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STEAMTeach

STEAM Education for Teaching Professionalism

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STEAMTeach Austria

RESOURCES

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Analysing Sporting Performance

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Try Tracker Online

Over 1 million users in 26 languages. Completely free and open source.

Latest Tracker 6 installers: [Windows](#) | [Recent MacOS](#) | [Older MacOS](#) | [Linux](#)

Upgrade installers (requires earlier Tracker 6): [Windows](#) | [Recent MacOS](#) | [Linux](#)

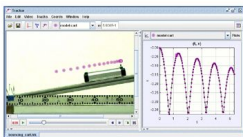
[Installer Help](#) | [Change Log](#) | [Discussion Forum](#)

Tip: save your work as a [Tracker Project](#). Easy to build and share. Easy to browse in the [Library Browser](#).

What is Tracker?

Tracker is a free video analysis and modeling tool built on the [Open Source Physics](#) (OSP) Java framework. It is designed to be used in physics education.

Tracker **video modeling** is a powerful way to combine videos with computer modeling. For more information see [Particle Model Help](#) or AAPT Summer Meeting posters [Video Modeling](#) (2008) and [Video Modeling with Tracker](#) (2009).



Installing and using Tracker

Tracker Features

Tracking:

- Manual and automated object tracking with position, velocity and acceleration overlays and data.
- Center of mass tracks.
- Interactive graphical vectors and vector sums.
- RGB line profiles at any angle, time-dependent RGB regions.

Modeling:

- Model Builder creates kinematic and dynamic models of point mass particles and two-body systems.
- External models animate and overlay multi-point data from separate modeling programs such as spreadsheets and [Easy Java Simulations](#).
- Model overlays are automatically synchronized and scaled to the video for direct visual comparison with the real world.

Video:

- Free Xuggle video engine plays and records most formats (mov/avi/flip4/wmv etc) on Windows/OSX/Linux.
- Video filters, including brightness/contrast, strobe, ghost trails, and deinterlace filters.

Tracker Free Software

<https://physlets.org/tracker/>

CCITE
Cambridge Centre for Innovation in Technological Education

HOME | Hothousing | Tracker | GeoGebra | Your Ideas!

HP Catalyst Academy supported Mini-Course

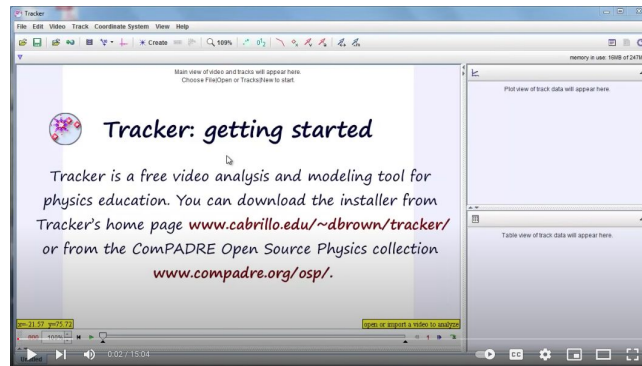
Analyzing Sporting Performance: a STEMx Toolkit
Tony Houghton and Adrian Oldknow
Cambridge Centre for Innovation in Technological Education

Original HP Analysing Sporting Performance

<https://sites.google.com/site/cciteasp2/home>

Analysing Sporting Performance PDF

https://docs.google.com/document/d/1mfmlUIQ2VpJ7F4ejm_dRNxSJLxB3vOFeaZ/edit?usp=sharing&oid=116785179076121452044&rtopof=true&sd=true



Getting Started with Tracker - D. Brown

<https://youtu.be/La3H7JywgX0>

3D Modeling and Printing

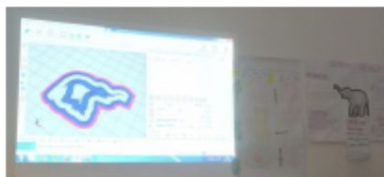


Using art to create 3D models additionally inspired teachers to collaboratively create their own tools to utilize in their lessons. This showed us that using art as a motivating factor can help teachers to focus on and enjoy the opportunities of a technology and overcome resentments.

3D printable puzzles [12] to play and models created on GeoGebra [6] platform > Passive enjoyment



Real life object > 3D print > Active engagement



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3D Modeling and Printing PDF

https://docs.google.com/document/d/19L2lkRpUBqH-es0HNjHE9iqplYhc7_A7/edit?usp=sharing&oid=116785179076121452044&rtpof=true&sd=true

1.1 Project Overview

Participant age: From 20 to 65	No. of participants: Groups of 10 to 20 people	Duration: 5 to 6 hours, 2 parts
Level of knowledge: Basic Knowledge of GeoGebra, PC user, owner and user of a smartphone	No. of teachers: 2 to 3 people would be perfect, one is the minimum	Type of venue: A mix between a computer classroom and a makerspace with 3D printers
Learning methodologies: Collaboratively working on problems, task based	Involved disciplines: all STEAM disciplines are involved	Technological needs: Computers, two tablets, internet, 3D printers
Most emphasised learning methodology: Collaboration and problem based learning, modelling	Main addressed topics: 3D thinking, mathematical modelling	Estimated project cost: 1500 €

2.2 Content

DISCIPLINE	CURRICULAR CONTENT ADDRESSED
Science	Temperatures, slopes, shrinking of material, chemical components of materials, glass and melting points, ...
Technology	The use computers and CAD programs that are easy to use from 10 years and above
Engineering	The use 3D printers and create models that can be created in the real world
Arts	design objects that not only fulfill a purpose but that also express one's inner world
Mathematics	mathematical modelling, geometry, vertices, calculus, mirroring, scaling, ...



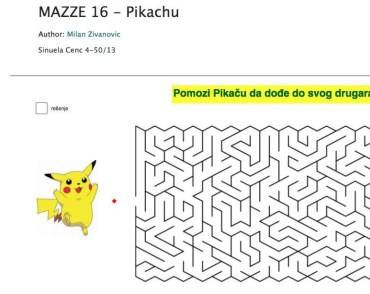
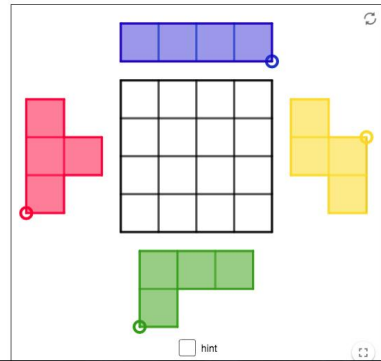
Student-generated Microgames

Microgames PDF:

https://www.steamteach.unican.es/wp-content/uploads/2021/11/STEAMTeach-Activity_Imam.pdf

Can you fit the four pieces into the square? Why?

Author: Diego Lieban
Topic: Logic, Square



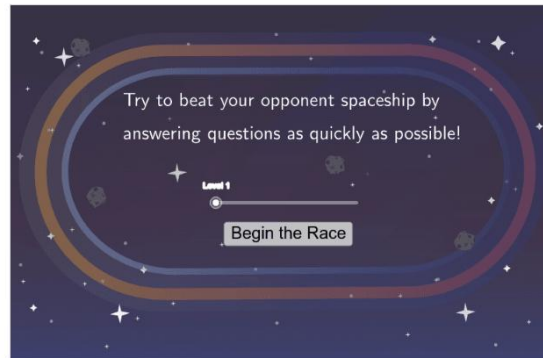
The present activity promotes students and teachers to be able to develop microgames on the GeoGebra platform. The activity could empower them to explore arts in connection to science, technology, engineering, and mathematics. Students and teachers could start expressing their creativity by designing a very short and small game with mathematical contents. This process is followed by constructing the design on GeoGebra so that they can apply science, technology, and engineering during the game developments. The process of designing and developing microgames can be done individually or in collaboration with peers. They may also share the created games to their peers for testing.

1.1 Project Overview

Participant age: 15 - 45	No. of participants: Groups of 3 - 5	Duration: 5 hours
Level of knowledge: Basic of GeoGebra, computer, and programming	No. of teachers: 2 - 3	Type of venue: Regular classroom Computer laboratory
Learning methodologies: Project-based learning Collaborative learning	Involved disciplines: Science Technology Engineering Arts Mathematics	Technological needs: Paper and pencil Computer Internet
Most emphasised learning methodology: Project-based learning	Main addressed topics: Mathematical games	Estimated project cost: 500 €

Topic: Addition, Integers, Subtraction

A game to practice adding and subtracting integers



2 CURRICULAR CONTEXT

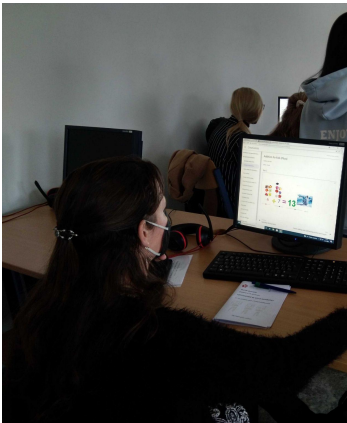
2.1 Key competences

The present activity develops students and teachers competences on digital literacy and STEAM.

2.2 Content

The content of this activity is described in the following table.

DISCIPLINE	CURRICULAR CONTENT ADDRESSED
Science	Proof of game concept
Technology	Computer and programming
Engineering	Coding and programming
Arts	Design and visualisation
Mathematics	Mathematical contents



Zero Cost Energy Scrap Bike



Diy Electric Bike From Scrap ||
Homemade Electric Bicycle

https://www.youtube.com/watch?v=giu_vrSfARM



Scrapyard articles, prices...jobs, family livelihoods

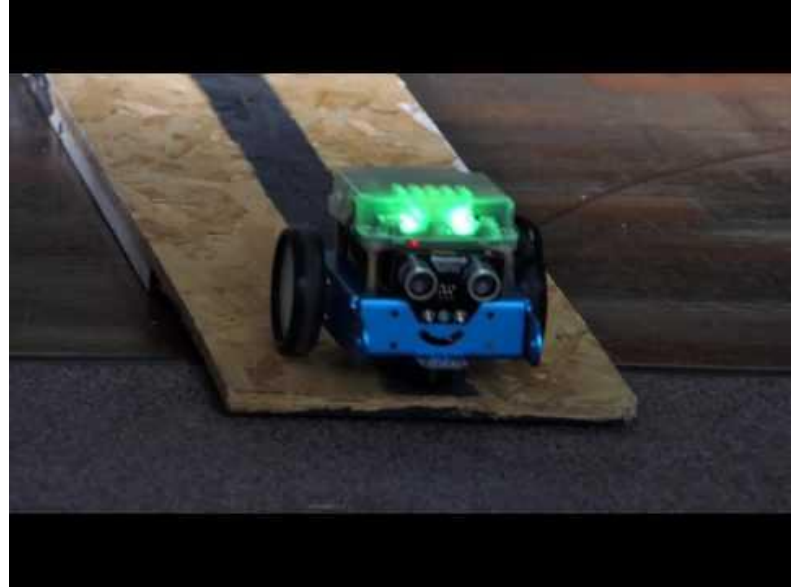
<https://youtu.be/nrukZNcAqnw>

Chain Reaction



Rube Goldberg Machine

https://youtu.be/863z_eHGIJw



Westbridge Chain Reaction

<https://youtu.be/j7dodM5Esjw>