

SAM

**SECTOR SKILLS STRATEGY
IN ADDITIVE MANUFACTURING**



This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



3D Printing Kit for Teachers Tech4Kids Kit

Table of Contents

Brief Information 2

Some Tips 3

What's Included in Tech4Kids Kit 4

Primary School Teachers' Roadmap 5

Secondary School Teachers' Roadmap 6

High School Teachers' Roadmap 7

Primary School's Activity Time 8

Secondary School's Activity Time 9

High School's Activity Time 10

How can teachers use Tech4Kids Kit? 11

3D Printing Challenge 12

Brief Information



AIM

To familiarize young students with 3D printing technology; to stimulate the interest for 3D printing



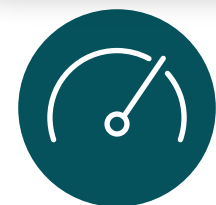
TOOLS USED

SAM Beaver comic serious
Presentations
Podcasts
TinkerCAD user manual
SAM quizzes
Printable CAD files (3D printing model of Space X Rocket)



TO WHOM

Primary, Secondary and High School (6-18 y/o) students and teachers



LEVEL OF IMPACT

The feedback from teachers

**Some tips
for Tech4Kids Kit
users as teachers**

Allow students some **freedom to explore.**

Let students **ask questions** again and again.

Be flexible in your schedule!
If something is late or missing in your plan, don't worry.

Be a team with students; **work together**, solve problems and keep the session open ended.

Allow students to **make mistakes** and let them explain the solution of the problem.

Create a situation to **encourage problem-solving**, creative thinking and collaboration.

Let students handle 3D printers and **fix technical problems themselves.**

What includes Tech4Kids Kit

Tech4Kids has three levels



6-9 Years Old
(Primary School)



Materials



Roadmap



Activity Time



10-14 Years Old
(Secondary School)



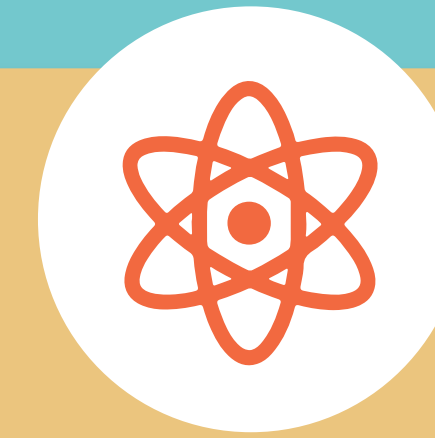
Materials



Roadmap



Activity Time



15-18 Years Old
(High School)



Materials



Roadmap



Activity Time

Primary School Teachers' Roadmap



What is 3D printing? (5 mins)
SAM Comics Series Chapter 1

1

2 How we can use 3D printing (10 mins)
SAM Comics Series Chapters 2 and 3

Samples of 3D printed things (5 mins)
Sam Beaver and Space X rocket video

3

4 Let's have fun and learn more (5 mins)
SAM's DAM Quiz

Evaluation (5 mins)
Kids Questionnaire

5

Secondary School Teachers' Roadmap



1 What is 3D Printing and how it works? (5 mins)
Sample Presentation

3 Why 3D Printing (5 mins)
Sample Presentation

5 How to build a simple 3D model
using TinkerCAD (10 mins)
TinkerCAD manual

7 Quiz time -Sam's Dam (5 mins)
SAM's DAM Quiz

2

4

5

7

8

4 What can I 3D print and
how can I use it
in solving a global problem (10 mins)
Sample Presentation

6

6 What jobs can I do
with 3D Printing (5 mins)
Sample Presentation

8 Recap and Survey
(5 mins)
Kids questionnaire

2 Common materials
used for 3D printing (5 mins)
Sample Presentation

High School Teachers' Roadmap



Welcome and Introduction (5 mins)

1

2

General Presentation of Additive Manufacturing (20 mins)
Presentation 1 or Video – Learn more on the basic of AM

How to use TINKERCAD (10 mins)
Presentation 2

3

4

Real Life Examples and Profiles For AM (30 mins)
Presentation 3

5

Quiz- time (10 mins)
SAMANTHA Quiz

6

Q&A and Discussions (10 mins)

7

Youngest's Questionnaire (5 mins)

Primary School's Activity Time



The SAM Beaver 3D Printing

Objectives:

List the basis of an AM process;
Find a solution to his/her
problem with 3D technology

Expected Outcomes:

Define the function of 3D printing;
Recall the print process (draw and print);
Give example the purpose of
3D printing usage;
Recall how 3D printing print.

Resources:

SAM the Beaver Comic Series;
Different type of waste materials;
If it is possible, a 3D Printers
and filament.

Procedures:

Tell an interesting personal story about meeting
with 3D printer to take students' attention;
Watch SAM the Beaver Comic Series;
Have a conversation about 3D printer;
Ask to students "what would they print
from 3D printer"
Give time to students come up with their examples;
Demonstrate 3D printer machine images or videos.

Assessment:

Teacher can choose a problem and ask to students
"how can they solve the problem
by 3D printing technology";
Draw an item to solve their problems;
Students will build a prototype of their items
from waste materials;
Students explain the process of building prototype
(additive or traditional manufacturing).

Secondary School's Activity Time



The SAM Beaver 3D Printing

Objectives:

Understanding the basis of an AM process;
Demonstrate teamwork by working productively with others (face-to-face classroom);
Modify and/or create products with 3D technology.

Expected Outcomes:

Draw and design SAM the Beaver;
Recognize the different tools to a print process (files, 3D printer, etc.);
Suggest other possible applications for the process.

Resources:

Printable SAM the Beaver file;
SAM 3D printing Beaver video (simple info about main process and concepts);
If it is possible, a 3D Printers and filament.

Procedures:

Welcome students, present SAM and the objectives of the activity;
Explain general concepts about AM;
Explain about AM materials;
Give students time to discuss about possible advantages and disadvantages of 3D printing;
Show the design to print;
Demonstrate to students how 3D printer (if it is possible) works.

Assessment:

Teacher will ask to students script a scenario to explain "how 3D printer contributes human-life";
Students will present their scenarios in face to face class or online platform.

High School's Activity Time



3D Printing Kit

Objectives:

Understanding the basis of an AM process;
Demonstrate teamwork by working productively with others (face-to-face classroom);
Modify and/or create products with 3D technology.

Expected Outcomes:

Draw and design Rocket Space X;
Recognize the different tools to a print process (files, 3D printer, etc.);
Suggest other possible applications for the process.

Resources:

CAD software;
Printable files (+ simple info about main process and concepts);
If it is possible, a 3D Printers and filament.

Procedures:

Welcome students, present SAM and the objective of the activity;
Give students time to discuss any aspect of the procedure;
Explain general concepts about AM;
Explain about AM materials;
Show the design to print;
Demonstrate to students how 3D printer (if it is possible) work.

Assessment:

Teacher will monitor student created models and completed 3D prints in a face-to-face classroom or advice in online session;
Students will present their finished print to the class.

How can teachers use Tech4Kids Kit?



Teacher Training

The teacher will receive a guideline file to introduce him/her to the 3D Printing technology, that also include recommendations about how design and implement the class (steps to follow, necessary tools, etc.).

Face to Face Classroom

The kit can be used in face-to-face classroom, where the teacher can control the activity directly. It is recommended that the school has a 3D printer to print the files and enable a real-time demonstration combined with a basic explanation of the process, but also is conceived as a digital kit.



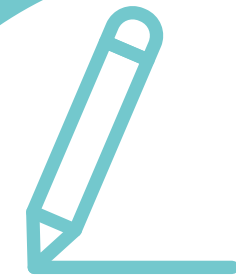
Online Session

In this second option, the teacher could organize an online session where he/she will give instructions about the 3D print pen and the way to use the printable files with the students following the activity in their homes.

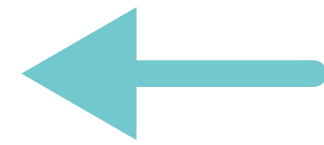
3D Printing Challenge



If you have access to a 3D printer,
You can try this challenge with your students:



Design and print
a proposed solution



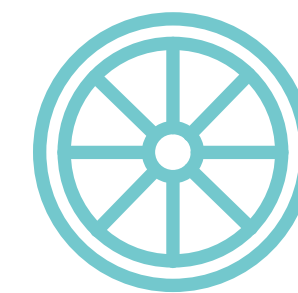
Think about a problem
you would like to solve



Make a short video
telling the story



Teachers are encouraged to design
and print something with their class
for one or both of the following categories:



Transport
Accessories



Useful
Classroom /
Home Product

Share your idea with us!



<https://forms.office.com/e/S9mTyLWahz>



This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.