolkit offers **practical tools and approaches** to enrich learning experiences in VET schools and educators across Europe. It acts as a bridge, connecting a wide range of resources and methodologies that foster creativity, inclusivity, and hands-on exploration.

Recognizing the diverse structures and needs of VET institutions across Europe, the toolkit provides **adaptable resources** that support educators in creating dynamic and engaging learning environments for all students.

Funded by the European Union

The Objectives

- **Empower Educators**: Provide teachers and educators with tools and guidance to design and facilitate **meaningful, project-based** learning experiences.
- **Develop Technical Skills**: Enhance students' competencies in various **technical fields**, preparing them for future technological advancements.
- **Promote Inclusivity**: Ensure that **all students**, including girls and those at risk of being left behind, are included and engaged in the learning process.
- **Foster Creativity**: Encourage the use of technology as a **"construction material"** for creative expression and problem-solving.
- **Online community:** Create a **growing community** of VET Schools and educators focusing on tech skills.

Funded by
the European Union

The Values

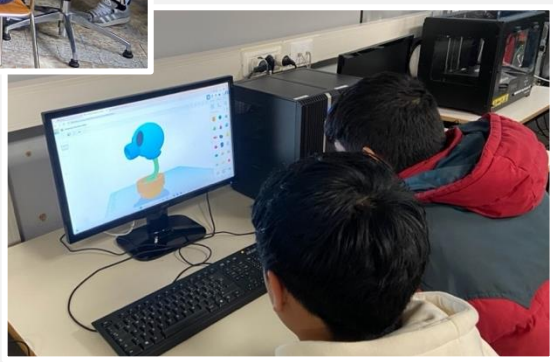
Creating Inclusive and Engaging Learning Environments

To address the diverse needs of VET schools across Europe, the VET Toolkit emphasizes the importance of creating inclusive and engaging **learning environments**. These environments are designed to adapt to different educational contexts and support all learners, regardless of their background or skill level. By promoting diversity, ensuring no one is left behind, and encouraging peer collaboration, the toolkit aims to create a space where every student can find their own path.

A key aspect of this approach is **embracing diversity** by offering flexible and adaptable resources that support the unique structures and needs of each school. Strategies are also suggested to ensure inclusivity and provide multiple entry points into activities to accommodate varying skill levels.

Peer learning is another pillar of the toolkit, as students are encouraged to collaborate, share knowledge, and support one another in their learning journey. **Facilitators** play an essential role in modeling collaborative behavior and guiding interactions to nurture a supportive community.

Here below some photos that show the peer-learning approach encouraged among students



Funded by
the European Union

Educative Guide

This toolkit offers a collection of valuable resources designed to support both **students** and **teachers** in creating **meaningful and engaging learning experiences**. Each component is thoughtfully developed to provide practical guidance and foster creative exploration.

In this section, teachers and educators are guided through a comprehensive **learning journey**—starting with understanding the learning approach, preparing the activity, and progressing to designing, facilitating, and evaluating it effectively. The goal is to empower them to confidently lead dynamic, hands-on learning sessions while supporting students in their creative journeys.

Below are the **essential components** of the toolkit, designed to support educators at every stage of this journey:

- **How to explore the learning approach**
- **How to take your first steps in Tinkercad**
- **How to prepare the activity for the classroom**
- **How to arrange the setting**
- **How to facilitate the activity**
- **How to scaffold students' free exploration**
- **How to evaluate learning through diversity in projects**
- **How to promote continuous and advanced learning**

Funded by the European Union

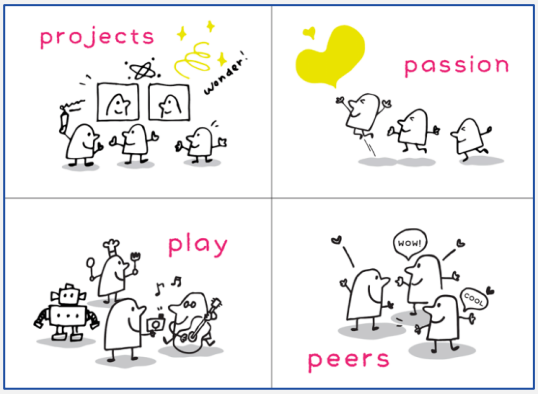
How to explore the learning approach

"Learning is most effective when part of an activity the learner experiences as constructing a meaningful product"

Seymour Papert

Based on the Creative Learning principles from MIT Media Lab!

The VET Toolkit adopts the **Creative Learning** approach developed by the Lifelong Kindergarten group at the MIT Media Lab. This pedagogical framework emphasizes learning through creating **personally meaningful projects** and is anchored in four key principles, known as the **4 Ps**:



1. **Projects**: Create learning sessions in which students can learn while working on **their own project**, in hands-on activities that encourage exploration and experimentation.
2. **Passion**: Allowing students to work on projects **"they care about"**, encouraging them to pursue topics and projects they are passionate about to enhance motivation and engagement.
3. **Peers**: Promoting collaboration and knowledge sharing among students, to build a supportive **learning community**.
4. **Play**: Fostering a playful, exploratory, and open-ended learning environment where curiosity and experimentation drive the process. Through **multiple iterations**, students can refine their ideas, develop new insights, and continuously improve their creations.

If you are curious and want to learn more about **Creative Learning**, you can explore this learning approach directly **here**!

Funded by the European Union

How to take your first steps in Tinkercad

What is Tinkercad?

Tinkercad is a free and intuitive **3D modeling tool**, ideal for learning through practice, bringing creative ideas to life, and express yourself. Designed for students and educators, it can be used effectively in both **in-person** and **online** workshops, making it a versatile option for various educational contexts. It is perfect for beginners but also offers advanced features for creating complex projects.

Tinkercad can be used both on a **personal computers** and on **tablets**, but not smaller devices (it could be difficult to interact with!).

Why Tinkercad?

Tinkercad is much more than a 3D design tool—it is a **creative playground** that fosters exploration, iteration, and collaboration. Its alignment with **Creative Learning** principles makes it ideal for hands-on education.

- **Learn through meaningful projects:** Tinkercad encourages **Project-Based Learning**, allowing students to create projects that hold personal significance *(remember the 4Ps?)*
- **Iteration and continuous improvement:** Each project becomes a cycle of experimentation, where students can refine their ideas and learn through successive iterations, following the natural process of the **Creative Learning Spiral** (**Imagine** => **Create** => **Play** => **Share** => **Reflect** => *Imagine* => ...)
- **Inclusivity and accessibility:** Tinkercad embraces the **low floor, high ceiling, wide walls** principles:
    - **Low floor**: Students can easily get started and create their first project in no time.
    - **High ceiling**: The platform offers opportunities to create increasingly complex and ambitious projects.
    - **Wide walls**: The variety of projects students can create is vast and adapts to their personal interests and creativity.
- **Flexibility:** Tinkercad can be used both in-person and online, fostering a dynamic and accessible learning experience anywhere.

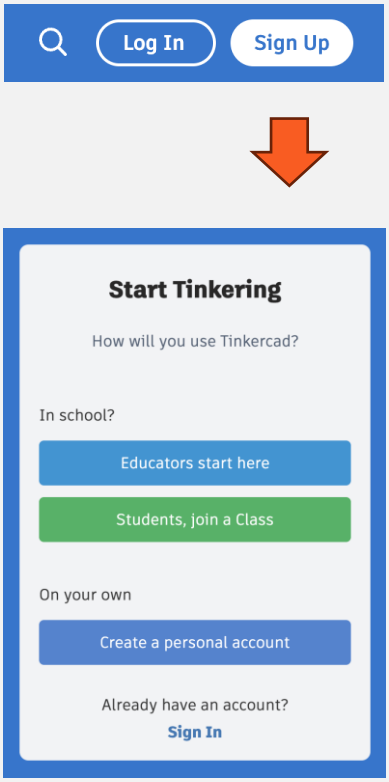
Create your Tinkercad account

- **Where to find it**: Visit the website **www.tinkercad.com**.
- **Is it free?** Yes, completely free!
- **Do I need to register?** Yes, registration is required. Create a personal account to start creating your first project!

How to register:

1. Go to **www.tinkercad.com**.
2. Click the **Sign Up** button.
3. Select **Create a personal account** and follow the instructions.
4. You can log in with your personal account to start creating immediately!

Funded by the European Union



Note for teachers

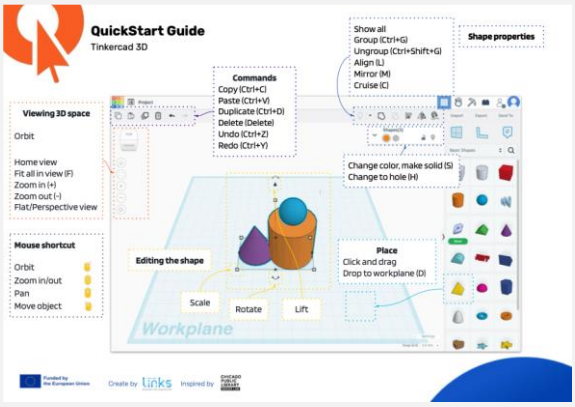
There are also specific options for students and teachers: **Tinkercad Classroom**. This is an ideal solution for managing classroom activities, by providing the students with the shared class link. For more details, you can refer to the **Official Guide to Tinkercad Classrooms**.

Funded by the European Union

Move your first steps on Tinkercad

Are you new to Tinkercad?
Don't worry! Just print out this **Tinkercad Quick Start Guide**!

It is a **cheat sheet** designed to help **beginners**, both students and educators, quickly get familiar with essential commands and navigation in Tinkercad, enabling them to confidently start creating 3D projects.



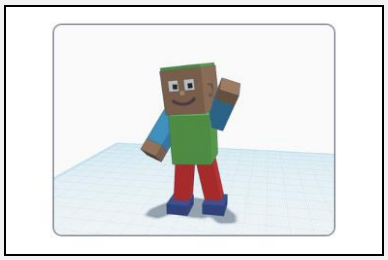
Are you looking for a specific Tinkercad lesson plan?

Click here to explore a variety of **official Tinkercad lesson plans** designed to engage your students in creative 3D projects and support hands-on learning across different subjects.

Click the link below to discover engaging activities and resources:

https://www.tinkercad.com/lessonplans

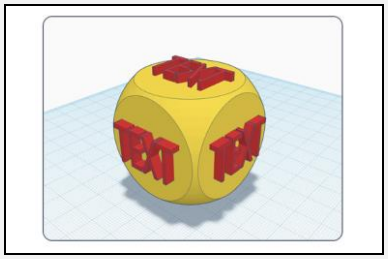
Here are some examples of what you can find:



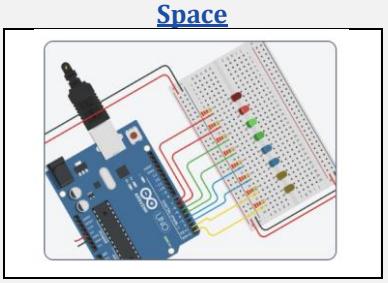
Create Your Own Avatar

Design an Inclusive Play Space

Design Your Dream Room



Design Story Starter Dice



Program an LED Light Show
(Yes! Also with Arduino!)

... and more!

Funded by the European Union

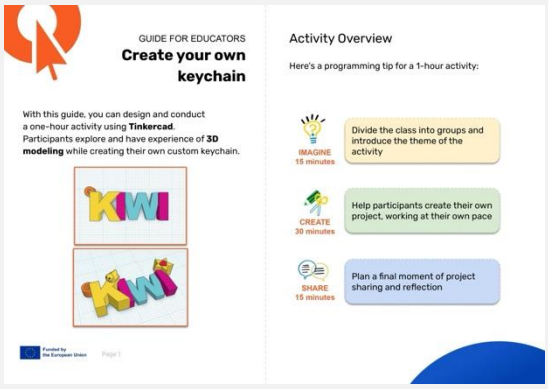
How to prepare the activity for the classroom

Educator guides

Just as students benefit from guidance and flexibility, teachers and educators need suitable support to confidently facilitate creative, hands-on learning experiences. The VET Toolkit includes **Educator Guides**, which provide practical advice and step-by-step instructions for effectively running project-based activities.

- **What are they?**
  The Educator Guides are resources for teachers and educators, inspired by the original **Scratch Educator Guide** format. They offer guidance on facilitating projects, supporting students' creative exploration, and encouraging collaboration within the classroom.
- **Why are they effective?**
  The guides provide a structured plan, helping educators navigate key aspects of the activity—from preparation to reflection—while allowing enough flexibility to adapt to their students' needs and interests.

Educator Guide - Create Your Own Keychain



This **Educator Guide** is associated to this **Create Cards** resource. It includes detailed steps for preparing materials, introducing the activity, and guiding students as they design their keychains using Tinkercad.

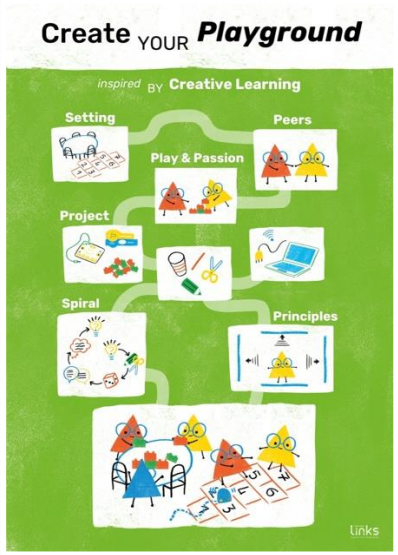
The guide offers tips on fostering collaboration, managing diverse skill levels, and encouraging peer feedback. Educators are encouraged to act as **facilitators** and **co-learners**, promoting an open and inclusive environment.

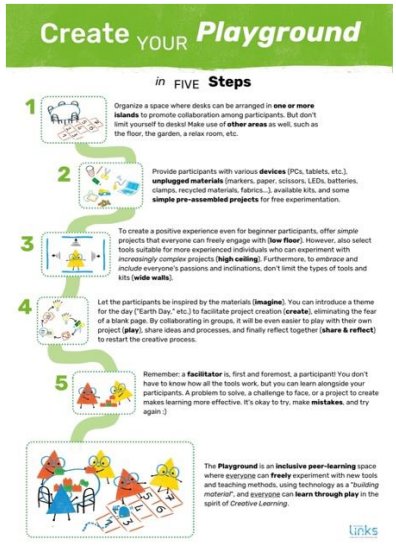
Funded by the European Union

How to arrange the setting

Create Your Playground

- **Learning Environment Suggestions**: This handout offers useful support on setting up a creative and collaborative learning space, whether physical or virtual.
- **Principles**:
  - **Flexible Spaces**: Organise environments where furniture and resources can be arranged to promote teamwork and **free exploration**.
  - **Diverse Materials**: Provide a variety of tools and materials (e.g., computers, tablets, art supplies, recycled items) to cater to **different interests, attitudes and skill levels.**
  - **Inclusive Approach**: Design activities that have a **"low floor, high ceiling, and wide walls,"** meaning they are accessible to beginners, offer challenges for advanced learners, and allow for diverse expressions of creativity.
  - **Facilitator Role**: Encourages teachers and educators to participate alongside students, fostering a community of learners where **the teacher is also a co-creator and explorer**.





Create Your Playground!
>> click here!

Funded by the European Union

How to facilitate the activity

An example of how you can organise your 1-hour lesson

You just read about a few different tools, and you might be wondering how to concretely implement them during your lesson. Although there are different ways in which you can use them, we have put together a sample 1-hour class that is powered by the earlier-mentioned **Creative Learning** approach together with the **different tools** that you can easily download from this toolkit.

- **Before the activity:**
  - Read through the toolkit and find what you believe would work best for your classroom. Let's imagine that you choose multiple tools, so you decide to use **Tinkercad** and Cisco Networking Academy's **"Intro to IoT"** and **"Computer Hardware Basics"** courses.
  - **Read** the **Educator Guide** and **print** out the **Create Cards** and open the links of the respective courses on each computer (you can find the links later in this chapter and at the beginning of this toolkit).
  - Arrange the **classroom setting** to promote peer collaboration, and place at least a set of printed **Create Cards** and a computer per group. If every student has a computer, you can also simply share the Cisco Networking Academy courses with them.

- **During the activity:**
  - Start with a **brief introduction** to the theme or project where you explain what the materials are, where they can be found and what students can use them for.
  - Make a short **demo project**. Involve the students by inviting them to make suggestions or take small steps during the demo. Let their input guide decisions as you work through the project together.
  - Make sure that students understand that the main goal is experimentation, and that **making mistakes** is a natural part of the process.
  - Allow students to work at **their own pace** while providing support when needed (e.g., some students may prefer to use the printed **Create Cards**, others may prefer to explore on their own) .
  - Encourage **peer exchanges** to stimulate creativity and problem-solving. Is a student stuck for a long time on a step? A different student might be able to help with that issue.

- **After the activity:**
  - Facilitate a group **reflection** session where students can share their projects and insights.
  - Ask **reflective questions** to encourage deeper thinking (e.g., *"What did you learn? What would you do differently next time?"*).
  - Collect **feedback** to improve and refine future activities.

- **After the lesson:**
  - **Reach us out** at **info@codeweek.eu** to share your feedback on the toolkit and suggest new themes for future materials!
  - Did your students engage well with the Cisco Networking Academy courses? You can easily **become a Cisco Networking Academy** in the section right above this one and teach the whole portfolio for free!

Funded by the European Union

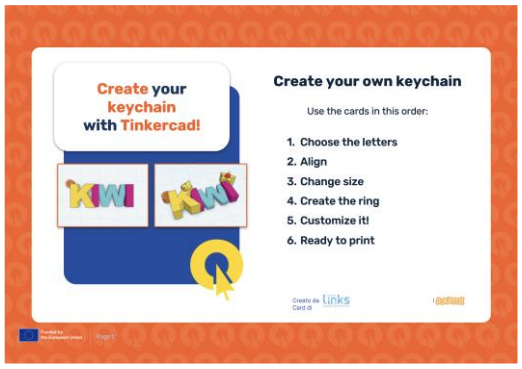
How to scaffold students' free exploration

Providing students with the **right balance** of guidance and autonomy is key to fostering meaningful learning. The VET Toolkit includes resources like the **Create Cards**, designed to support students' creativity while allowing them the freedom to explore, experiment, and personalise their projects.

Create Cards

- **What are they?**
  The **Create Cards** are step-by-step resources **for students**, inspired by the original **Scratch Cards** format. They help students create meaningful projects by using technology as a **"construction material"** and promoting exploration.
- **Why are they effective?**
  The cards provide **just enough structure** to get students started while leaving room for experimentation and personalisation, ensuring they can make each project their own.

Create Cards - Create Your Own Keychain with Tinkercad!



This **Create Cards** resource guides students through the design of a personalised keychain using Tinkercad. Along the way, they will learn essential **3D modeling concepts**, such as navigating the design interface and combining shapes to build custom objects. The students are encouraged to test, refine, and improve their designs as they go. Through this process, they develop problem-solving skills and confidence in their ability to create.

Notes for the Practitioner

We would love to clarify that the **Create Cards** are not intended to be activities or lesson plans. Instead, they are resources that teachers and educators can print and make available in the playground, offering inspiration to participants who may not know where to start. These cards are not step-by-step guides but rather a **source of inspiration**, support and guidance to spark creativity and free exploration.

Their purpose is to **complement the facilitator's role** in guiding the learning experience, fostering an environment where participants can explore ideas at their own pace. Based on our experience and on the feedback from students participating in the pilot in Italy, we have found that materials alone are not enough: peers, facilitators, relationships, and hands-on experiences all play a crucial role in meaningful learning.

To further support this approach, we are considering offering a **teacher training workshop** where educators can experience this hands-on, exploratory way of learning while working on significative projects. Tinkercad, for example, is an excellent tool for both in-person and

Funded by the European Union

online sessions, providing opportunities to engage in meaningful projects while exploring and creating in an open-ended way.

How to evaluate learning through diversity in projects

In a learning environment inspired by ***Creative Learning***, evaluation is not about assessing individual performance but rather the overall effectiveness of the learning experience. One way to gauge this is by applying the ***"Wide Walls"*** principle: observing the variety of projects created by participants.

At the ***MIT Media Lab***, this principle is used as a ***formative evaluation tool***. If the projects produced during an activity are all very similar, it may indicate that the experience has been too constrained, limiting opportunities for personal exploration. In contrast, when the projects are diverse—each reflecting unique ideas, interests, and approaches—it suggests that participants felt free to experiment, express themselves, and follow their passions. This diversity of outcomes is a strong indicator of a rich and open-ended learning environment.

By keeping this perspective in mind, educators using the ***VET Toolkit*** can reflect on their facilitation strategies and consider ways to further ***expand the "walls"*** of their learning experiences. Encouraging personal expression and a diversity of ideas ensures that students are not just following instructions but actively engaging with the content in meaningful and self-directed ways.

Funded by the European Union

How to promote continuous and advanced learning

Free Online Courses from CISCO Networking Academy

NetAcad's introductory classes are the perfect means to combine theoretical knowledge from the courses with practical, hands-on projects to reinforce learning through application. These classes are meant for **anyone above the age of 13**, and all last under 10 hours, so they are perfect for those who are completely new to the topic or need a refresher. Find below a brief explanation of each class and click on the links to enroll as a student! As an educator, you can share the links below to your own students to let them independently work through the course materials.

- **Introduction to IoT**: Offers foundational knowledge about the Internet of Things, preparing students for the interconnected world of technology. **(*>> click here!*)**
- **Intro to Cybersecurity**: Teaches cybersecurity basics to protect the students' personal digital life and gain insights into the biggest security challenges companies, governments, and educational institutions face today. **(*>> click here!*)**
- **Intro to Data Science**: Teaches data science, data analytics, and data engineering to understand how machine learning is shaping the future of business, healthcare, education, and more. **(*>> click here!*)**
- **Introduction to Modern AI**: Helps students learn key AI concepts and get hands-on practice with AI-enabled apps. **(*>> click here!*)**
- **Digital Awareness**: Equips students with fundamental knowledge and practical digital skills that can be applied at home, school or work. **(*>> click here!*)**
- **Computer Hardware Basics**: Explores the fundamentals of computers and mobile devices, the components that comprise them, how they work, and basic troubleshooting tools and techniques. **(*>> click here!*)**

Click here for a full orientation course on all the available Cisco Networking Academy courses and how you can make the most of these materials!

Become a Cisco Networking Academy

Cisco Networking Academy partners globally with **12,100 academies** and **31,300 instructors**, offering a curriculum in 18 languages. There are **many more courses** than the ones outlined in this toolkit, including more advanced levels! Once your school is registered as a Cisco Networking Academy, you will be able to independently exploit this curriculum, use useful teaching tools and you can be supported by our global network of institutions through, for example, teacher training and technical support.
To exploit all the resources offered and gain support from our global network, you can easily **become a Cisco Networking Academy** through the following **link**.
Find out **here** about **data privacy**.

Funded by the European Union

Conclusion

The **VET Toolkit** aims to bring significant improvements to the way technical skills are taught in VET education by integrating creative, project-based learning with practical applications. By embracing the **Creative Learning** approach, educators can inspire students to become active learners, thinkers, and creators, better preparing them for future technological challenges.

Our initial pilot experiences have received positive feedback from both students and teachers, confirming the potential of the toolkit to support engaging and inclusive learning. However, **this is just the beginning! We need your feedback if you experiment with it, and we are happy to hear your ideas—new themes, new topics, and new ways to enrich the toolkit together!**

You can **reach out** at

info@codeweek.eu

Next Steps

- **Resource Expansion**: We are developing additional **Create Cards** and **Educator Guide** on various topics, such as coding, robotics, and advanced IoT projects. Feel free to suggest **new topics you care about!**
- **Feedback Integration**: We would like to receive feedback from more pilot schools in Europe to refine and enhance the toolkit! We cannot wait to **share your experience!**
- **Community Building**: We plan to use the EU Code Week site as an online platform for educators to share experiences, resources, and best practices related to the toolkit. **Stay tuned!**
- **Please record all your activities in our EU Code Week website under "Add an Activity" here – "EU Code Week" this will enable us to measure our success against the objective of inspiring millions of young people with digital activities.**

Funded by the European Union

Appendix

Pilot experiences in Italy

The VET Toolkit was piloted in two **VET schools in Turin**: **Valdocco** and **Agnelli**. These pilot sessions provided invaluable insights into the toolkit's effectiveness and highlighted areas for refinement. During the sessions, students engaged in a 3D modeling project where they created personalised keychains using Tinkercad. The activities were facilitated by educators applying the **Creative Learning** approach, which encouraged exploration, collaboration, and personal expression.

Students responded positively to the experience, particularly appreciating the opportunity to design and personalise **their own projects**. The prospect of seeing their creations materialise as tangible 3D-printed objects added an extra layer of engagement and excitement. This hands-on approach not only sparked their creativity but also **deepened their understanding** of 3D modeling concepts.

Facilitators noted the importance of **flexible learning environments**, which allowed students to collaborate effectively and explore their ideas freely. **Peer collaboration** emerged as a powerful driver of engagement, with students actively seeking support and inspiration from their classmates. However, some challenges were identified, such as maintaining attention during group sharing activities and the need for better technological tools to enhance visibility and focus on the classroom.

Overall, the pilot sessions reflected the potential of the VET Toolkit to transform learning experiences in VET schools. By **integrating technology as a tool for creative expression** and providing a structured yet flexible framework, the toolkit has shown its ability to **inspire students and equip them with essential skills for their future.**

Funded by
the European Union

References

Resnick, M. (2017). *Lifelong Kindergarten: Cultivating Creativity through Projects, Passion, Peers, and Play*. MIT Press.

Learning Creative Learning online course: https://lcl.media.mit.edu/

Scratch tutorials and ideas: https://scratch.mit.edu/ideas/

Tinkercad: https://www.tinkercad.com/

CISCO Networking Academy: https://www.netacad.com/

Funded by the European Union

Tinkercad 3D
Quick Start Guide

Funded by
the European Union

Introduction

The **Tinkercad Quick Start Guide** scaffolding resource is designed as a **cheat sheet**, providing educators and students with a quick, at-a-glance reference to essential commands and shortcuts in Tinkercad. It helps beginners navigate the platform, quickly gain confidence, and engage in creative 3D design projects.

How to prepare

- **Designed for:** **Educators and students** who need a quick overview of Tinkercad's key tools and commands.
- **Preparation:** Provide a **copy of the guide**, either digitally or as a printout, so participants can reference it during the activity.
- **Setup:** Ensure participants have access to devices and a stable **internet connection** to explore Tinkercad in practice.

How to use the Guide

- Use the guide as a **reference** to understand basic commands, shortcuts, and navigation tips.
- Invite students to **refer to it** while working on projects to quickly find the right tools and actions.
- Encourage **hands-on exploration** by using the guide as a support tool, allowing participants to build confidence as they work through creative challenges.

Funded by the European Union

QuickStart Guide

Tinkercad 3D

Viewing 3D space

Orbit

Home view
Fit all in view (F)
Zoom in (+)
Zoom out (-)
Flat/Perspective view

Mouse shortcut

Orbit
Zoom in/out
Pan
Move object

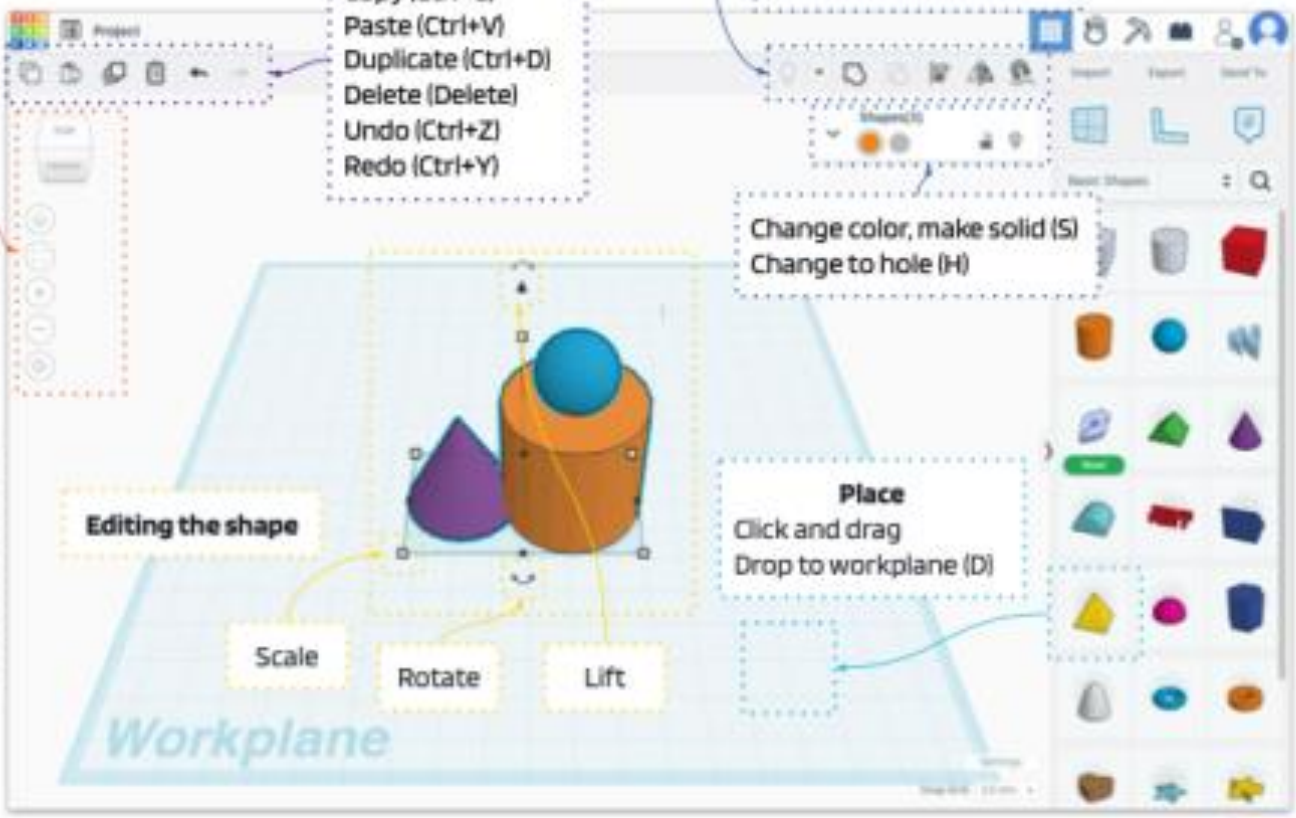
Commands

Copy (Ctrl+C)
Paste (Ctrl+V)
Duplicate (Ctrl+D)
Delete (Delete)
Undo (Ctrl+Z)
Redo (Ctrl+Y)

Show all
Group (Ctrl+G)
Ungroup (Ctrl+Shift+G)
Align (L)
Mirror (M)
Cruise (C)

Shape properties

Change color, make solid (S)
Change to hole (H)



Place
Click and drag
Drop to workplane (D)

Funded by the European Union
Create by links
Inspired by Chicago Public Library

Create a 3D project with Tinkercad
Create Cards

Funded by
the European Union

Introduction

The **Create Cards** are designed as a flexible **classroom resource**, inspired by the **Scratch Cards** format, to guide students through meaningful projects using technology as a construction material. Their goal is to spark creativity and hands-on exploration.

How to prepare

- **Designed for**: **Classroom** settings or **group-based** learning (both in presence and on-line workshop)
- **Preparation**: **Print out** one set of cards for each group of students.
- **Arrangement**: Organise the classroom into **tables**, allowing small groups to collaborate effectively.
- **Registration**: students must **sign up** for Tinkercad using their school/personal email accounts (**click here** for a step-by-step guide!)

How to use the Cards

- Each card provides **step-by-step guidance** but **leaves room** for personalisation and creativity.
- **Encourage** students to modify their projects and experiment with different design ideas.
- **Support** students in sharing their progress and learning from one another.

Funded by the European Union

Create your keychain with Tinkercad!

Create your own keychain

Use the cards in this order:

1. Choose the letters
2. Align
3. Change size
4. Create the ring
5. Customize it!
6. Ready to print

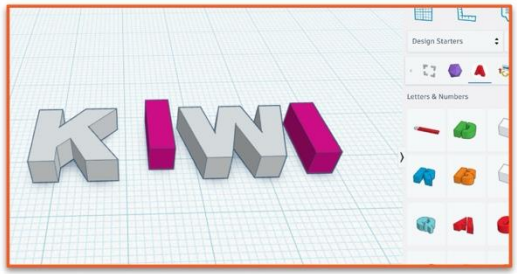
Create by links Inspired by Scratch Card SCRATCH

Funded by the European Union

Funded by the European Union

1. Choose the letters

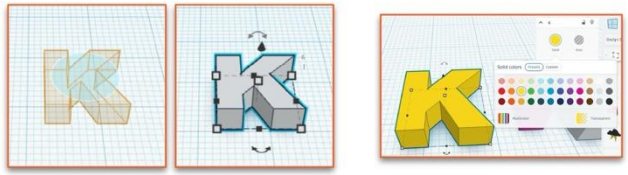
Follow the steps on the side
to get what is represented
in the image.
You can freely modify the project
to your liking!



Choose the letters

Connect on tinkercad.com and create a new 3D project.
To find the letters and numbers, select ***"Design Starters"*** in the drop-down menu on the right.

Choose the letters and **drag** them on the workspace.
If you want to copy a letter, select it and press *ctrl+C*, *ctrl+V*.
Try changing the color too!



How to move around the workspace?

- Zoom in or out from your project by pressing + and -, using the touchpad or the mouse wheel.
  Use  to change the view angle. For precise navigation, press the right mouse button or hold down *ctrl* and *click* to change the view angle.

Funded by
the European Union

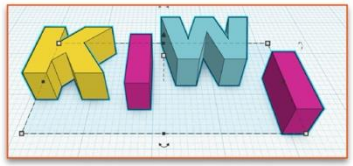
Funded by
the European Union

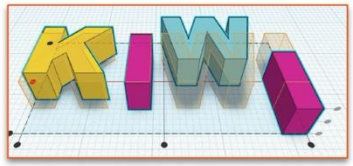
2. Align

Follow the steps on the side
to get what is represented
in the image.
You can freely modify the project
to your liking!

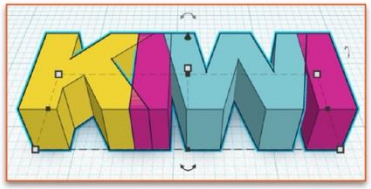
Align

Select all the letters and click the **icon** to align them.
Find out different alignment types by using
the different **black dots**.





Place the letters close together: you can also move them
using the arrows.
Select all of them and **group** them together.



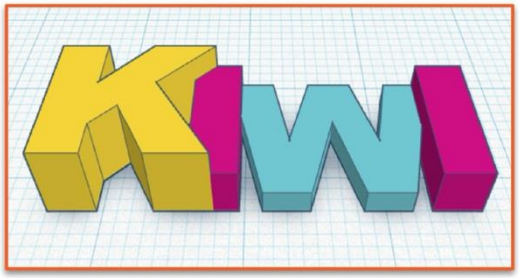
Tip: Change the setting of the *Snap Grid*
to work with greater accuracy.

Funded by
the European Union

Funded by
the European Union

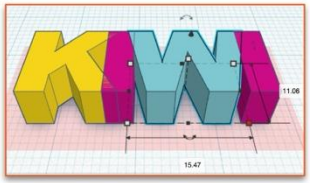
3. Change size

Follow the steps on the side
to get what is represented
in the image.
You can freely modify the project
to your liking!



Change size

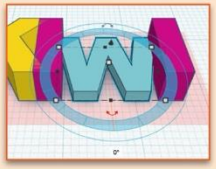
To change the size of a single letter, *double-click* on the group and select the element, then use the **small squares** that will appear. To maintain the aspect ratio, hold down *shift* while changing the size.



If you want to change the height, use the square in the middle position.

Try it yourself!

What happens if you act on the arrows ?



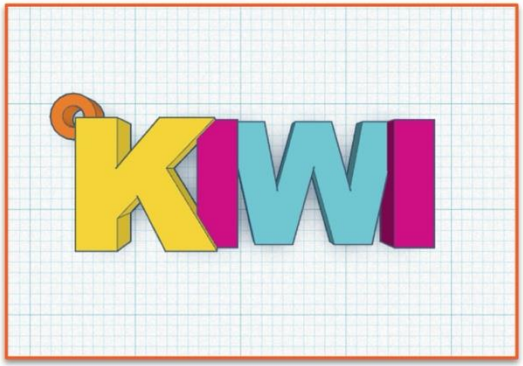
Funded by the European Union

OBJ

Funded by the European Union

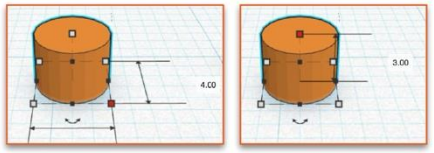
4. Create the ring

Follow the steps on the side
to get what is represented
in the image.
You can freely modify the project
to your liking!

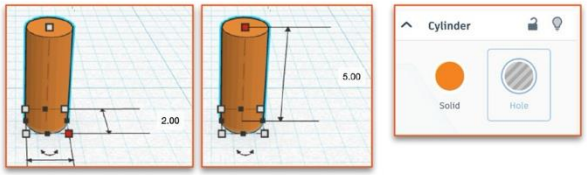


Create the ring

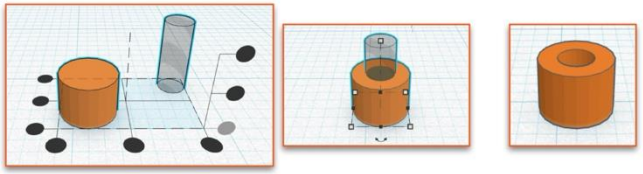
Place a **cylinder** (diameter 4mm and height 3mm) on the work surface.



Place a second cylinder (diameter 2mm and height 5mm) and select **"empty"**.



Align the two cylinders in the center and **group** them together to create a **hole**. Then, place the ring in one corner of the keychain and group all the objects together.

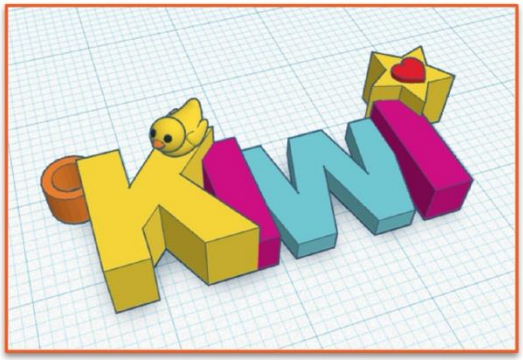


Funded by
the European Union

Funded by
the European Union

5. Customize it!

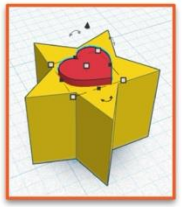
Follow the steps on the side
to get what is represented
in the image.
You can freely modify the project
to your liking!



Customize it!

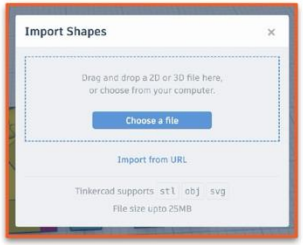
To customize your keychain you can:

1. **Add** new objects from the gallery by searching through categories. You can use the cone to move elements vertically.



2. **Create** and invent new shapes, combining different elements and grouping them.

3. **Import** items from files. You can find useful sites online with libraries of ready-made and ready-to-use objects. For example thingiverse.com

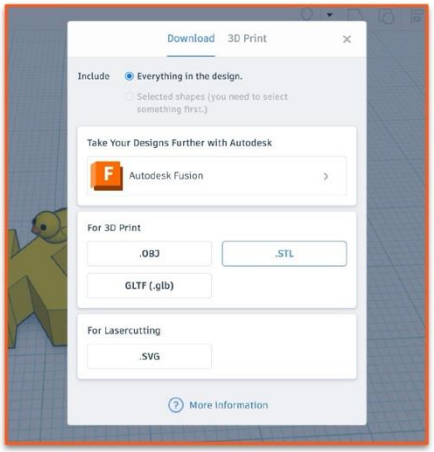


Funded by
the European Union

Funded by
the European Union

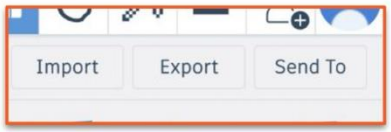
6. Ready to print

Follow the steps on the side
to print your keychain!



Ready to print

Select **"Export"** to prepare the project for printing



Select **.stl** format

Import the .stl file in *Ultimate Cura* software to resize the keychain, check for possible errors, and enable printing supports if necessary.
Export the file in **.gcode** format and upload it to an **SD card.**

UltiMaker

Insert the **SD card** into the slot on your printer and start pt printing process!

Funded by the European Union

Funded by the European Union

Create a 3D project with Tinkercad
Educator Guide

Funded by
the European Union

Introduction

The Educator Guide, inspired by the Scratch Educator Guide format, complement the Create Cards by providing teachers with structured support to plan, facilitate, and reflect on the learning experience. They are intended to help teachers feel confident in guiding open-ended activities while maintaining a flexible approach. The session is designed to last one hour, but it can be adapted based on the needs of the class and aims to facilitate a project-based activity that promotes both technical and social skills.

Steps to follow

- **Before the activity**:
  - Use tools like Tinkercad to explore the project in advance and familiarise yourself with it.
  - Sign up for Tinkercad using your school email to access all features and manage student activities (click here for a step-by-step guide!)
  - Refer to the Tinkercad Quick Start Guide for an introduction to the basics, and experiment with the Create Cards to build confidence, especially if you are a beginner.
  - Print out the Create Cards and ensure all materials (e.g., devices, projectors) are ready.
  - Arrange the classroom setting to promote peer collaboration.
- **During the activity**:
  - Start with a brief introduction to the theme or project.
  - For Tinkercad you could show this video.
  - Allow students to work at their own pace while providing support when needed (e.g., some students may prefer to use the printed Create Cards, others may prefer to explore on their own).
  - Encourage peer exchanges to stimulate creativity and problem-solving.
- **After the activity**:
  - Facilitate a group reflection session where students can share their projects and insights.
  - Ask reflective questions to encourage deeper thinking (e.g., *"What did you learn? What would you do differently next time?"*).
  - Collect feedback to improve and refine future activities.

Checklist for Educators

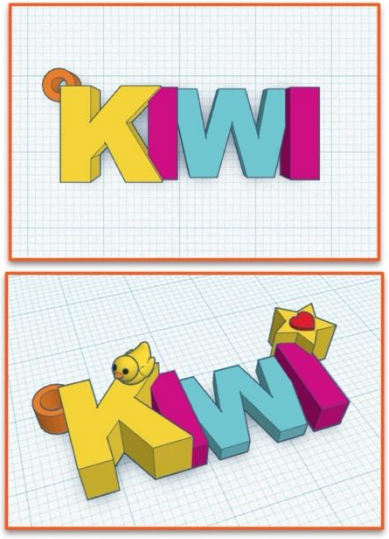
- ✅ Have you printed enough cards?
- ✅ Is the classroom set up for collaboration?
- ✅ Do students understand that experimentation and mistakes are part of the process?

Funded by
the European Union

GUIDE FOR EDUCATORS

Create your own keychain

With this guide, you can design and conduct a one-hour activity using **Tinkercad**. Participants explore and have experience of **3D modeling** while creating their own custom keychain.



Funded by the European Union

Activity Overview

Here's a programming tip for a 1-hour activity:

IMAGINE
15 minutes

Divide the class into groups and introduce the theme of the activity

CREATE
30 minutes

Help participants create their own project, working at their own pace

SHARE
15 minutes

Plan a final moment of project sharing and reflection

Funded by the European Union

Checklist

Use this checklist to prepare for the activity:

- ❑ **Have a tutorial with the participants.**
  Before the activity, explore Tinkercad and do a simple tutorial to create 3D objects. You can show how you move in space and how to create simple elements.
  >>>> Are you new to Tinkercad?
  No problem! Open the **Create Cards** and follow the steps to create your first 3D project!
- ❑ **Print the activity cards.**
  Prepare some printed copies of the "guides for participants" that can be used during the workshop.
- ❑ **Verify that participants have an account.**
  Participants can register for free at tinkercad.com. If you are facilitating the workshop for a class of students, you can create a teacher account to easily support students.
- ❑ **Prepare the computers.**
  Arrange devices so that participants can work in small groups. Also set up a computer connected to a projector or a large screen to show examples and guide participants through the first steps.

Funded by the European Union

Imagine

Start engaging the participants by introducing the theme and stimulating new ideas for the projects.

IMAGINE

Provide ideas and inspiration

Show an introductory video about Tinkercad or examples of simple objects created with the software.
Show different examples with different customizations, such as keychains with the shape of animals, comic book characters, etc...

Peer-to-peer exchanges of ideas

To help participants, come up with ideas for their keychain, brainstorm creative themes. Take turns to share shape ideas or customizations, such as a star-shaped keychain with your name, or a keychain that represents a hobby, like a tennis racket or a book.

Funded by the European Union

Demo project: first steps

IMAGINE

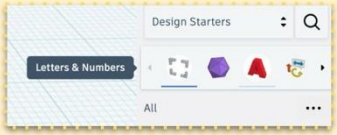
Show the first steps to create a new project.

How to move in space

To zoom in or out press + or -, use the touchpad or rotate the mouse wheel.
Use  to change the view angle. For precise navigation, press the right mouse button or hold down *ctrl* and *click* with the mouse.

Choose a letter

Select "Project Starters" in the drop-down menu on the right, select a letter and drag it onto the workspace.



Change the parameters

Show participants how to change the size or color of selected objects, how to add more shapes and group them together.

Funded by the European Union

Create

CREATE

Support participants during the creation of their project.

Start with...

Ask questions to guide participants to start creating their own project.
For example:
-Which name did you choose?
-What new element would you like to add?

Provide helpful resources

Offer different ways to get started.
For example: some participants will be happy to follow printed guides, others will instead watch online tutorials. See example resources in the "Learning Center" section on tinkercad.com.

Suggest ideas to get started

- Choose a name
- Change colors
- Think of a composition
- Add decorative elements

Funded by the European Union

CREATE

Try more

- Create new shapes
- Create a keychain made up of multiple parts that fit together
- Import complex shapes from other galleries

Support peer collaboration

- When someone gets stuck, encourage collaboration with other participants who can help them.
- Have you found an interesting idea? Ask the person who thought of it to share it with others.

Facilitate problem solving

Help participants to feel comfortable trying different combinations of shapes and seeing what happens.
To understand their thought process, you can ask questions like:

- How is it going?
- What are you working on now?
- What do you plan to try next?

Funded by the European Union

Share

Ask participants to share their project with their peers of exploration.

SHARE

Ask questions they can discuss:

What did you like the most about the project you created?

What was the hardest part?

If you had more time, what would you have wanted to add or change?

And then...?

- Participants can use the ideas and the concepts from this workshop to create a wide variety of projects.
- If possible, provide an online space to collect and share everyone's projects.

These guides were created by Fondazione links Passion for Innovation
Inspired by the Scratch Cards

Funded by the European Union

Create your Playground
A Learning Environment

Funded by
the European Union

Introduction

The **Create Your Playground** resource is designed to help educators **set up** dynamic, inclusive **learning environments** where students can freely explore, collaborate, and create meaningful projects. Inspired by the principles of **Creative Learning**, it emphasises flexibility, hands-on exploration, and peer collaboration. The **purpose** of setting up the classroom using this simple guide is to **encourage creativity** and **experimentation** in a supportive environment, provide a **variety of tools and materials** to meet different skill levels and interests, and promote **collaboration** and **peer learning**.

How to set up "Your Playground"

1. **Organise the space**
    - Arrange **desks** in clusters or flexible group configurations to promote teamwork.
    - Utilise **different areas** of the room, such as the floor, outdoor spaces, or relaxation corners.
2. **Provide diverse materials**
    - Include **digital tools** (PCs, tablets) and **unplugged resources** (paper, markers, recycled materials).
    - Prepare simple, pre-assembled **projects** for beginners while offering advanced materials for experienced participants.
3. **Support a wide range of projects**
    - Apply the **low floor, high ceiling, wide walls** principle:
        - **Low floor**: **Accessible** entry points for beginners.
        - **High ceiling**: **Challenges** for advanced learners.
        - **Wide walls**: **Opportunities** for diverse projects based on students' interests.

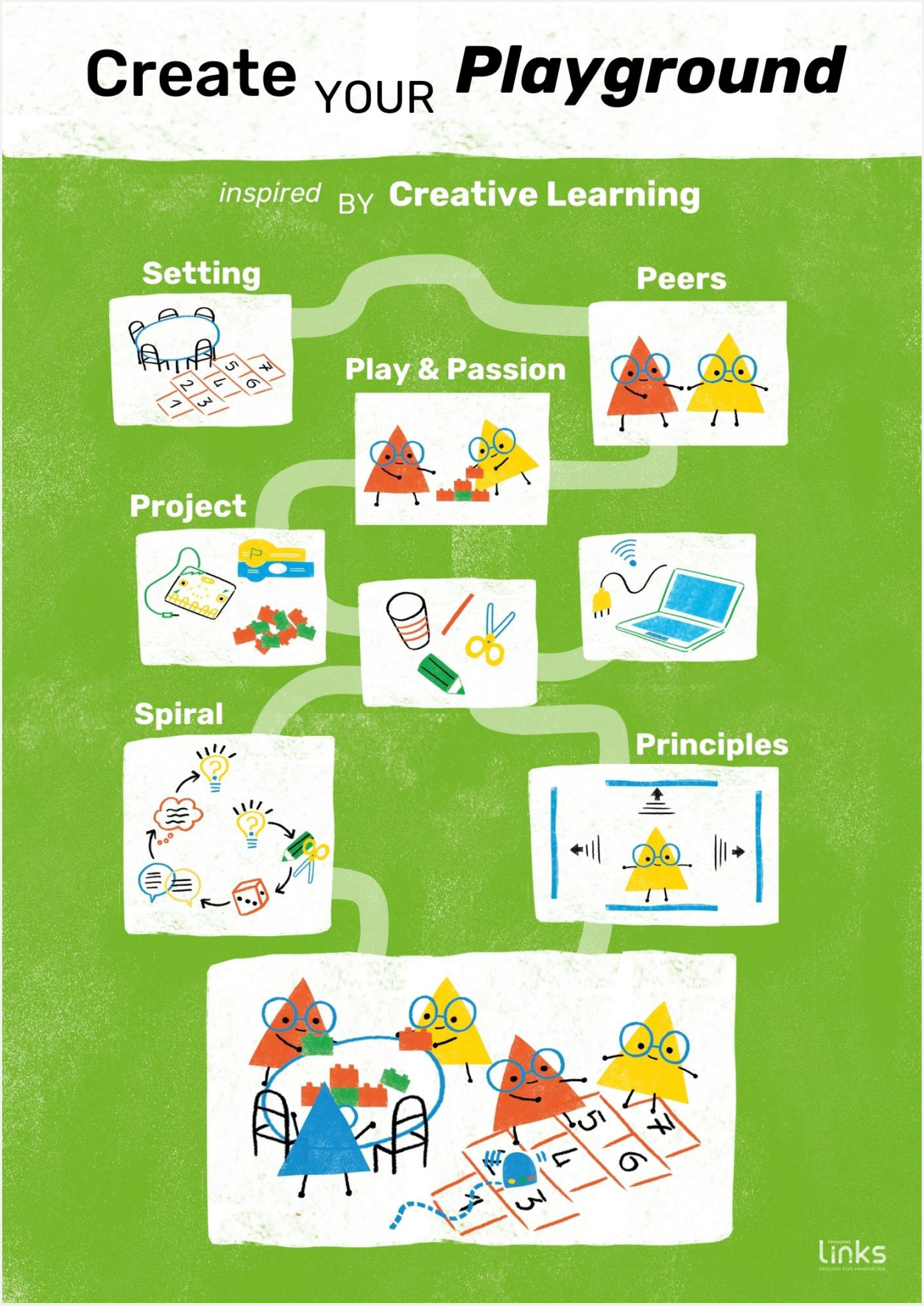
How to facilitate the experience

- **Before the activity**:
    - **Set up** the space and materials to allow students to easily access what they need.
    - Introduce a **theme** to spark creativity (e.g., *"Earth Day," "Future Cities"*).
- **During the activity**:
    - Act as a **participant-facilitator**, learning alongside students and encouraging experimentation.
    - **Support** students in collaborating, sharing ideas, and overcoming challenges together.
- **After the activity**:
    - Facilitate group **discussions** where students reflect on their projects and share their learning experiences.
    - Encourage **feedback** and suggestions for future projects.

Checklist for Educators

- ✅ Is the space organised to allow flexible and collaborative work?
- ✅ Are materials available for different levels of experience?
- ✅ Are students encouraged to take risks, make mistakes, and try again?

Funded by the European Union



Funded by
the European Union

Create YOUR *Playground*

in FIVE **Steps**

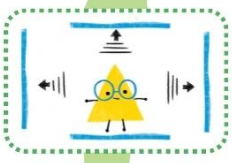
1

Organize a space where desks can be arranged in **one or more islands** to promote collaboration among participants. But don't limit yourself to desks! Make use of **other areas** as well, such as the floor, the garden, a relax room, etc.

2

Provide participants with various **devices** (PCs, tablets, etc.), **unplugged materials** (markers, paper, scissors, LEDs, batteries, clamps, recycled materials, fabrics...), available kits, and some **simple pre-assembled projects** for free experimentation.

3



To create a positive experience even for beginner participants, offer *simple* projects that everyone can freely engage with (**low floor**). However, also select tools suitable for more experienced individuals who can experiment with *increasingly complex* projects (**high ceiling**). Furthermore, to *embrace* and *include* everyone's passions and inclinations, don't limit the types of tools and kits (**wide walls**).

4

Let the participants be inspired by the materials (**imagine**). You can introduce a theme for the day ("Earth Day," etc.) to facilitate project creation (**create**), eliminating the fear of a blank page. By collaborating in groups, it will be even easier to play with their own project (**play**), share ideas and processes, and finally reflect together (**share & reflect**) to restart the creative process.

5

Remember: a **facilitator** is, first and foremost, a participant! You don't have to know how all the tools work, but you can learn alongside your participants. A problem to solve, a challenge to face, or a project to create makes learning more effective. It's okay to try, make **mistakes**, and try again :)

The **Playground** is an **inclusive peer-learning** space where everyone can **freely** experiment with new tools and teaching methods, using technology as a "*building material*", and everyone can **learn through play** in the spirit of *Creative Learning*.

Funded by the European Union

CodeWeek
Build your digital future

Legal Disclaimer

The European Commission's support to produce this publication does not constitute an endorsement of the contents, which reflect 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.

Project funded via a Digital Europe Programme grant 101158834

Funded by
the European Union