



# 21st Century Schools

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**INNOVATIVE TEACHING TECHNIQUES**

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





**If you want to learn more about 21st Century Schools,  
visit our website or blog:**

<https://21-st-centuryschools.jouwweb.be>

<https://21stschool.wordpress.com/blogger/>

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Erasmus+ Programme  
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Google for Education



# Google Tools in 21st Century Schools







# What is 'Google for Education'?



“Google Apps for Education” is one of the best solutions for messaging, interactive learning, documentation, storage, sharing and online classroom by Google. It enhances the efficiency and productivity of both teachers and students. Its apps and services foster higher degree of collaboration, empower students and level the playing field for all. The free apps and services can be used widely both on computers as well as on smartphones. Their accessibility allows teachers to implement them in their daily school routine and offer students new methods to learn online in a very safe and controlled environment allowing them to focus on computer skills too while teaching any subject.

It features several Web applications with similar functionality to traditional office suites, including [Gmail](#), [Hangouts](#), [Meet](#), [Google Calendar](#), [Drive](#), [Docs](#), [Sheets](#), [Slides](#), [Groups](#), [News](#), [Play](#), [Sites](#), [Tasks](#) and [Classroom](#)

Many people (including students) are already using these apps in their daily lives but they can have great educational value too.



# What are the benefits?



No more lost or forgotten assignments and/or documents

Collaboration is a piece of cake

It's free!

Accessible at any time and any place

Parent - teacher communication is only a click away

Environmentally friendly

Safe and Controlled

Once logged in, you have access to all apps and all is linked



# 5 Google for Education tools explained



1. Google Classroom



Google Classroom

2. Google Drive



Google Drive

3. Google Calendar



Gmail

4. Google Mail



Google Meet

5. Google Meet



Google Classroom

# 1. Google Classroom



Google Classroom

**Google Classroom** is a learning management system (LMS) that aims to simplify creating, distributing, and grading assignments and engaging students in learning online or remotely. Google Classroom is a free application designed to help students and teachers communicate, collaborate, organize and manage assignments, go paperless, and much more!

*Keen to get started?  
This video will help you  
get on your way!*





Google Classroom

# What does Google Classroom do exactly?



Google Classroom

Google Classroom provides a teacher/student a friendly way to manage classroom documents.

- ***Make Assignments***: the main thing you will do as teacher is make homework assignments. When you create an assignment you can upload the necessary documents for the students to read or work on personally, with a fixed layout for all. Students receive email notifications of new assignments and get a transparent look into the evaluation system as assessment rubrics are easily added. The students “turn in” the assignments when finished and get a notification once their work has been assessed by the teacher. Assignments are automatically added to the Google Calendar as well, giving them no option to ‘forget’ what they had to do. Each assignment has a public and private chat box as well making it easy for students to ask questions and to help each other answering them.

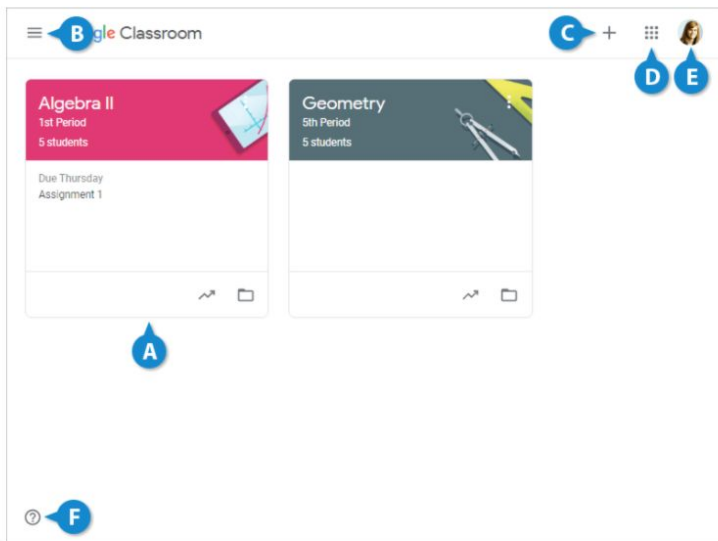
- ***Make Announcements:*** If you have a quick announcement for the entire class, you can quickly type it in the 'updates' section and again, all students receive an email notification.
- ***Storage Classroom Materials:*** The materials you add to an assignment aren't the only documents you can store. Each classroom is linked to a folder on Google Drive in which you can easily find all the work of the students as well. Templates of each assignment you make are saved so they can be used again at a later time or for a parallel class.
- ***Allow students to interact:*** Students will have the ability to comment on assignments or to ask you questions through a designated chat box for each assignment. It also allows students to answer each others questions.



When you create documents for your students, you may want to use the Google apps, such as Google Docs and Sheets, rather than third-party applications, like Microsoft Word or Excel. The reason for this is that Google apps are fully integrated with Classroom, whereas with third-party apps you need to do a lot of downloading, converting, and re-uploading of documents. So, when a student opens a Google Doc to work on, changes are automatically saved in the document on Google Drive, which you can then grade when completed, without having to download or re-upload the document.

# What does it look like exactly?

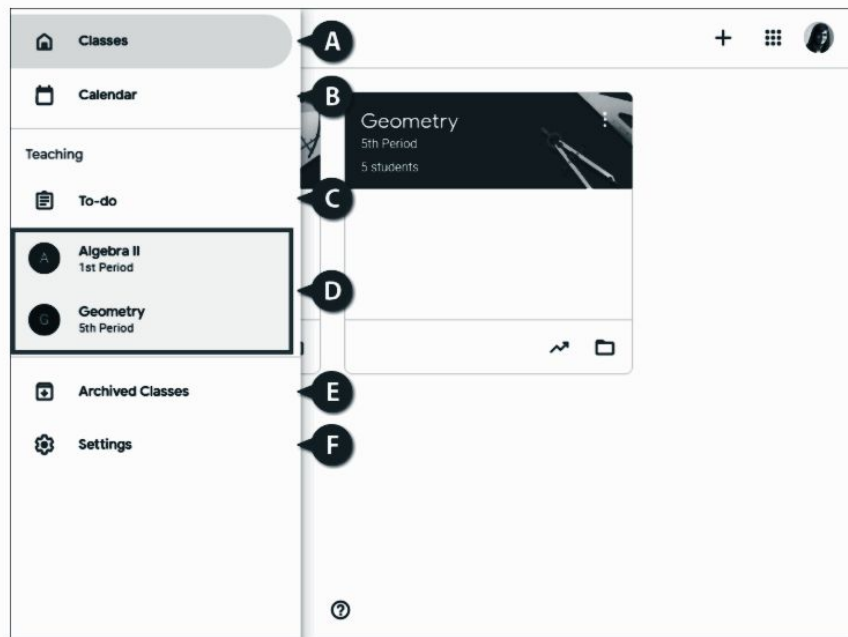
## The Classroom Homepage



<b>A</b>	<b>Class Tile:</b> Displays the class name and number of students, as well as a link to the gradebook and the folder for the class's files on Google Drive.	<b>D</b>	<b>Google Apps:</b> Jump to another Google application in the suite. The selected application will open in a new browser tab.
<b>B</b>	<b>Menu:</b> Contains options to change views, jump to a class, or modify settings.	<b>E</b>	<b>Google Account:</b> Click your picture to modify your Google Account settings. You can view your Google Account page, add an additional Google Account, or sign out from here.
<b>C</b>	<b>Create or Join a Class:</b> Click the + to create a new class or join a class using a class code.	<b>F</b>	<b>?:</b> See what's new, send feedback, ask a question, or get help.



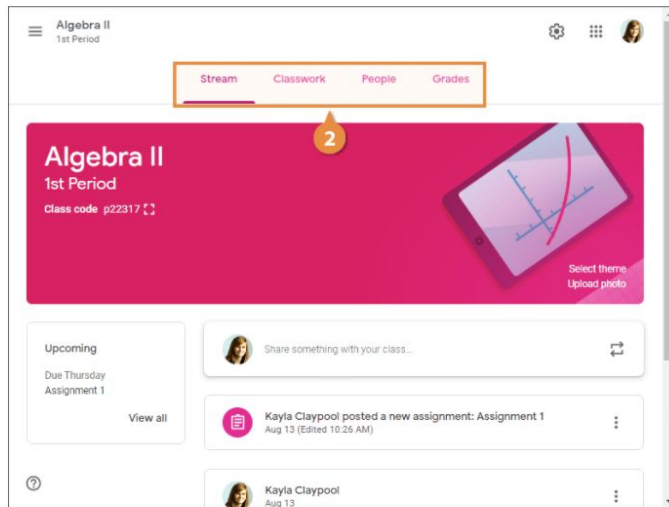
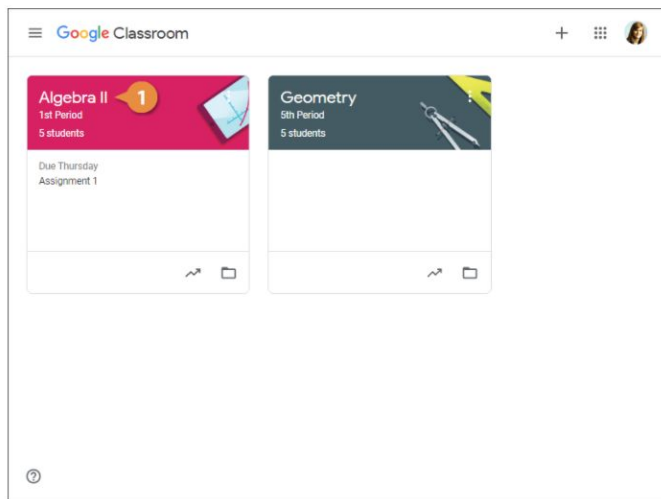
## The Classroom Menu



<b>A</b>	<b>Classes:</b> View the Google Classroom homepage, which shows your active classes in the tile format.	<b>D</b>	<b>Active Classes:</b> Your active classes are listed here in the menu. Quickly jump to a class by clicking it.
<b>B</b>	<b>Calendar:</b> Track assignments, questions, and events in class calendars. For each class, you and your students can view work in a calendar view.	<b>E</b>	<b>Archived Classes:</b> View the classes you are done teaching and have archived. Restore or delete these classes from here.
<b>C</b>	<b>To-do:</b> See an overview of assignments and questions across all your classes on the To-do page. You can filter by class to display only the work for a specific class.	<b>F</b>	<b>Settings:</b> Modify your profile, manage account settings, and adjust notifications for email, comments, and classwork. The settings here are Google Classroom-wide settings that affect all the classes you teach.

## Navigate a Class

- 1 Click the class name to open a class.



- 2 Click a tab at the top of the page to jump to an area of the class.

- **Stream:** This is a central place to view class posts and announcements. When something is added to classwork, it also appears on the Stream. On the left side of the Stream page, in the Upcoming area, a list of assignments with upcoming due dates displays.
- **Classwork:** This is where you create assignments, questions, and class materials. Furthermore, you can create topics to keep the Classwork page organized. For example, you may create a topic for classwork, one for homework, and another for projects. All like-work will be organized under the topic you assign.
- **People:** This tab houses the class roster, including all teachers and co of the class. You can add additional people to the class from here.
- **Grades:** View, grade, and return assignments from here. You see individual student scores as well as the class average.

## Return to Google Classroom

1 Click the **Menu** button.

The screenshot shows the Google Classroom interface for a class named 'Algebra II 1st Period'. The 'Grades' tab is selected, displaying a table of student grades. A red circle with the number '1' highlights the menu icon in the top left corner.

Sort by last name	Sep 12 Assignment 1 out of 25	
Class average	22.4	
Emily Howard	22	
Faith Morrison	25	
Hunter O'Neil	20	
Theo Marshall	24	
Vienna Reyes	21	

<https://www.customguide.com/google-classroom/classroom-navigation>

2 Select **Classes**.

The screenshot shows the Google Classroom interface with the 'Classes' menu open. A red circle with the number '2' highlights the 'Classes' option in the left sidebar.

- Classes
- Calendar
- Teaching
- To-do
- Algebra II 1st Period
- Geometry 5th Period
- Archived Classes
- Settings

<https://www.koncon.nl/storage/documents/Manual-Google-Classroom-EN-Teachers-v1.1.pdf>

Click here for a detailed, digital manual on how to get started with Google Classroom

## Extra useful Applications that can be shared on Google Classroom.

### BookWidgets



With BookWidgets (Google for Education Partner), you can create interactive exercises for your students on tablets, computers and smartphones. As a teacher you can choose between more than 40 different exercises and games.

We give you the template, you add your lesson idea in just a few clicks. It's that easy! Students open the exercise with the app on their iPad, Chromebook or smartphone via a special short code or by scanning the QR code you gave them. Or, you can just assign them a BookWidgets exercise, right away in Google Classroom. Just download the BookWidgets Chrome plugin and get started in Google Classroom.

You can even follow your students' activity, live, from a distance, inside Google Classroom with the *Live widgets* feature.

The biggest advantage of BookWidgets is that it's so diverse. Making your own quizzes or worksheets? BookWidgets! Making your own games like crossword puzzles, memory, spot the difference, jigsaw puzzles, etc.? BookWidgets. Making automatically graded tests right inside Google Classroom? BookWidgets! Want to give it a try?

### EDPuzzle



EDpuzzle is an easy and effective way to deliver videos in your (Google) Classroom. And it's not just a video distributor. With EDpuzzle video comes to life. Add audio-notes and questions to your video.

EDpuzzle makes it easy to add comments to videos and the questions make the video more interactive. When should you use EDpuzzle? You can use it to empower critical thinking when students watch a video. It's also well suited for flipped classrooms.

## Nearpod



Nearpod is also a presentation tool like Buncee. It's also much more than that! Create your own interactive presentations. Add some slides, slide by slide, or choose for a special Sway template you can adjust.

All those slides make an amazing interactive presentation. Especially if you add activities like quizzes, open ended questions, polls, draw questions and others. What about taking your students on a field trip within your presentation? Just add a slide with a virtual reality experience from Nearpod's library.

When your presentation is ready, your students can opt in by entering a code in their Nearpod app or just click on the assigned link in Google Classroom. You, as a teacher, are in charge of the presentation. when you switch to another slide, the presentation on your students' devices will also switch to that slide.

When your students' have to make a quiz or a poll, they can just do that on their screen, as it is a part of the presentation. The answers are gathered live! So you can see immediately what your students answered.

## Quizlet



Quizlet is a quiz tool that focuses on terms and definitions. As a teacher, you add a class and make a quiz. Share this quiz with your Google Classroom with just a few clicks.

They just have to click on the assignment in Google Classroom and choose what game they want to play. They can take a test, opt for the learn mode, learn by flashcards or match terms with their definitions.

Quizlet *Live* lets your students work together in order to find the right word or definition to the description. It's made for practicing terms and definitions.

There's something tricky though: you can't see what descriptions your teammates have. If someone on your team makes a mistake, you have to start over again. Teams battle each other in order to be the first team to reach the finish line.

*Did you know?  
For each Google Classroom you  
make, a special Drive folder is  
added in which all of the  
documents and templates can  
easily be found too.*



## 2. Google Drive



<https://helpjuice.com/blog/google-drive-tutorial>

*If you are interested in  
a guide to get started  
with Google Drive!*

Google Drive is a cloud-based storage solution that allows you to save files online and access them anywhere from any smartphone, tablet, or computer. Using a cloud storage service like Google Drive has plenty of advantages, such as easier file sharing and having a remote location to backup your files.







Think of Google Drive as a latter-day hard drive.

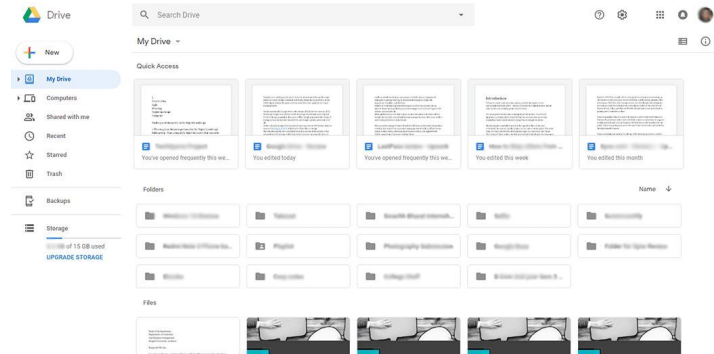
Google Drive gives you the power to upload and save a range of file types – documents, photos, audio, and videos – to Google servers, or the “cloud.” Drive can serve as a backup solution, or as a way to free up space on your device.

To understand why Google Drive is so popular, it's important to note that it's built to work seamlessly with Google. And one of Drive's best features is its integration with Google's office suite of cloud-native apps, which, if you have experience with Microsoft Office, will look familiar.

# Here's a breakdown of the most commonly used Google Drive Applications

## Google Drive apps and functions

APP	DESCRIPTION	PRIMARY FUNCTIONS
 <b>Google Docs</b>	Text documents	Proposals, reports, shared meeting notes
 <b>Google Sheets</b>	Spreadsheets	Project plans, budget sheets
 <b>Google Slides</b>	Presentations	Pitch decks, training modules, team presentations
 <b>Google Forms</b>	Surveys	Customer satisfaction surveys, group polls
 <b>Google Drawings</b>	Shapes, charts, and diagrams	Flowcharts, mind maps website wireframes
 <b>Google Sites</b>	Websites	Team sites, project sites, resume sites







## 3. Google Calendar



With Google Calendar, you can quickly schedule meetings and events and get reminders about upcoming activities, so you always know what's next. Calendar is designed for teams, so it's easy to share your schedule with others and create multiple calendars that you and your team can use together. Google Calendar allows users to create and edit events. Reminders can be enabled for events, with options available for type and time. Event locations can also be added, and other users can be invited to events. Users can enable or disable the visibility of special calendars, including Birthdays.

*Did you know?  
For each Google Classroom you make, a new Google Calendar is created and found in the 'classwork' menu. All Classroom assignments are automatically added to this calendar for all participants to see and links to Google Meets can be added easily too.*

## Gmail 4. Google Mail Gmail

*Did you know?*

*Your Gmail and Classroom accounts are linked. That way you will get an email notification whenever a student posts, asks or hands anything in through Classroom, making it easy for you to react quickly and effectively.*

Gmail is a free email service provided by Google. In many ways, Gmail is like any other email service: You can send and receive emails, block spam, create an address book, and perform other basic email tasks. But it also has some more unique features that help make it one of the most popular online email services.

With Gmail, your email is stored safely in the cloud. You can get to messages from any computer or device with a web browser. If your administrator allows, you can join or start a video meeting in Google Meet right from Gmail. Add Google Chat to your Gmail inbox and get all the features of Chat directly in Gmail. You can also quickly organize and find important email, as well as read and draft email without an internet connection.



# 5. Google Meet



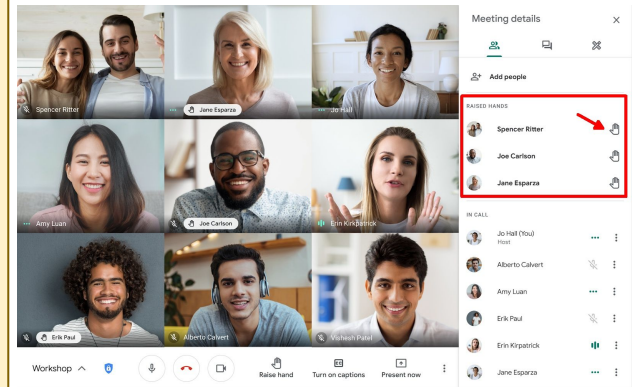
Google Meet, also known as Google Hangouts Meet, is built to let dozens of people join the same virtual meeting, and speak or share video with each other from anywhere with internet access.

Through the Chrome Web store, extra extensions can be added to increase its usefulness. Good examples are 'Grid View' and 'Raise Hand'. These will allow the host to see all the participants at once as well as give you a quick idea of who has a question or has something to say.

The chatbox can easily be used to share things while meeting or to allow people without a microphone to join the meeting and ask questions or comments.

Each meeting can be recorded too. The recorded file will be sent to the host's Gmail shortly after the meeting.

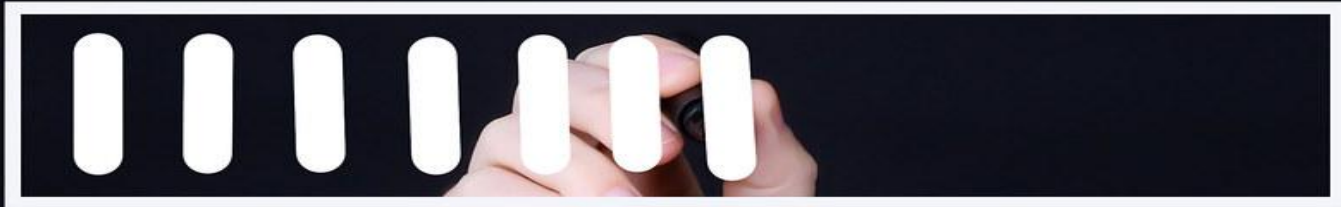
New Meets can easily be added to and through Calendar. Invitations can then be sent through Gmail or the link can be shared.



# Gamification in 21st Century Schools



# GAMIFICATION



LOADING...

# What's Gamification?

**Simply put, the definition of gamification is the use of game-design elements and game principals in non-game contexts. For example, in-game principals and themes such as acquiring virtual 'points' or other currency, and completing series of tasks or activities to advance to the next level, may be used in contexts other than gaming to provide fun and stimulation for the learner.**

**Gamification can also be defined as a set of activities and processes to solve problems by using the characteristics of game elements. Simply put, the definition of gamification is the use of game-design elements and game principals in non-game contexts. For example, in-game principals and themes such as acquiring virtual 'points' or other currency, and completing series of tasks or activities to advance to the next level, may be used in contexts other than gaming to provide fun and stimulation for the learner.**

## Gamification User Types



## Player Traits



Let's find out your Game User Type .  
Take the survey and 👁️ the result!!!

[Click Here](#)



# Benefits of Gamification in the Classroom

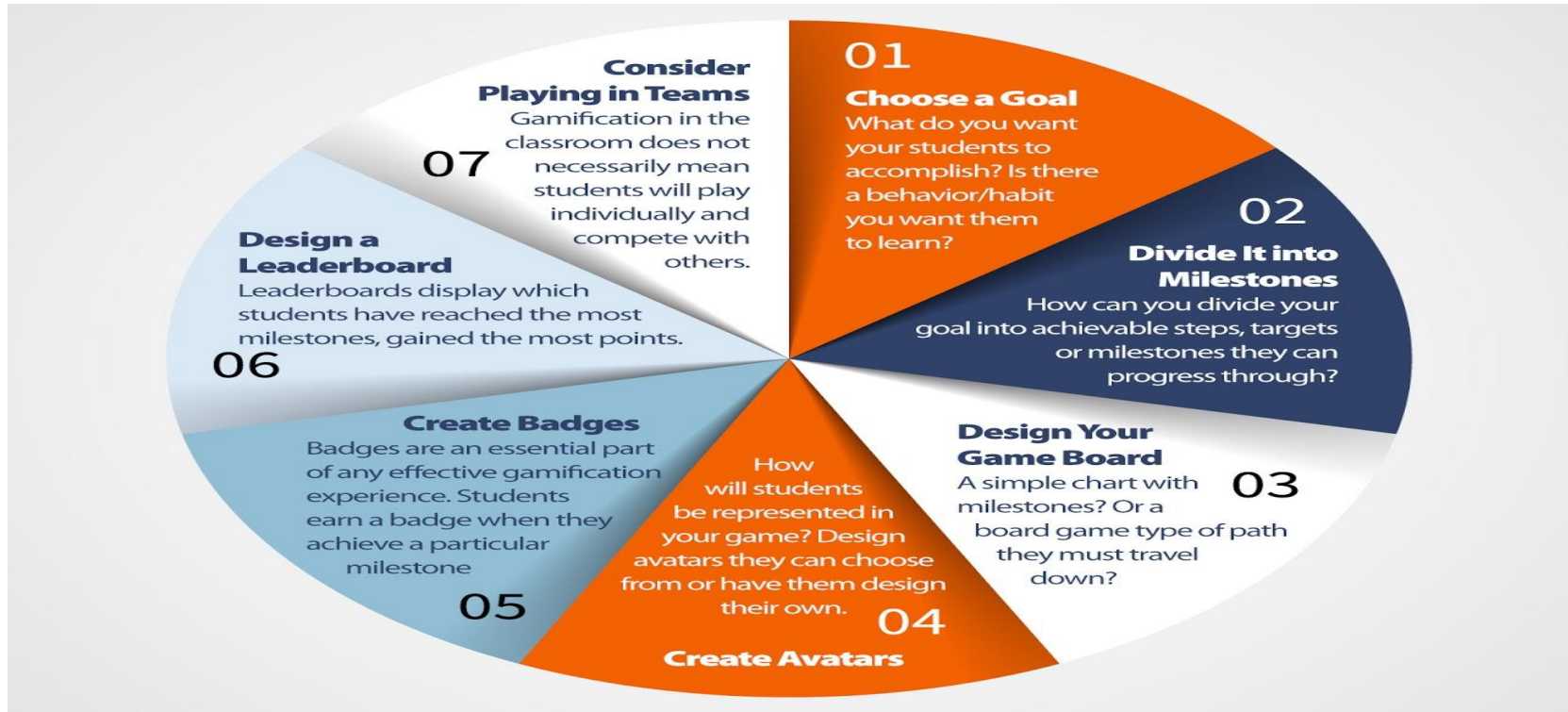
There are many proven benefits to using gamification in the classroom, such as:

- Students feel like they have ownership over their learning
- A more relaxed atmosphere in regards to failure, since learners can simply try again
- More fun in the classroom
- Learning becomes visible through progress indicators
- Students may uncover an intrinsic motivation for learning
- Students can explore different identities through different avatars or characters
- Students often are more comfortable in gaming environments, so are more proactive and open to making mistakes
- Higher engagement and concentration levels amongst students
- The opportunity to think outside of the box. Tasks are no longer just about filling in a worksheet – what are the wider, ‘gamified’

## SOME VIDEOS REFERS TO GAMIFICATION



# How to Gamify Your Classes



# 14 GAMIFICATION EXAMPLES IN THE CLASSROOM

## 1. Giving Points for Meeting Academic Objectives

**Do students need to be citing details from the text and evidence for conclusions in class discussions?**

**Answers without evidence are now worth 1 point, a correct answer with 1 piece of evidence is worth 2 points, a correct answer + 2 pieces of evidence = 3 points.**

## 2. Giving Points for Meeting Procedural/Non-academic Objectives

**Need to solve a classroom issue such as shortening the time it takes to check homework? All students who have their homework out ready to be checked before being prompted by the teacher now receive 2 points.**



### 3. Creating playful barriers

These sorts of barriers can be academic or behavioral, social or private, creative, or logistical. The point is, one of the primary tenets of Gamification



is the use of encouragement mechanics through the application of playful barriers—challenges, for example.

### 4. Creating competition within the classroom

**Teacher vs. Class:** Students must follow a rule that the teacher sets. Anytime a student follows the rule, the Class gets a point. Anytime a student does not follow a rule, the teacher gets a point. This is particularly great for introducing procedures and behavioral expectations. If the Class wins, use a sustainable reward, such as a 1-minute dance party, extended recess time, or fewer homework problems.

## 5. Comparing and reflecting on performance in nuanced ways personalized for each student

At the end of some video game levels, the player's performance is broken down into countless details offering enormous data, achievements, and ways to reflect and document their performance and compare with others.

For example, one game might offer statistics of which objectives were met and how, assigned a 'badge' based on that particular performance 'style,' then track every minute detail around that performance you can imagine: total number of jumps, number of enemies alerted, number of different ways a specific problem was solved, etc.

## 6. Creating a range of unique rewards desirable for a range of unique students

In my class, students get sunglasses to wear until the period is over at 5 points, the privilege to take off their shoes at 10 points, a positive text to their parents at 15, and if the high score is over 15, whoever has it may 'steal' the teacher's chair.





# GAMIFICATION CONCEPT



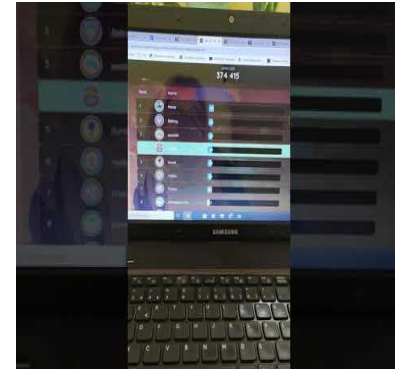
## 7. Using levels, checkpoints, and other methods of 'progression'

Track points over multiple classes, when students reach an important milestone such as 100 points let them level up, as they progress further give out sustainable milestone rewards, such as eating lunch with the teacher or a free dress pass (if your school wears uniforms).

Competitive students will race to have the highest level in their class and grade which can be leveraged by creating quests that require them to recruit lower-level students in quests that require both to practice target skills.

### Other Examples Of Gamification In The Classroom

**8. Grading backward**—start grading at 0 instead of 100. Every assignment, demonstrated mastery of skill, or desired behavior earns points for them towards 100/letter grade/certificate, or whatever reward you'd like to provide.



9. Creating challenges with more than one way to be solved and emphasize the different approaches.

10. Giving learning badges instead of (or in addition to) points or grades.

11. Letting students set their own goals, then track their own progress in a fun/visual/social/personal way.

12. Helping students assume specific perspectives in learning—as a judge, designer, father, etc. This element of fantasy role-play is a big draw of video games.



**3. Incentivizing student 'exploration' of content by offering bonuses, 'easter eggs,' and other benefits of achieving supplementary goals beyond the main lesson objective itself.**

**14. Create problems or challenges with more than one way to solve**

**Bonus: Using a scoreboard seating chart**

**Draw or project a seating chart onto a whiteboard/screen, and then award students points for all activities that you want to incentivize with sustainable rewards/recognitions at different point levels.**

# The Interview of Students About Effectiveness of Gamification in Classroom



# ONLINE COURSES ABOUT GAMIFICATION

- **European School Net Academy :Games in Schools Course**

[www.europeanschoolnetacademy.eu/courses/course-v1:GiS+GamesCourse+2019/about](http://www.europeanschoolnetacademy.eu/courses/course-v1:GiS+GamesCourse+2019/about)

- **Coursera Gamification Course**

<https://www.coursera.org/learn/gamification>

- **Leading Change: Go Beyond Gamification with Gameful Learning**

[www.edx.org/course/leading-change-go-beyond-gamification-with-gameful](http://www.edx.org/course/leading-change-go-beyond-gamification-with-gameful)

- **MineCraft in Education on Microsoft**

<https://education.microsoft.com/cs-cz/learningPath/3eede2ae>

# 10 WEBSITES TO GAMIFY YOUR LESSONS



[Flippity.net: Easily Turn Google Spreadsheets into Flashcards and Other Cool Stuff](#)

[GamiLab](#)

[LearningApps.org - interaktive und multimediale Lernbausteine](#)

[ClassDojo](#)

[Cram.com: Create and Share Online Flashcards](#)



[Kahoot! | Learning games | Make learning awesome!](#)

[Classcraft - Because Kids Love Games](#)



Classcraft

<https://quizizz.com>

[Genially, the tool for bringing your content to life](#)

[GameBuilder](#)



genially



## References & Further Reading about Gamification

*McGonigal, J. (2011). Gaming can make a better world. | TED Talk | TED.com [Video File]. Retrieved From: [ted.com/](http://ted.com/)*

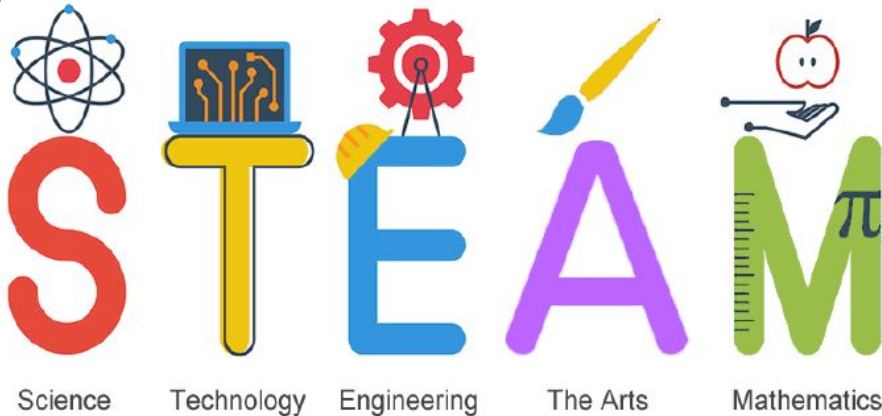
*Schaaf, R., & Mohan, N. (2014). Making school a game worth playing: Digital games in the classroom. SAGE Publications.*

*Schell, J. (n.d.) When games invade real life. | TED Talk | TED.com [Video File]. Retrieved from [https://www.ted.com/talks/jesse\\_schell\\_when\\_games\\_invade\\_real\\_life](https://www.ted.com/talks/jesse_schell_when_games_invade_real_life)*

*Zicherman. (n.d.). Fun is the Future: Mastering Gamification [Video File]. Retrieved From [youtube.com](http://youtube.com)*

*12 Examples Of Gamification In The Classroom*

# What is STEAM?



- **STEAM** is an educational discipline that aims to spark an interest and lifelong love of the arts and sciences in children from an early age.
- Science, Technology, Engineering, the Arts and Math are similar fields of study in that they all involve creative processes and none uses just one method for inquiry and investigation.
- Teaching relevant, in-demand skills that will prepare students to become innovators in an ever-evolving world is paramount, not only for the future of the students themselves but for the future of the country.

# What is STEM Education?

- STEM education is based on integrates subjects as opposed to teaching them separately.
- STEM education builds greater capacity in teachers through content specific, ongoing professional development and training.
- STEM education's integration of hands-on, real-world learning tasks, coupled with academic theory, helps students master rigorous math and science concepts.

In addition to fostering in-depth knowledge of math and science, a STEM education increases achievement by equipping students



# How to STEAM up

the classroom



**1. Select a topic**  
choose one that allows you to incorporate all 5 aspects of STEAM

**2. Connect topic to a real-world problem**

**3. Define**  
the challenge (what do you want students to accomplish)



**6. Have students research and brainstorm solutions**

**5. Explain**  
the challenge to students (use videos to engage)

**4. Use the Engineering Design Plan**



**7. Guide students as they select an idea and build a prototype**

**8. Test Prototype**

**9. Have students communicate their findings**

**10. Redesign**



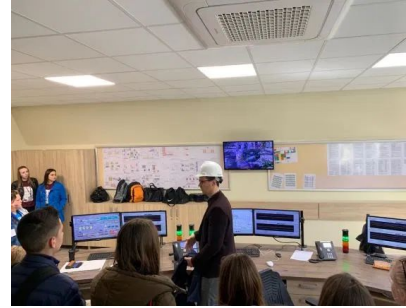
The objective of the project is to guide European schools in increasing young Europeans' interest and skills in STEM and to provide the schools with the necessary tools in order to engage their students, teachers and other actors, in related activities.

# STEAM Examples:

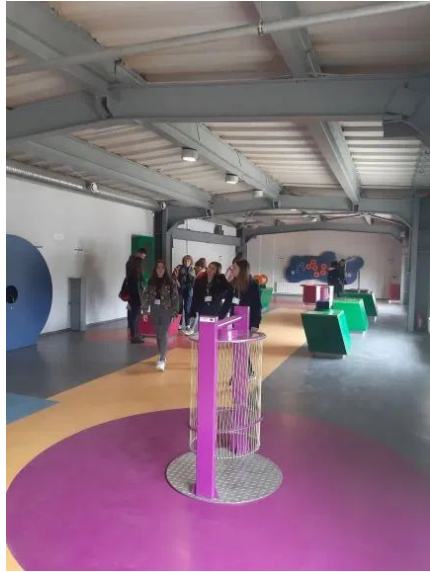
## Chocolate Making Lesson from Lithuanian Mob



## Chemistry Lesson in the Company



## Physics lesson in the Energy and Technology Museum.

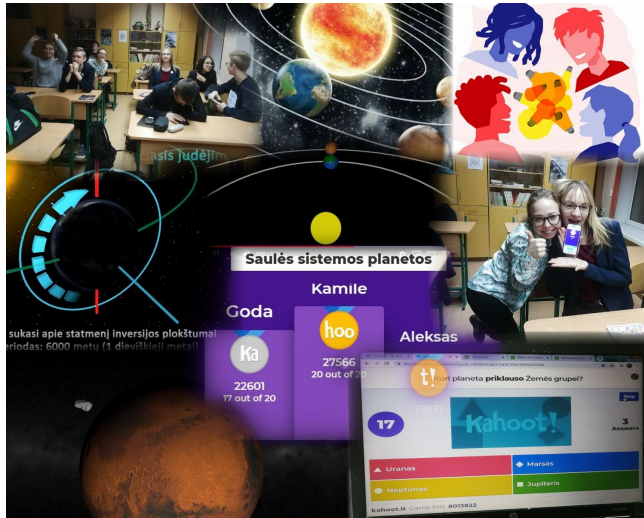


## Have you ever built a bridge from spaghetti noodles?






## Flipped Classroom- Astronomy




## Math Lesson

Krakių Mikalojaus Katkaus gimnazija, Kėdainių Rajonas, Lithuania  
Colegiul Auto "Traian Vuia", Târgu Jiu, Romania

### Active projects (1)

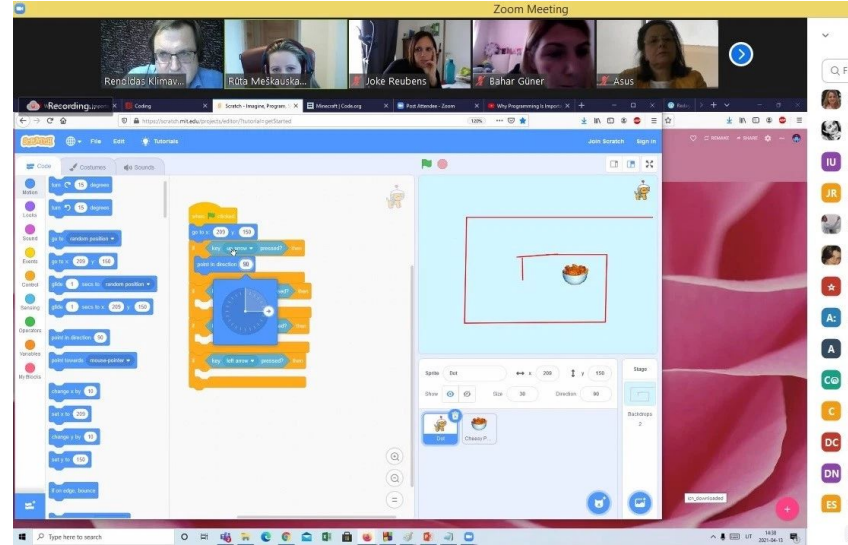
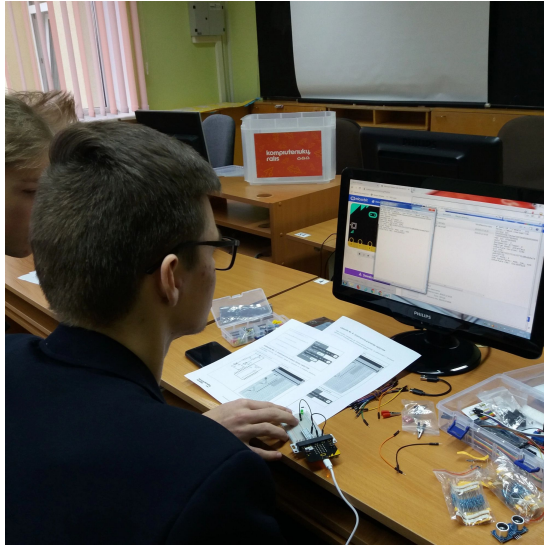
 **Pi around us**  
24.02.2019

  
*FENIKO AYKEIO TYXEROY, Tyxero, Greece*

- Edit
- Image gallery
- Add new partner(s)
- Manage partner(s)
- Close project
- TwinSpace
- Project Card: talk to your NSS
- Download eTwinning Certificate
- Apply for a Quality Label



# Coding Lessons



Creative coding is a type of computer programming in which the goal is to create something expressive instead of something functional.

For example:

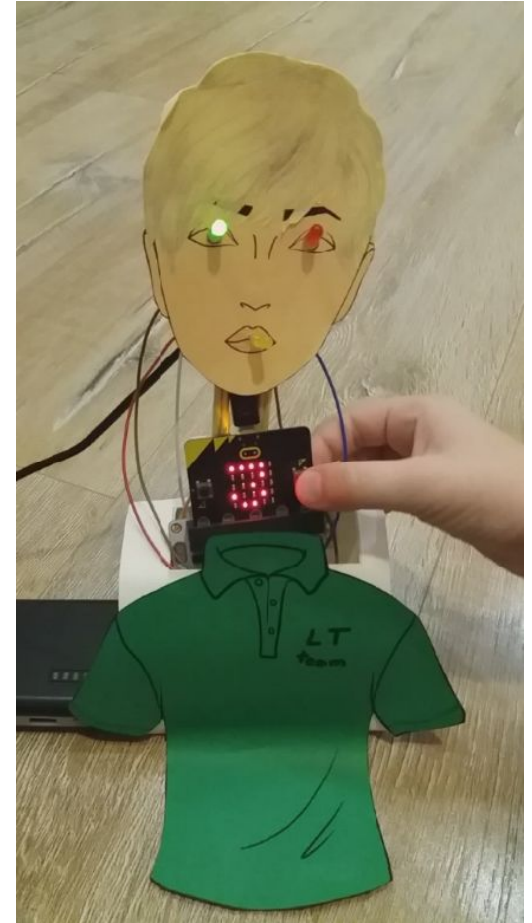
[https://www.youtube.com/watch?v=Of0c0\\_tuE](https://www.youtube.com/watch?v=Of0c0_tuE)  
AQ

Microbit. Krakij Mikalojaus Katkaus gimnazija. Lithuania.

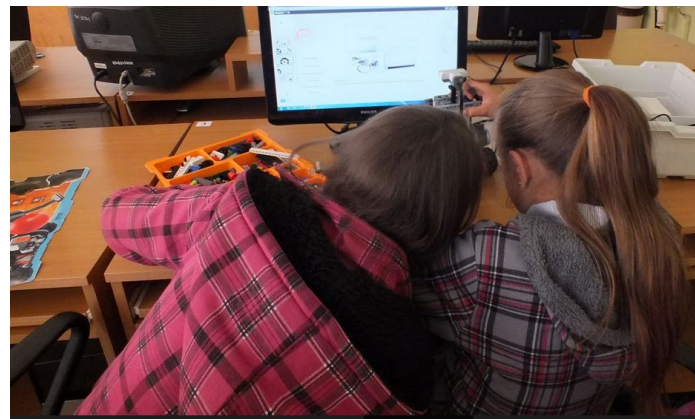
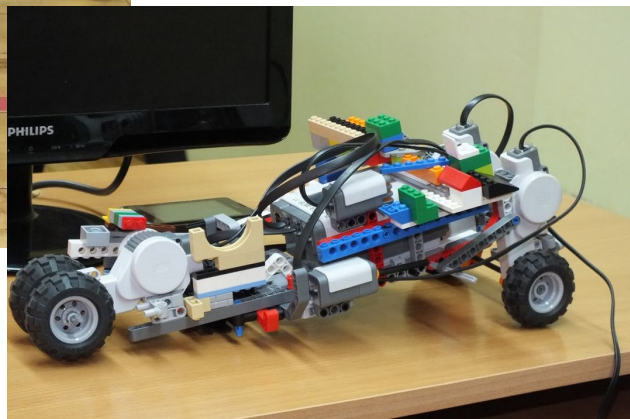
A button - Green Color - I feel great.  
B button - Red Color - I need help.  
A+B button - Yellow Color - I do not understand.

1:14 / 2:32

Stella TRYF...

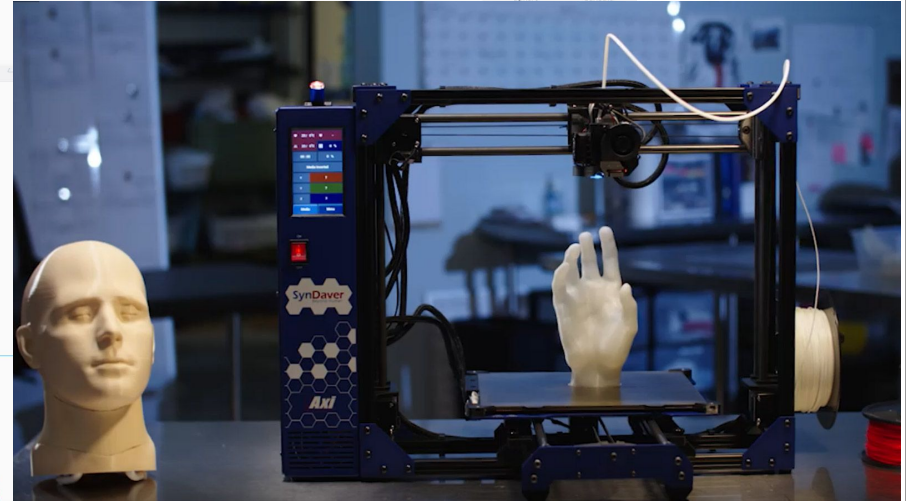
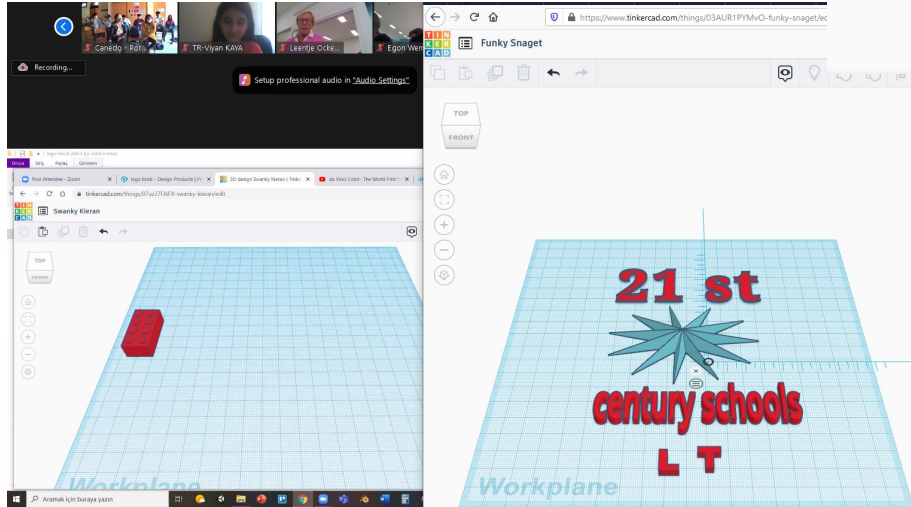
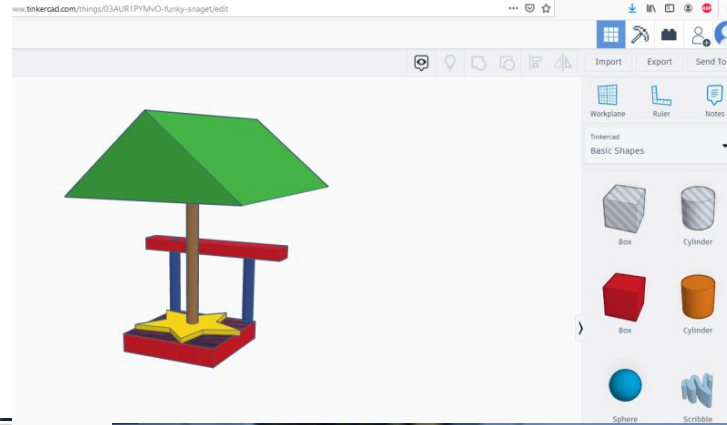


# Robotic Lessons





# 3D Printing Technology Techniques in Education



# Coding in 21st Century Schools



# What is Coding ?

Coding refers to Computer programming, the process of designing and building an computer program that is written in one or more programming languages, such as FORTRAN, COBOL, PASCAL, Scratch etc.

With coding we can create computer software, apps , games, websites etc.

```
(Visual Studio)
#include <iostream>
using namespace std;
void main () {
    int num;
    cout<<"num =";
    cin>>num;
    if (num%5==0 && num%6==0)
        cout<<"5 and 6"<<endl;
    else if (num%5==0 || num%6==0)
        cout<<"5 or 6"<<endl;
    else
        cout<<"not both 5 and 6"<<endl;
}
```

# Coding in Schools

Nowadays, many schools all over the world have begun teaching coding in ways that are relevant and engaging for students.

There also many initiatives such as **Code.org** and the “**Hour of Code**”, supported by organisations such as Google and Microsoft, advocate that **every school student should have the opportunity to learn computer coding.**



# Benefits of Coding

Coding helps to learn of how things work

Coding helps to learn to problem-solving

Coding helps to learn to use logical thinking

Coding is a basic skill for future jobs

Coding teaches computational thinking





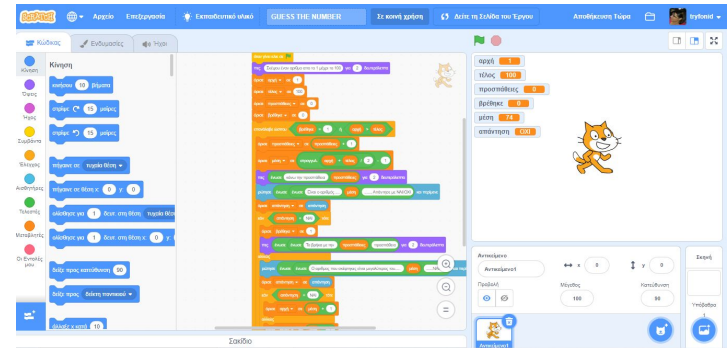
# Scratch



**Scratch** is a free programming language and online community where you can create your own interactive stories, games, and animations.

**With Scratch, you can code your own interactive stories, games, and animations, then share with your friends, classroom, or a global community of creators.**

**Official Scratch app for Chrome and Android tablets also available!**

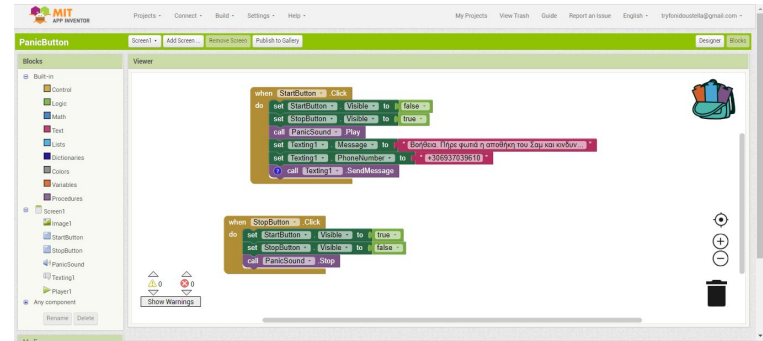


# Appinventor

MIT App Inventor is an intuitive, visual programming environment that allows everyone – even children – to build fully functional apps for smartphones and tablets.

App Inventor is a cloud-based tool, which means you can build apps right in your web browser. This website offers all the support you'll need to learn how to build your own apps.

A lot of beginner-friendly tutorials available!



# Alice Alice

Alice is an innovative block-based programming environment that makes it easy to create animations, build interactive narratives, or program simple games in 3D.

Unlike many of the puzzle-based coding applications Alice motivates learning through creative exploration.

Alice is designed to teach logical and computational thinking skills, fundamental principles of programming and to be a first exposure to object-oriented programming.

Lessons and tutorial available!



# Code week



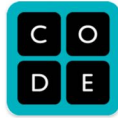
EU Code Week is a grassroots initiative which aims to bring coding and digital literacy to everybody in a fun and engaging way...

Even not sure how to get started, there are many toolkits, lessonplans and resources available.

<https://codeweek.eu/>



# Hour of Code



Code.org

Many activities offered in over 45 languages, such as...

- Star Wars: Building a Galaxy with Code
- A Minecraft Tale of Two Villages
- Code with Anna and Elsa
- Discover Python with Silent Teacher
- Barbie You Can Be Anything

<https://hourofcode.com/>



# Artificial Intelligence - Machine Learning

**Artificial intelligence (AI)** refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.

**Machine learning** is all around us. We all use machine learning systems every day - such as spam filters, recommendation engines, language translation services, chatbots and digital assistants, search engines, and fraud detection systems.

It's important that pupils are aware of how our world works!



# Machine Learning for Kids

This free tool introduces machine learning by providing hands-on experiences for training machine learning systems and building things with them.

This builds on existing efforts to introduce and teach coding to children, by adding these models to educational coding platforms Scratch and App Inventor, and helping children create projects and build games with the machine learning models they train.



**Machine  
Learning  
for Kids**

# Learn how to code-Unplugged

To first start learning the basics of coding, you don't even need a computer! [CS Unplugged](#) is a collection of free teaching material that teaches Computer Science through engaging games and puzzles that use cards, string, crayons and lots of running around.





# Topics to teach unplugged

- Binary numbers
- Image Representation
- Searching algorithms
- Sorting Networks
- Searching algorithms
- Cryptography





Code.org

Code.org® is a nonprofit dedicated to expanding access to computer science in schools and increasing participation by young women and students from other underrepresented groups.

<https://code.org/>



MIT App Inventor is an intuitive, visual programming environment that allows everyone – even children – to build fully functional apps for smartphones and tablets.

[appinventor.mit.edu](http://appinventor.mit.edu)



Scratch is a free programming language and online community where you can create your own interactive stories, games, and animations.

<https://scratch.mit.edu>



Alice is an innovative block-based programming environment that makes it easy to create animations, build interactive narratives, or program simple games in 3D.

<https://www.alice.org/>



This free tool introduces machine learning by providing hands-on experiences for training machine learning systems and building things with them.

<https://machinelearningforkids.co.uk>

# Flipped Learning



“Flipping the classroom” means that students gain first exposure to new material outside of class, usually via reading or lecture videos, and then use class time to do the harder work of assimilating that knowledge, through problem-solving, discussion or debates.

The idea of the Flipped Classroom is quite simple: direct instruction (lecturing) is mainly done via videos that students can watch on their own before class. These videos, then, allow time for the teacher to work with students on things they struggle with.

For many years we have been “doing” school backwards: students are sent home with the hard stuff and with no help except their notes (if they have taken them) and their textbooks (if they have and read them), but little else. Teachers expect students to solve problems and apply what they have learned in class.

With the Flipped Classroom, on the contrary, students do the hard stuff in class, where the teacher is present and can help them, and do the easy stuff outside of class.

‘Flipping’ is an educational methodology to be used in a fluid and flexible way, regardless of the subject or type of class. What is important is that the time ‘gained’ in class thanks to flipping is used in an optimal manner and that the resources used by the student in the time at home are of high quality.

# Changing Education Paradigms

RSA

ANIMATE



# Who are our students?

**The Baby Boomers** (born between 1946 and 1964) growing up in a time of economic expansion and prosperity, major social movements, and national optimism.

Core values include optimism, team orientation, personal gratification, health and wellness, personal growth, work, and involvement.

**Generation X** (born between 1965-1977) witnessed corporate layoffs and corruption, inflation, the energy crisis, and nuclear proliferation.

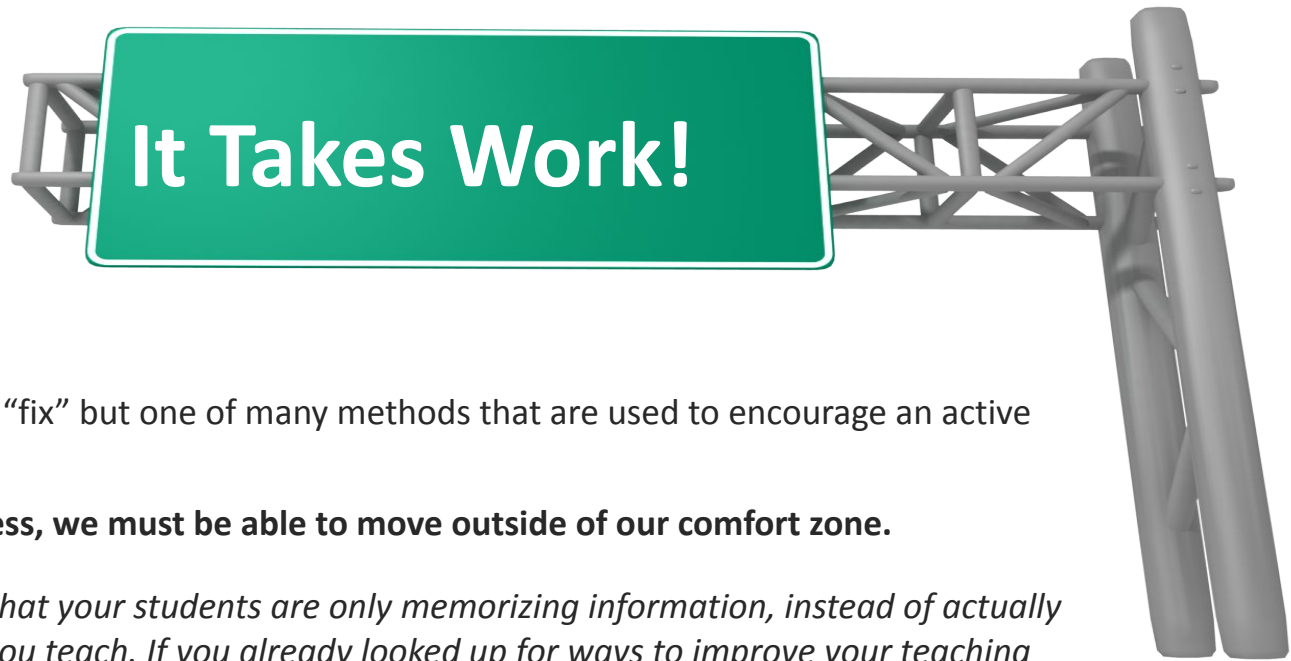
Core values include diversity, thinking globally, balance, techno-literacy, fun, informality, self-reliance, and pragmatism.

**Generation Y** (born 1977 through 2000) grew up being defined by 9/11, terrorists attacks and the financial crisis of 2007–2008. They were raised in a child focused environment.

Core values include optimism, civic duty, confidence, achievement, sociability, morality, street smarts, and diversity.

**Generation Z** (Millennials) (born early 1990s to present) grew up with the internet, cell phones, I-Pads and I-Pods. They get information fast and expect it quickly. They often are seen as impatient and are technically savvy.

Core values are a sense of social justice, philanthropy and maturity that comes with growing up in an economically depressed time.



Flipped Classroom is not a “fix” but one of many methods that are used to encourage an active learning environment.

**To reach success, we must be able to move outside of our comfort zone.**

*So if you have discovered that your students are only memorizing information, instead of actually understanding the topics you teach. If you already looked up for ways to improve your teaching Practice, but haven't found the right one yet, then you should ask your students to read or watch or listen the material assigned before class, and then just dedicate the classroom time to interaction, debate and meaningful thinking, to laboratory experiments or practice. Instead of always „telling”, lecturing you will start „facilitating / coaching the students learning”.*

# Basic Principle of Flipped Classrooms

It's Not a Magic  
Bullet

What is traditionally done in the class is now done at home  
and what is done at home can be done in the classroom

But it really isn't that simple 😞

This method is well thought out before using—  
and uses both summative and formative assessment



## CETL Blog-Chris Faulkner

“While I’m glad many educators seem to be jumping onboard with the model, my concerns are that some teachers may simply transfer their lectures to video and then have their students write papers or fill out worksheets during class. To me, that is bad pedagogy. However, if significant learning opportunities are capitalized on during class time, this could truly change learning and solve the problem, at least temporarily, of engaging students with material outside of the classroom.”

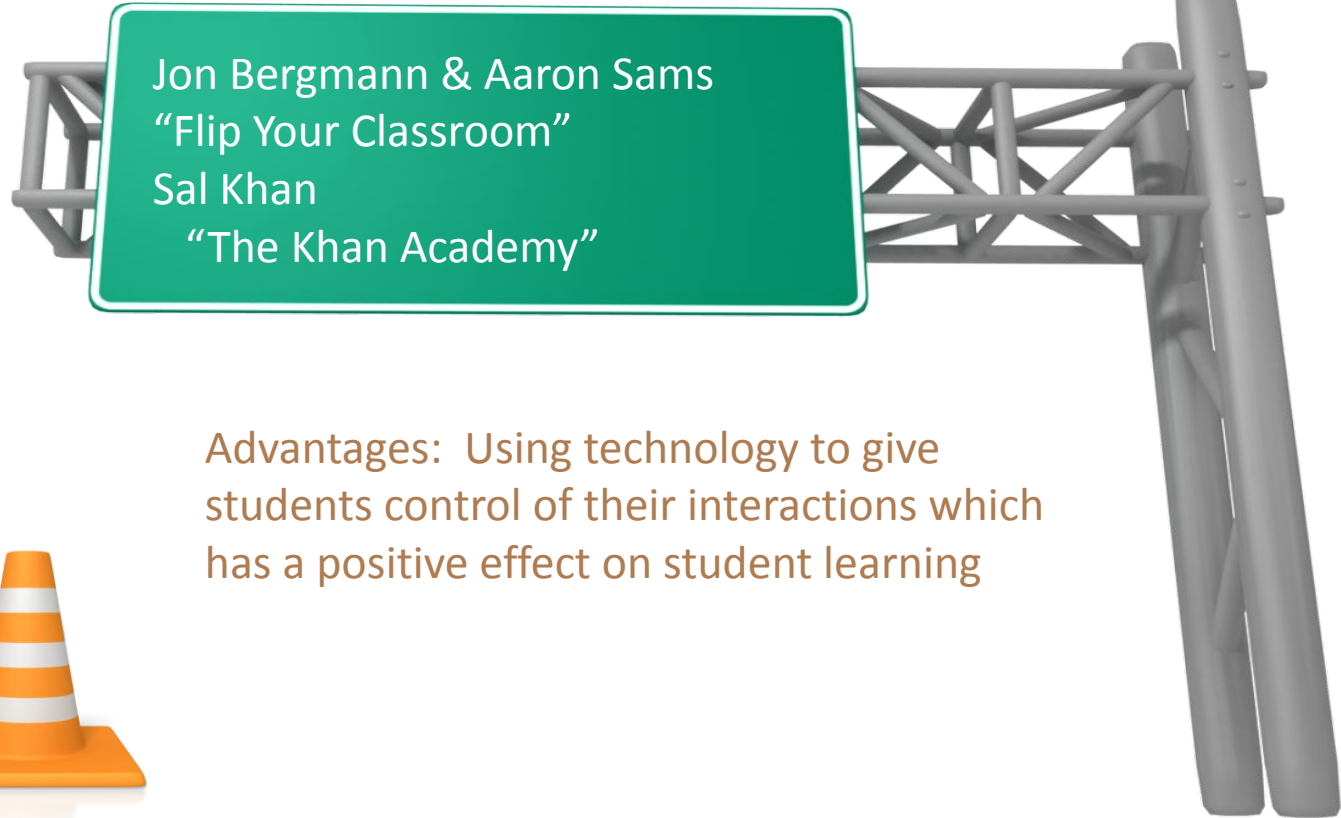


# There are Many Ways to Flip Your Classroom

- Don't think you have to make your own videos—there is much available now on line especially at Khan Academy
- Takes time to plan on what “parts” of your content/classroom you want to flip—not everything fits with flipping”
- Find Help (like this workshop or a similar one) or a partner to work with to help you on this journey
- Find out what is the “best” way to access your students—what access do they have at home, do some need to have the information “burned” on a disc, do all have the capability of Elluminate, etc?
  -
- Find a way to engage students in the videos, not just “listening” to lectures online. Should follow by some sort of discussion questions, etc.



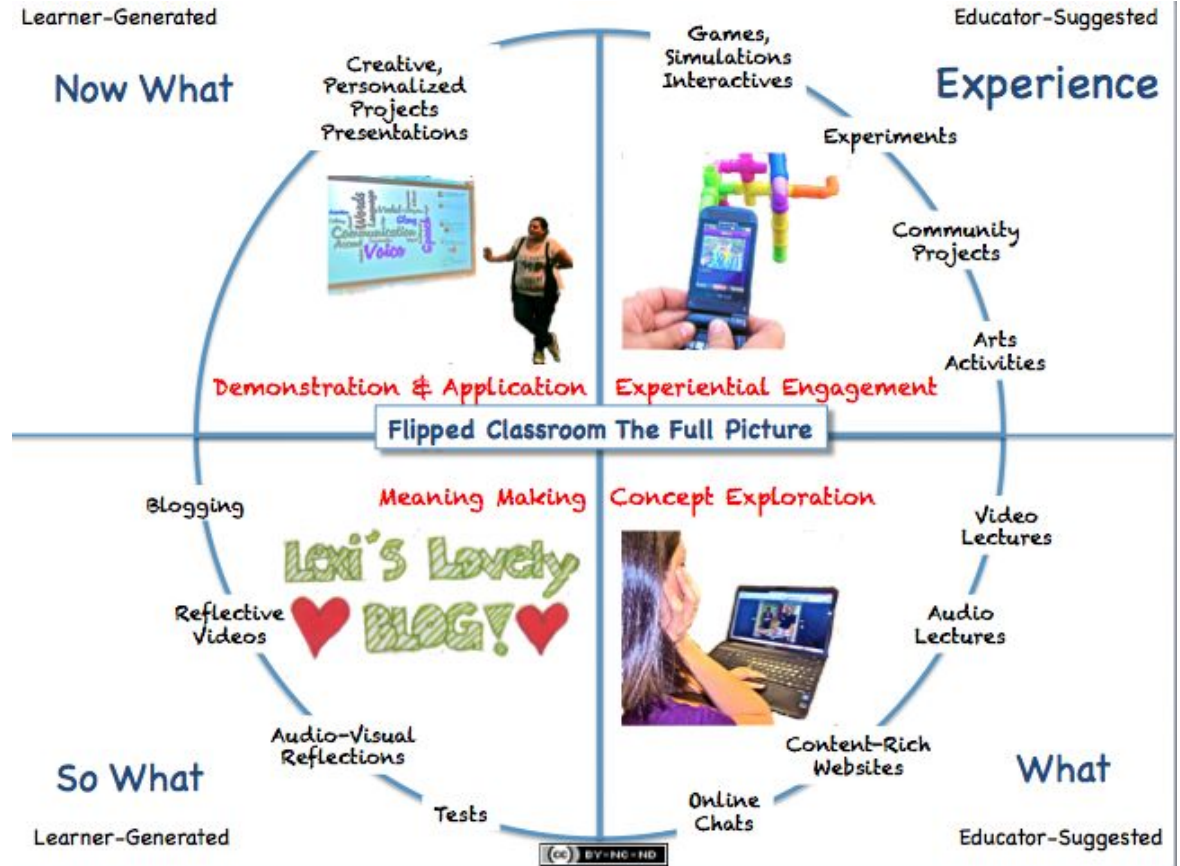
# Excellent Resources



Advantages: Using technology to give students control of their interactions which has a positive effect on student learning



# The Flipped Classroom Model



# Problems:

We don't know what to do with the extra time if we do not lecture in the class.

How we teach changes considerably

Time is needed to develop the videos and discussions as well as activities that will be done in the classroom

To “do what you want with the time in classroom” is not enough to help teachers know what to do!



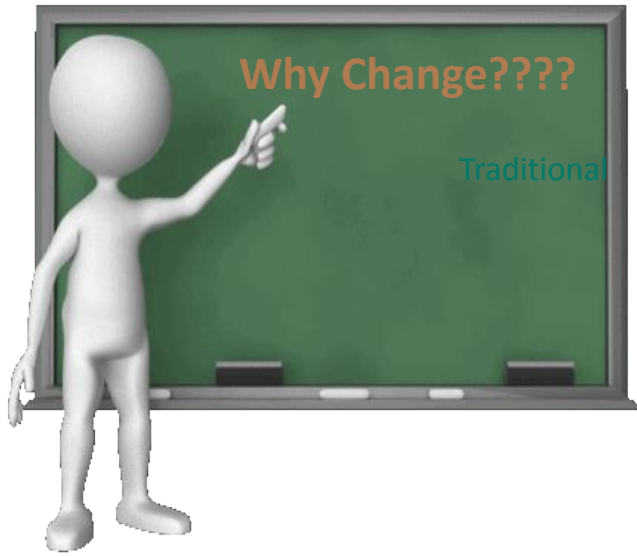
# Comparison Traditional to Flipped

Traditional

Activity	Time
Warm-up Activity	5 min
Go over previous night's homework	10-15 min
Lecture new content	15-20 min
Guided and independent practice and/or lab activity	10-15 min

Flipped

Activity	Time
Warm-up Activity	5 min
Q&A time on video	10 min
Guided and independent practice and/or lab activity	35 min



# Flipping

- Speaks the language of today's students
- Helps busy students
- Helps struggling students
- Helps students of all abilities excel
- Allows students to pause and rewind their teacher
- Increases student-teacher interaction
- Allows teachers to know their students better
- Educates not only students but parents and other siblings

# Why You Should Not Change--If

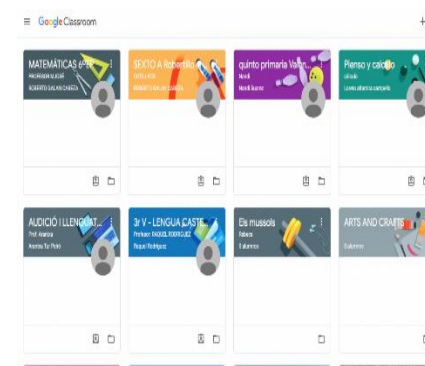
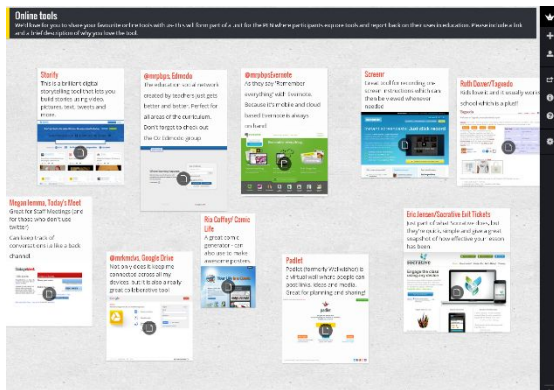
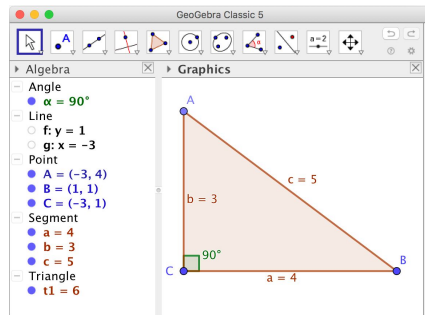
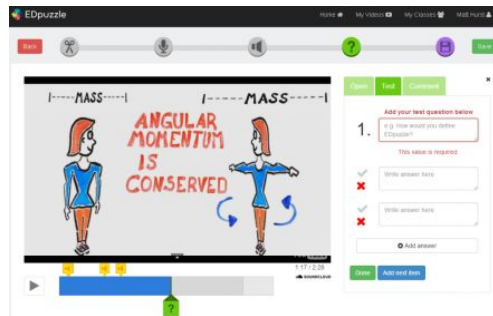
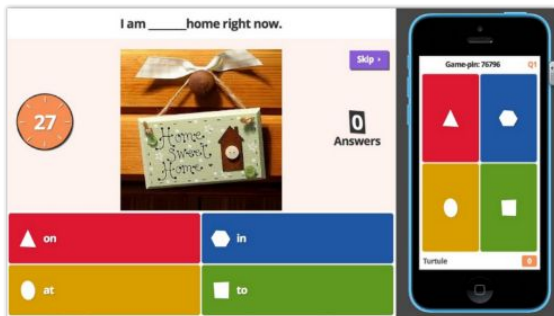


**Because you  
think it is  
cutting edge**

**Because it  
is easier**

**Because  
everyone is  
doing it!**

**Because it  
exempts us  
from being  
good teachers**





## Khan Academy-Most Known for Flipped



# Questions? More Information?



Iohana Cristina Udrescu

[iohana4@yahoo.com](mailto:iohana4@yahoo.com)

I would love you to go on the journey of  
change with me 😊

# What's Next?

Step 1



Step 2



Step 3



Step 4

Make Commitment to Change-Join Our Group 😊

Learn about Flipping –Good, Bad and Ugly

Develop Your First Flipped Class Video (or whatever venue you choose)

Plan to begin to use next summer or fall

# Most Used Tools For Flipped Classroom

**Kahoot** gives users the ability to create an interactive, game-based assessment.

**Edpuzzle:** Instructional videos are an important component of the flipped classroom. While there are many schools of thought concerning teacher presence and action in these videos and how long they should be, most teachers would agree that students should be held accountable for the video content and that teachers should have a way to monitor student progress and provide timely feedback.

**Edpuzzle** allows teachers to do just that, and it provides teachers with the ability to embed a variety of formative assessments into videos they create or use from other sources. Students can access Edpuzzle videos from any browser or through iOS or Android apps, so it's very convenient.

Combining new educational approaches and educational technologies can make mathematics education more adaptable to pupils' needs in the 21st century. In a math lesson using the flipped approaches to education using *GeoGebra* makes things more easy.

Teachers can create a new Padlet wall for each video or unit and encourage students to ask questions and answer their peers' questions about content as a review for unit assessments. Using an extension such as Screencastify, teachers can create screencasts of the Padlet wall for their students to use as a study aid.

**Quizizz:** Formative assessment is extremely important in any classroom, and flipped classrooms are no exception. The flipped strategy puts more responsibility for viewing and interacting with content on the students, and formative assessment is therefore needed after every video.

**Google Classroom:** Teachers use Google Classroom in a variety of ways—to deliver assignments to students and to provide effective and efficient feedback, for example—and it can be a great landing page for students as they navigate assignments. At the beginning of a lesson, teachers can direct students to assignment goals, objectives, and instructions in Classroom. Classroom can also be used to distribute a lesson's digital texts and other resources.

**BookWidgets** allows you to make interactive lessons. BookWidgets provides strong digital templates of all kinds of interactive exercises. You just have to add your own content.



# Project Based Learning -Portugal

The main objective of developing projects is to improve the quality of learning, as content from different disciplines is articulated, seeking to give them practical meaning.

With the development of the project methodology, the practical component of learning is also valued, with very significant learning results.

The Portuguese education system has a profile of skills for the student when he finishes his basic educational path. The project methodology combine efforts in the development of these skills.

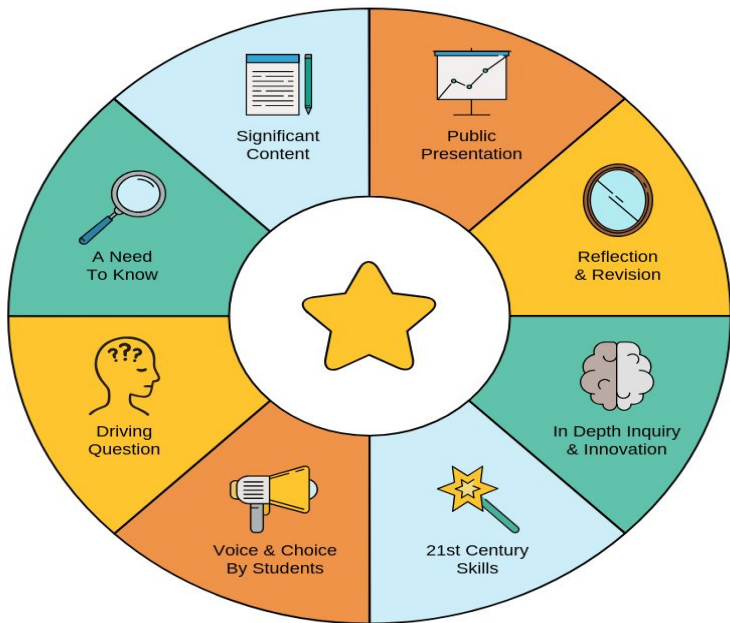
Our school's educational project has 3 main projects that are developed throughout the year: 5 More; Knowledge Workshops; and CLIL, that we present in a summarized form.

Project Based Learning is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an engaging and complex question, problem, or challenge. Project-based learning (PBL) is a student-centered pedagogy that involves a dynamic classroom approach in which students acquire a deeper knowledge through active exploration of real-world challenges and problems. Students learn about a subject by working for an extended period of time to investigate and respond to a complex question, challenge, or problem.

Definitions: It is a style of active learning and inquiry-based learning. PBL contrasts with paper-based, rote memorization, or teacher-led instruction that simply presents established facts or portrays a smooth path to knowledge by instead posing questions, problems or scenarios. Thomas Markham (2011): Project-Based Learning (PBL) integrates knowing and doing. Students learn knowledge and elements of the core curriculum, but also apply what they know to solve authentic problems and produce results that matter. PBL refocuses education on the student, not the curriculum. These cannot be taught out of a textbook, but must be activated through experience."



## Elements Of Project Based Learning



## 8 PROJECT-BASED LEARNING TIPS FOR TEACHERS



PBL ≠  
'Doing Projects'



PBL =  
a Team Effort



Students & Parents  
must understand  
the process



PBL empowers  
students



The right technology  
can make all of  
the difference



PBL forces  
students to see  
learning differently



Developing quality  
essential questions  
takes practice



Patience is key!



## STUDENT ROLE

Determine their projects, encouraged to take full responsibility for their learning. This makes PBL a constructivist learning method.

Students work together.

Use technology to communicate actively with teacher and peers others.

The student is makes choices on obtaining, displaying, or manipulating information.

Every student has the opportunity to get involved either individually or as a group.

Student role is to ask questions, build knowledge, and determine a real-world solution to the issue/question presented.

Students must collaborate to expand their skills and engage in focused communication.

Think rationally to solve problems.PBL forces students to take ownership of their success.

# TEACHER ROLE

## Facilitator

They develop an atmosphere of shared responsibility while having the overall control of learning.

Regulate student success with intermittent, transitional goals to ensure student projects remain focused and students have a deep understanding of the concepts being investigated.

The students are accountable to the goals through feedback and assessments.

The ongoing assessment and feedback to ensure the student stays within the scope of the question and the core standards the project.

Evaluates the finished product and learning that it demonstrates

IS IT A PROJECT OR IS IT PROJECT-BASED LEARNING?	
PROJECTS	PROJECT-BASED LEARNING
Can be done alone	Requires collaboration and teacher guidance
About the product	About the process
Teacher-directed	Student-directed
All projects have the same goal	Students make choices that determine the outcome
Products are submitted to the teacher	Products are presented to an authentic audience
Lack real-world relevance	Based in real-world experiences or problems
Occur after the "real" learning	Real learning occurs through the project

educationcloset



## Project of Articulation Between Cycles

During the academic year, groups of students from the 2nd and 3rd cycle Educational Teams travel regularly to EB 1/JI and vice versa, to present/develop works in the field of Experimental Sciences, TIC, Physical Education, Arts, Music, ..., implying interaction with pre/1st cycle children, or even to develop common projects. The interaction of the groups should be maintained over the years in the following scheme: Pre/5th; 1st/6th; 2nd/7th; 3rd/8th; 4th/9th.

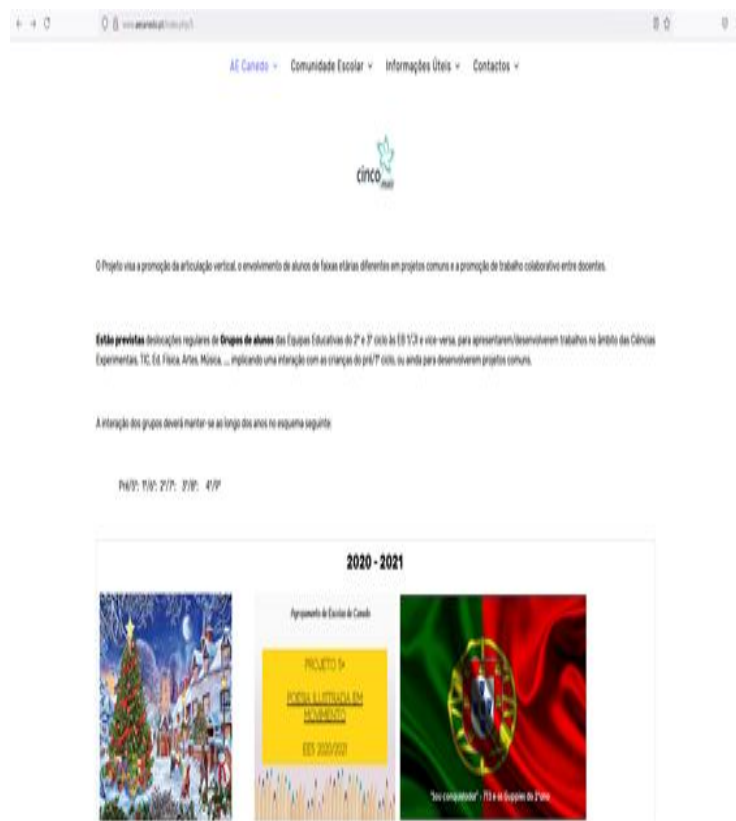


As an example, we present the project developed between preschool and 5th grade students.

Given the difficult pandemic situation in which we live, the work was entirely done at a distance, using TIC tools.

In this project the 5th year students, in Portuguese classes, developed skills related to the poetic text and produced poetry. Afterwards, the preschool students, after receiving the poems, made the respective illustrations. In the end, the result of the work carried out was compiled in a digital notebook that can be consulted on the our website:

<http://www.aecanedo.pt/index.php/5>





# Knowledge Workshops

## Articulation Projects Between Disciplines

With a view to producing better learning, from the 5th year onwards, 3 different subjects can join together to develop a common project. At the origin of this articulation is the profile of the student leaving education. The different subjects must develop basic skills of the student's profile through the development of their subjects.

The constitution of the working groups should be adapted to the interests and levels of development of the respective students;

- The adopted methodology will seek to privilege group work, practical and/or laboratory, autonomous, aiming to develop critical and creative thinking of students supported and monitored by teachers, both in identifying the problem and in developing the project;
- The activities should take place in different spaces: multidisciplinary room, outdoor spaces, field trips...
- A collaborative work will be developed in strict articulation with the Library, CLUBS...
- The functioning of the workshops may differ according to the year of schooling (semester, by term...)



By clicking on the image on the side, you can see the work carried out in the knowledge workshops of 1st and 2nd cycle students.

As an example, in the 5th year, the disciplines of Health, Physical Education and Science were joined and developed a project under the theme of health promotion through the regular practice of physical activity.

At the base of the work to be developed in each subject is always the promotion and development of the essential skills of the student's profile.

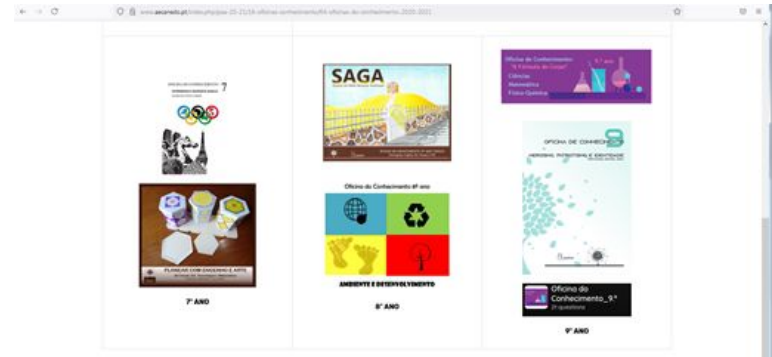




By way of example, in the 9th year, the disciplines of Science, Mathematics and Physical Chemistry were added and developed a project under the theme The Formula of the Body.

Each discipline made its contribution, seeking to articulate contents in order to promote meaningful learning.

In the end, students learn better and realize the importance of each discipline's contribution to the topic at hand.







# Content and Language Integrated Learning

Its principle is the teaching of different subject contents through a foreign language (ENGLISH), which is used as a tool to learn and as a way to motivate for learning.

This project assumes that classes are taught in two languages (Portuguese and English) and by two teachers simultaneously (one to two hours per week).

In practice, this project presupposes that the 1st cycle Studies of the Environment and Plastic Expression classes are taught in two languages and by two teachers at the same time - one teacher for each specific curricular area. Classes involve a very strong practical component, through the realization of projects, posters, research and daily experimental work. The project progressed in 2019/2020, in the 1st cycle (1st year), in the areas of E.Meio and/or Expressions, and it is planned to be extended to subsequent years in the next academic years.

# Content and Language Integrated Learning

This school year, activities were developed to enrich the understanding of disciplinary content in the Environmental Study subject. By watching animations, using new digital tools, exploring images and stories, making interactive games, singing songs and preparing teaching materials, students developed linguistic and cognitive skills that promote improved academic success.

