

Creating a new level at Crayon Physics

Deluxe

Previous compulsory steps / Prior students' knowledge	Playing the sandbox game: Crayon Physics Deluxe
Learning objectives	Learning how to create a new level for video games comprehension in basic laws of gravity and kinematics
Subjects	Computer Science, Physics
Recommended Age	10 - 14
Material needed	Crayon Physics Deluxe, Interactive Whiteboard, tablets or pc with touch screens or digitizers (for students)
Sequence duration	90 – 100 minutes
Individual or group activity	Individual and group activity
Similar games that you can use with the sequence	Algodoo (replacing videos for Crayon with relative to Algodoo videos)
Expected production	Creation of new Level at game Crayon Physics Deluxe
Skills developed (after learning objectives)	Creativity, critical thinking
Price range of the game	(<20€)
Useful site for teacher	http://www.clab.edc.uoc.gr/hsci2010/Pdfs/362.pdf

Tips for inclusion	IWB with touch screen or a digitizer are recommended for pupils with special difficulties
Tips for shortening the duration of the sequence	Step 3 can be completed at home or you can propose a level concept to your students instead of having them brainstorm it.

Step by step: how to implement the sequence

In this sequence, students can create a new Level for Crayon Physics Deluxe. They will draw the animation and the possible interaction within the game.

“**Crayon Physics Deluxe** is a [puzzle video game](#) designed by [Petri Purho](#) and released on January 7, 2009. An early version, titled **Crayon Physics**, was released for Android from 2006-2007 developed by Acrodea Korea, Inc. Deluxe won the grand prize at the [Independent Games Festival](#) in 2008. It features a heavy emphasis on two-dimensional physics [simulations](#), including gravity, mass, kinetic energy and transfer of momentum. The game includes a [level editor](#) and enables its players to download and [share custom content](#) via an online service. The objective of each level in Crayon Physics Deluxe is to guide a ball from a predetermined start point so that it touches all of the stars placed on the level” (“Crayon Physics Deluxe,” 2021).

- **Step 1 – Playing a few levels (15 minutes)**

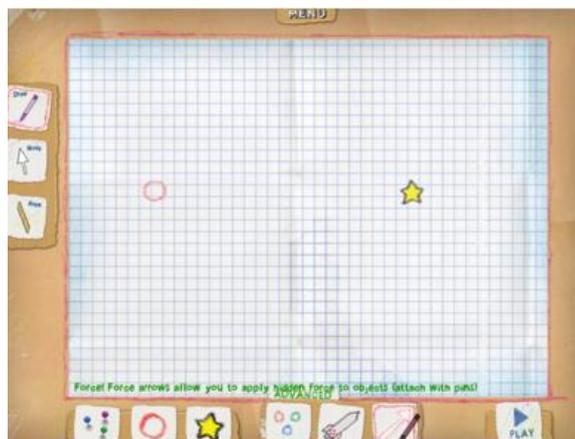
Your students, as an inspiration and to get more familiar with the gameplay of the game, should play a few levels (at least the students that had not played it before). In that way, they will see and understand the basic rules and the building materials that make up the game, such as rope, rocket, rigid points etc. Interchangeably, students could watch videos suggested below. This can also be done at home (within a flipped classroom teaching technique).

- [Crayon Physics Deluxe walkthrough - YouTube](#)
- [Crayon Physics Deluxe PC Gameplay 1080p - YouTube](#)

- **Step 2 – Presentation of level creation by the teacher (15 minutes)**

In this step, you will create a new level and during the process you will explain to your students the use of tools that assist you to create this new level. Alternatively, your students could watch the videos below and you could explain the use of tools with more details.

- [Crayon Physics Deluxe Level Editor-1.](#)
- [Crayon Physics Deluxe Level Editor-2.](#)
- [Crayon Physics Deluxe Level Editor-3.](#)



Snapshot of Level Creator in Crayon Physics Deluxe

The game has also a website which is called "[Playground](#)" where more levels and ideas could be found and students can upload their creation (a new level) if they want to share it with others.

- **Step 3 – Brainstorming and developing the backstory of the level (25 minutes)**

The game is a two-dimensional (2D) world game. This is something that everyone should take into account at the beginning, as it must be clear that the laws of physics are in a way “restrained” in the two dimensions. The ball and every object in the game are obeying to the law of gravity and every impact is elastic (not plastic). The player can slightly move the ball by clicking on it and the player can draw physical objects on the screen which interact “physically” with the ball and each other. The object can change its properties and its identity if it has been drawn differently by the player. For example, it can be a rigid surface or a pivot point, a rope, or even a wheel.

Any shape that someone draws becomes a physical object which can “interact” with the ball. The ball can hit on it, roll on it, drag or carry it, and there are many more actions for your students to discover.

The game also gives to creators the option to add forces to objects and you can change the size and the direction of the force. A special feature is the addition of a rocket in the drawing which can add more surprises in the animation. So, thinking and taking into account the basic laws of physics, students (maybe in groups of two) could draw a new level in the game which is fun to play and obeys the physical laws.

Questions like the ones that are following could guide this step:

- How many stars would you like to add in the level?
- How many balls would you like to add?
- What objects would you like to draw?
- What objects would you like to be immobile?
- What properties the objects would have?'

- Would you like to add a rocket?
- In which physics laws you must pay attention to?
- Would like to draw (and in that way emulate a) phenomenon or a simple machine?
- What kind of machine would be that one?

Keep in mind that students could create:

- Bridges
- Scales
- Newton pendulum
- Car crash
- Pistons

Ideas about level creation can also be found in the videos that we had referenced before and at: “Playground”: <http://pg.crayonphysics.com/>

- **Step 4 – Creation of a new level (proposed time for a single level: 45 minutes)**

Every group of students at this step will create a new level of their own depending on the previous discussion and in yours continuing supportive interaction.

Even when working from an existing game template, level design is an important part of the game creation process that gives a game its identity. In this example from the project’s game creation workshop, the student chose to start focusing on volumes and overall level design in this car racing game rather than on graphic identity. Access it at: <https://coregames.com/games/a56c9d/g4ssupercorekart>

Resources

Getting the game:

http://www.crayonphysics.com/dl3.php?id=i50940Ya54beaa6a3a54e2f33683ca956b40de5&f=crayon_release55.exe

http://www.crayonphysics.com/dl3.php?id=i50940Ya54beaa6a3a54e2f33683ca956b40de5&f=crayon_release55.dmg

http://www.crayonphysics.com/dl3.php?id=i50940Ya54beaa6a3a54e2f33683ca956b40de5&f=crayon_release55_hotfix.tar.gz

https://store.steampowered.com/app/26900/Crayon_Physics_Deluxe/

“Playground Section”: <http://pg.crayonphysics.com/>

References

Crayon Physics Deluxe. (2021, September 29). In Wikipedia.

https://en.wikipedia.org/wiki/Crayon_Physics_Deluxe

Pulsar. (2013, March 10). Crayon Physics Deluxe walkthrough [Video]. YouTube.

https://www.youtube.com/watch?v=pFEwSY2AA9Q&ab_channel=Pulsar

Jimmy Dali. (2013, June 8). Crayon Physics Deluxe PC Gameplay 1080p [Video].

YouTube. https://www.youtube.com/watch?v=pFEwSY2AA9Q&ab_channel=Pulsar

Chanceman93. (2009, September 10). Crayon Physics Deluxe Level Editor [Video].

YouTube.

https://www.youtube.com/watch?v=Ogym3qOALhs&ab_channel=chanceman93

SamadA4. (2009, April 30). Crayon Physics Deluxe Level Editor. [Video]. YouTube.

https://www.youtube.com/watch?v=aklOlpauK5M&ab_channel=SamadA4

Chanceman93. (2009, September 10). Crayon Physics Deluxe Level Editor 3. [Video]. YouTube.

https://www.youtube.com/watch?v=YgsGHNK58MU&ab_channel=chanceman93

Information

All screenshots used in this sequence were taken from Crayon Physics Deluxe, Kloonigames (2009).

