



# APPLICATIONS FOR VIRTUAL LABORATORY

## Part 3 – Interactive 2D simulations made with Algodoo, for virtual laboratories

Intellectual Output 2 of Science Connect project,

ref.no. 2019-1-RO01-KA201-063169

### Help file

### Contents

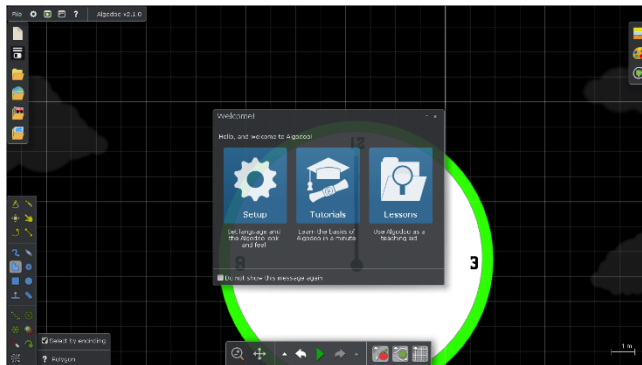
- APPLICATIONS FOR VIRTUAL LABORATORY .....1
- For opening and running simulations.....1
- Using the simulation.....2
- Instructions .....4
- Final tips .....4
- List of links for downloading Algodoo simulations made for Science Connect project .....4
- Wind farm .....4
- Spinner .....4
- Oscillations .....4
- Mixed pulleys .....4
- Inclined plane study .....4
- Elastic 2D collision .....4
- Demolition machine .....4
- Clock.....4
- Catapult.....4
- Catapult with spring .....4
- Car on a strange road .....4
- Cannon and collision .....4
- Note .....4

### For opening and running simulations

Note: to see Algodoo files, firstly install Algodoo (<http://www.algodoo.com/download/> ) then download the file and open it. The download process will start shortly.

On the same site you can access the tab Learn it.

On the same site you can go to the Learn it page, for the basics of Algodoo.

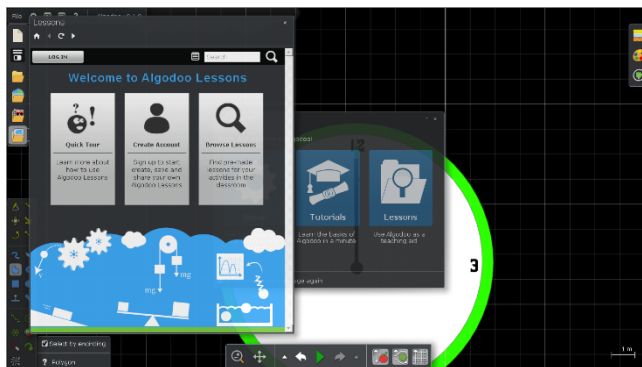


If you just want to use one of the simulations created with this software, the steps are as follows:

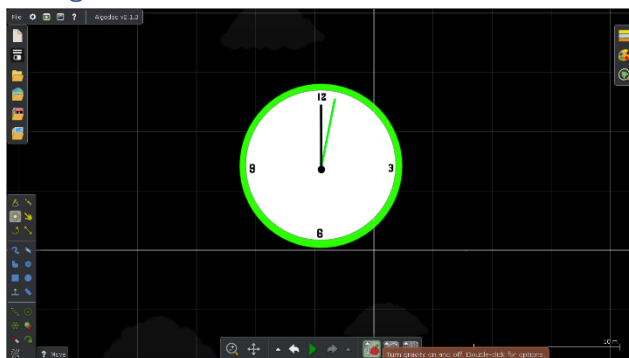
Double click on the Algodoo file, (.phz) and which is an archive.

You can access one of the sections, if you want to change the settings, go through the tutorials, which will teach you step by step how to use the program's facilities.

If you want to see lessons created with Algodoo, select Lessons and a new window will open. You will have to create an account to be able to create, save and share your own lessons, or you will be able to view lessons already created by others.

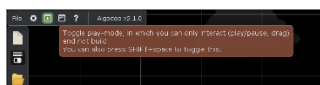


### Using the simulation

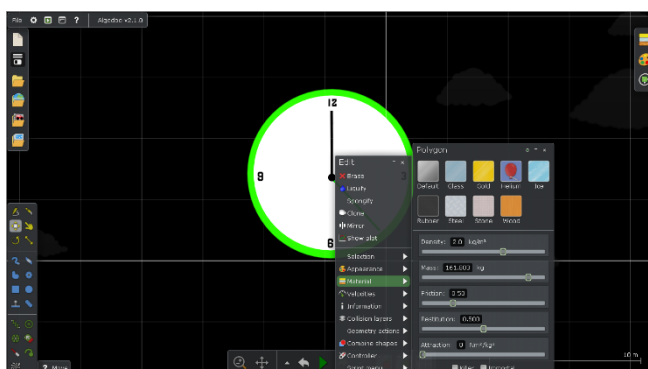


The main tools you will use while running the simulations are located in the toolbar located centrally at the bottom of the screen.

The purpose of each tool is explained if you place the mouse over it.



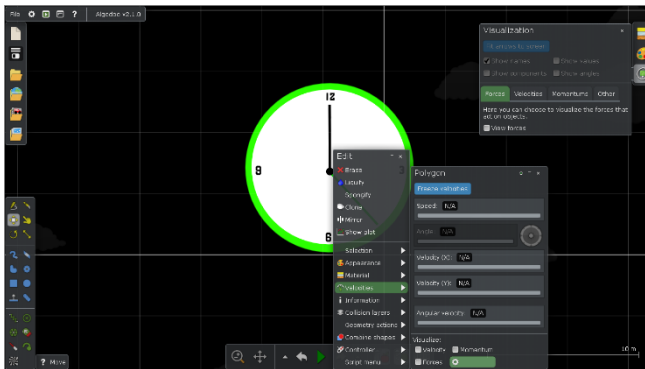
Although there is also the possibility to switch to using only the simulation, we do not recommend this option, it limits access to the use of the parameters of the digital models created, which is indispensable for their use in a virtual laboratory.



In Start or Pause mode, place the mouse over an object in the simulation and right-click to display the quick menu.

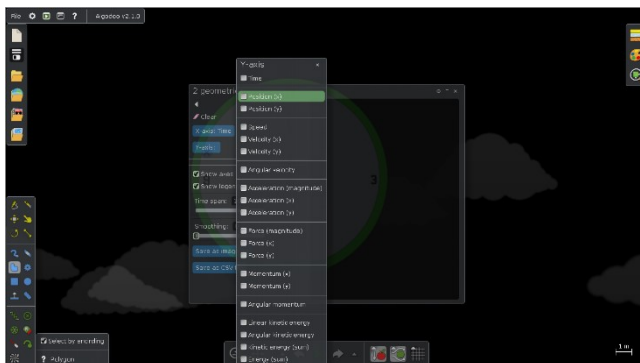
The Material tab allows you to quickly select/modify the properties of the body, choosing from the predefined material variants, or to modify different individual

parameters, specified according to the chosen body.



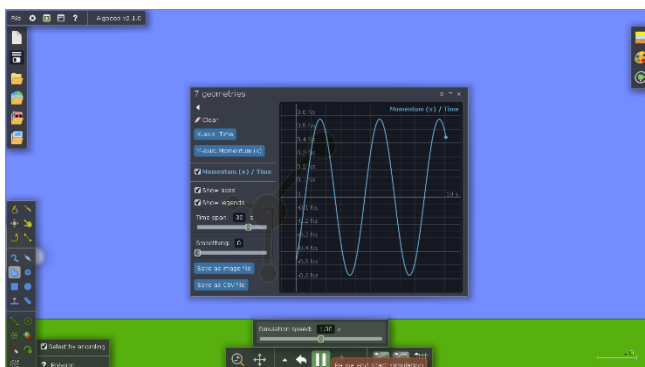
The Velocities tab is more complex, it allows you to view/modify individual parameters, or to select the visualization of these quantities, represented as vectors.

If the result of the modification is not the desired one, when you start the simulation, use the previous settings (Undo).



The Show plot tab allows you to select the type of 2D graphic display you want. You can select for each axis one or more quantities to represent. They are grouped according to their type. Two or more representations from different groups cannot be selected.

Although the software allows, we do not recommend selecting more than one quantity for the x-axis.



Tips: Do not close the Show plot window, only the show plot settings window, otherwise the graphic representation is no longer displayed.

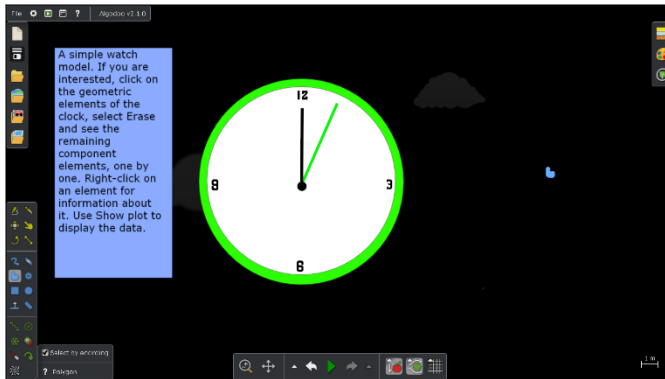
When you close the Show plot window, the next time it opens, the previously selected settings are displayed.

When you run the simulation, the selected graphic representation appears automatically. This stops if you pause the simulation, and restarts once the simulation starts.

You can select Save as image file or Save as cvs file, to document, share or later analyse the results obtained through the automatic collection of data and graphical representations, for the given simulation.



## Instructions



Each of the simulations created within the project has displayed instructions, which allow the use of the digital model for the purpose of studying a physical phenomenon or a mechanism. These instructions are not just steps to follow (do this...then this...). They are based on Inquiry based learning, asking questions derived from the violation of the

simulation and the dependencies between physical quantities, requiring the imagination and creativity of the students.

## Final tips

Distribute the simulations to your students, or show them to the class. Suggest that they bring changes, but which do not alter the results obtained with the basic version.

Use their creativity, proposing them to create other versions, possibly with other objects, that allow the study of the same phenomenon.

If you use the Algodoo simulations at the beginning of the study of mechanics or some simple mechanisms, propose to the students, as you move on to other study topics, to create their own simulations for their visualization or study.

List of links for downloading Algodoo simulations made for Science Connect project

[Wind farm](#)

[Spinner](#)

[Oscillations](#)

[Mixed pulleys](#)

[Inclined plane study](#)

[Elastic 2D collision](#)

[Demolition machine](#)

[Clock](#)

[Catapult](#)

[Catapult with spring](#)

[Car on a strange road](#)

[Cannon and collision](#)

## Note

All the simulations are created by the students, within the project.

They were shared and the displayed instructions are the result of discussions in the groups of students who used them, being supervised by the coordinating teachers.

Help File – How to open an Algodoo simulation and use it

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Use the students' imagination as a weapon to arouse their curiosity, to open their interest in the study of physics. Algodoo is one of the variants, created on strict, verified laws of physics, so the results that the students will obtain will contribute to the acquisition of skills in the field, subliminally.