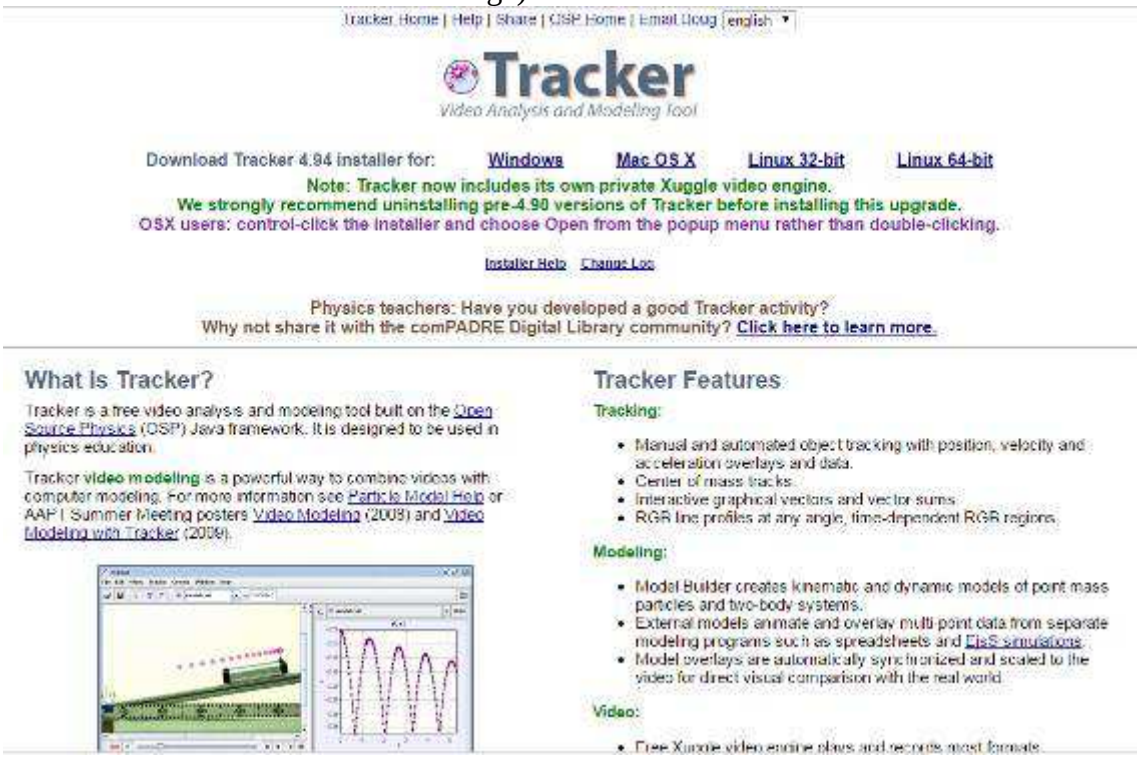
TRACKER USED TO STUDY PHYSICAL PHENOMENA

General description of the activity:

To choose a physical phenomena linked with a movement and obtain data using Tracker. Obtain a mathematical-physical model and conclusions related the phenomena

STEP 1

- To record a physical phenomena and use the video to obtain data with Tracker
- To use the obtained data to obtain a mathematical model. This mathematical model is, at same time, a physical model. There are different possibilities to use the obtained data:
    - Obtain the model directly, using a program to do it
        - Tracker
        - GeoGebra
        - Excel
        - Other programs
    - Obtain the model using mathematical tools (calculate the model using mathematical knowledge)



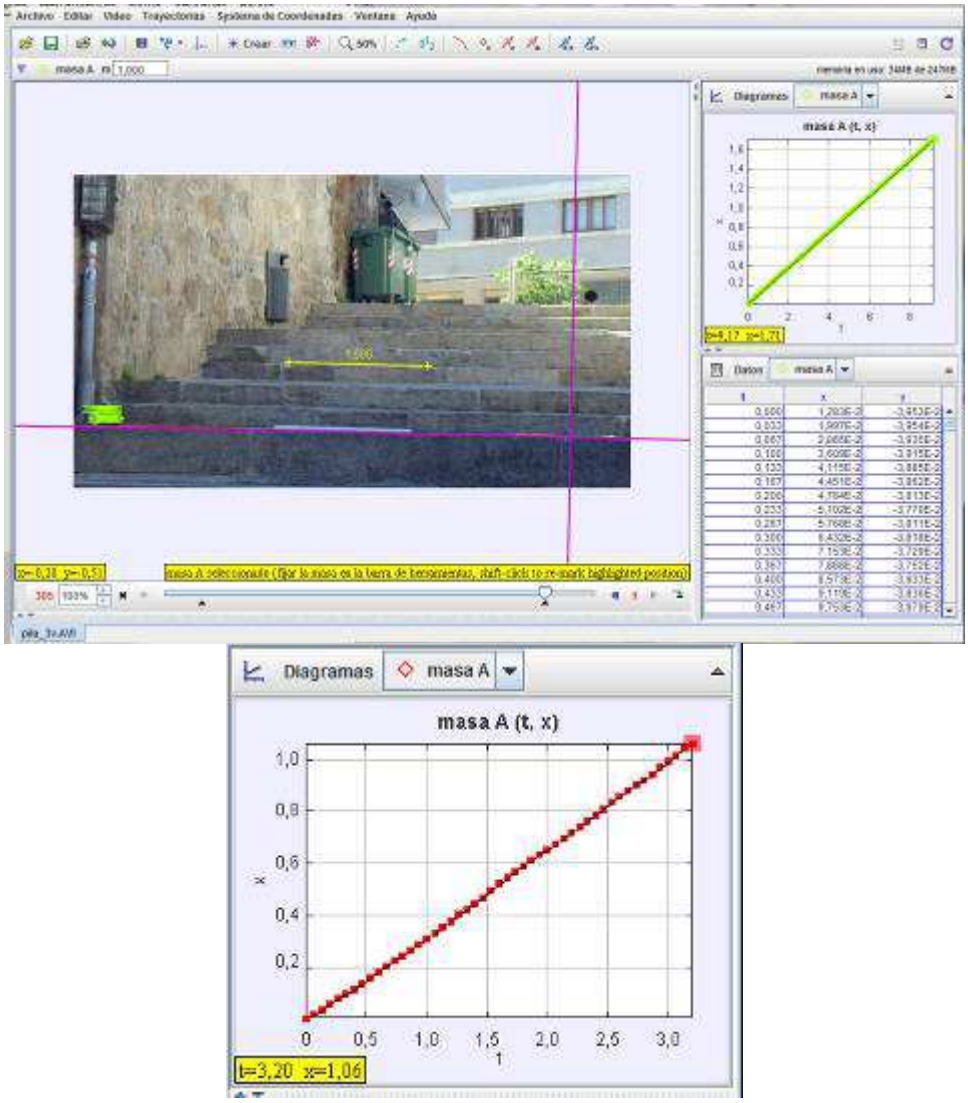
STEP 2

Implied knowledge in the obtained model:

- Mathematical variables↔Physical variables=Physical magnitudes
- Mathematical equation↔Pysical expression
- Mathematical parameters↔Physical parameters (initial conditions of the experiment)

STEP 3

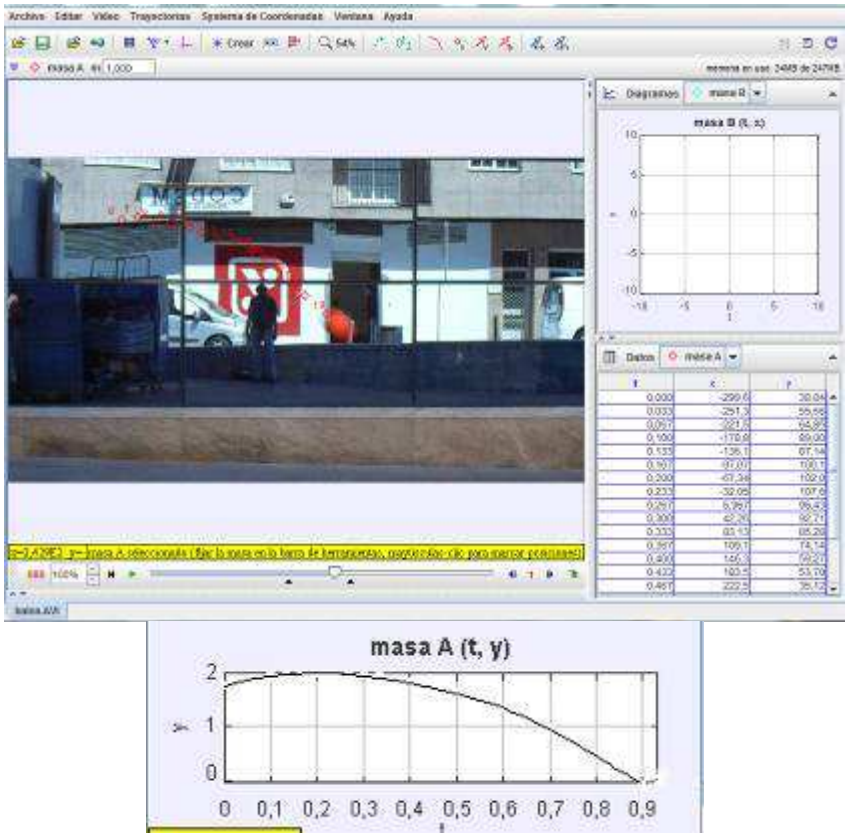
Conclusions: kind of movement, influence of the initial conditions in the mathematical-physical model, parameters and initial conditions, etc.



COLLABORATION OBJECTIVES

Teachers have a lot of possibilities to study. They have to decide what physical phenomena they want to study, what data they want obtain and what data they want to share with the other teams.

For example, they could decide to do a study of the parabolic movement. If they decide to study the parabolic movement, they can do it with a ball (typical object used like a example in this kind of movement). But they could decide use water to do something with the obtained model. That is to say, use the model to do one concrete thing. If they use water, they could decide design and build a model of a fountain with several water tap. The parabolic trajectory of the water in each water tap depends of several conditions. The influence of these conditions would be studied with the use of Tracker and the parabolic trajectory.



They could study the pendular movement. Each team of students could study the movement of a pendulum in several situations. Each team could do the study using all times the same length of the string but with different weights (the same weights for all teams). Each team will obtain different mathematical models but always of the same family function. As a result, the pendular movement depends of two initial conditions: the weight and the length of the string. Therefore, in the mathematical-physical expression will appear these two initial conditions. This option is an example of "collaborative learning" between students of different countries.