

Using PhET Simulations for Remote Labs

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Overview

PhET Today

158 simulations (83 in HTML5) &
2000+ sim-based lessons

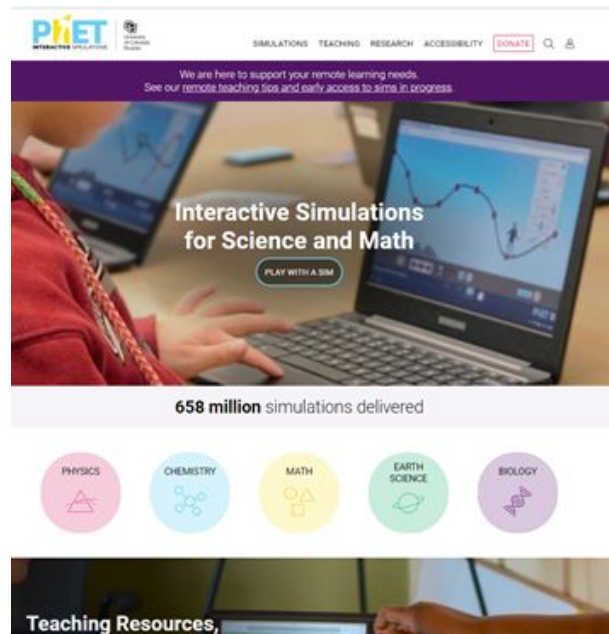
Physics, Chemistry, Math,
Biology, Earth Science

K-12 and College

Open education resources (free)

Translated into 90 languages

Run online or offline



<https://phet.colorado.edu>

Building PhET labs in 2020

Express your interest in working with others

([Share your name/info on this spreadsheet](#))

Summer 2020 PhET Lab Creation/Sharing Community Interest ☆ ↗ ↻

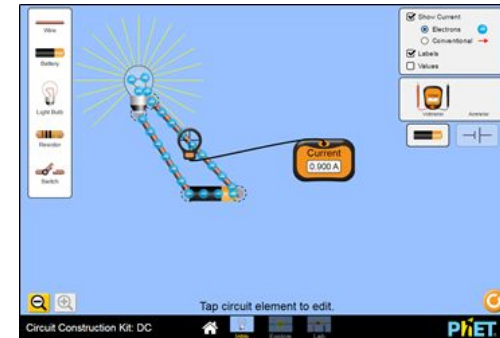
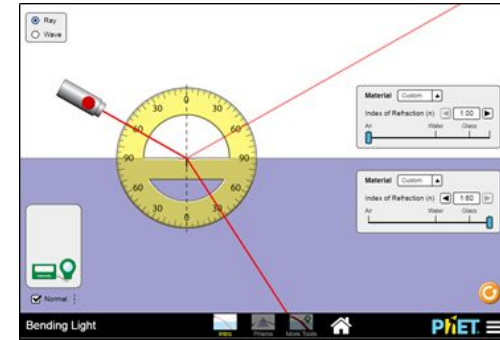
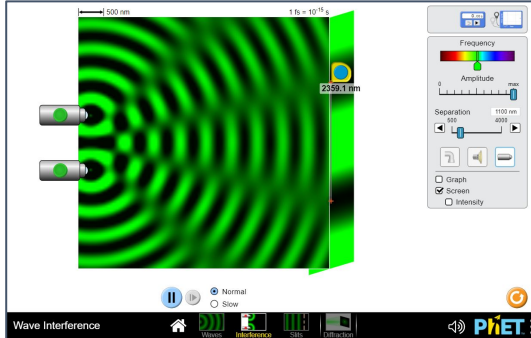
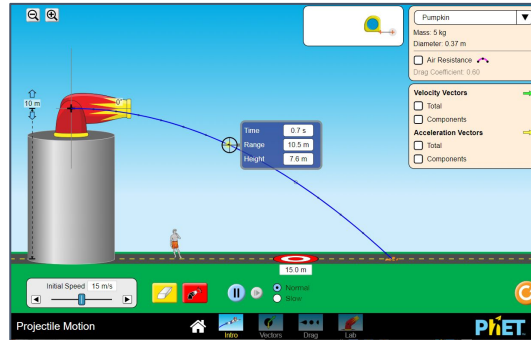
File Edit View Insert Format Data Tools Add-ons Help Accessibility Last edit was 13 minutes ago

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	A	B	C	D	E	
1	First Name	Last Name	Email	Institution	Physics Lab Course Level in which you want to use PhET	Have you c PhET Labs
2						
3						
4						
5						
6						
7						
8						
9						
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11						
12						
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14						

Example Sims

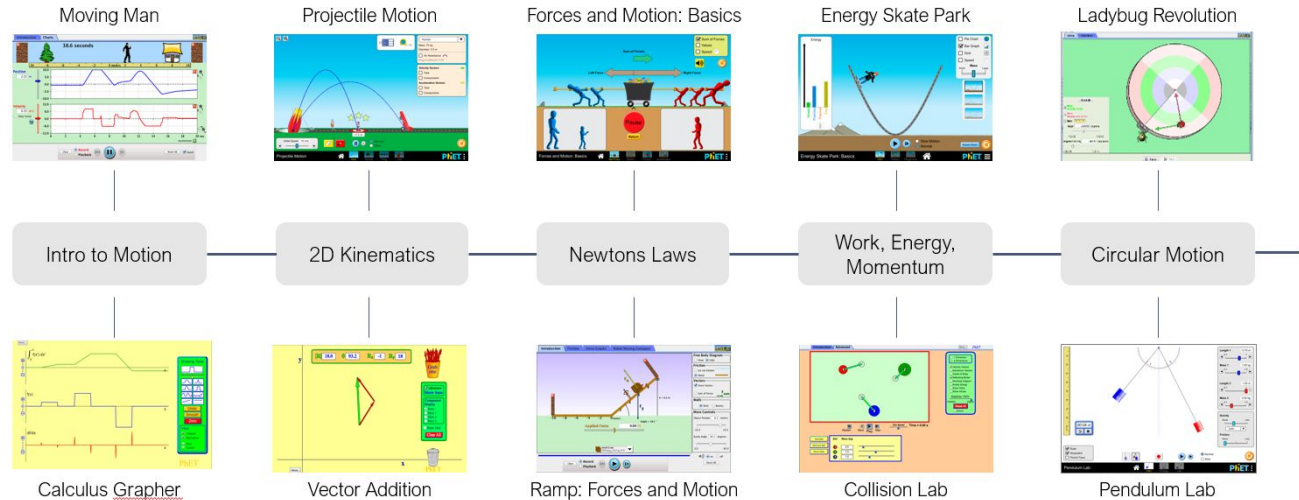
Open, flexible tools. Adapt to your class, students, and goals.



Energy Skate Park (full) Prototype ([link](#))

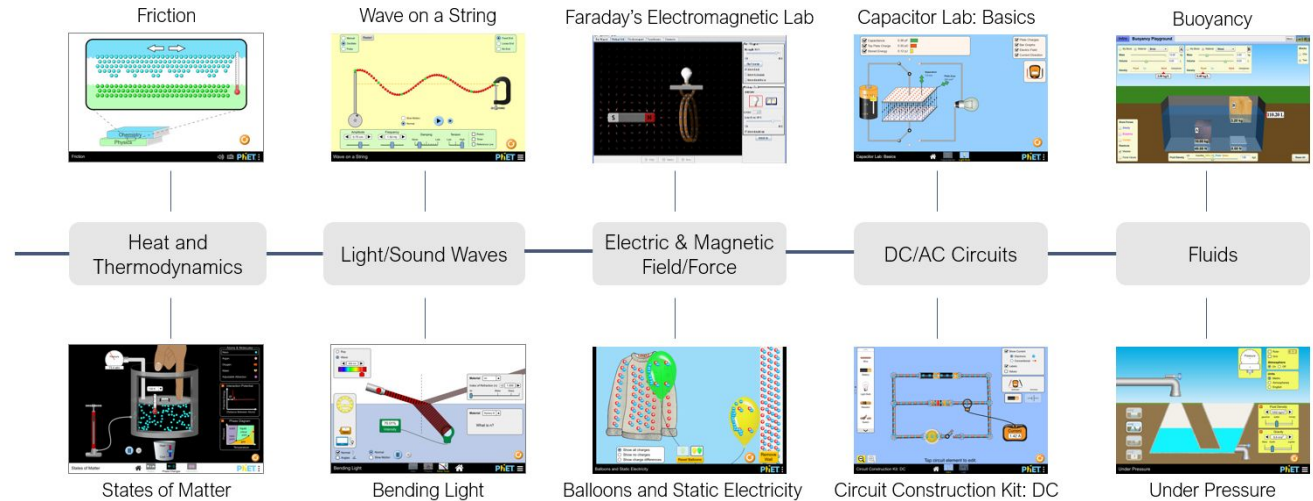
Physics Topic Alignment

106 Physics Simulations ([alignment doc](#))



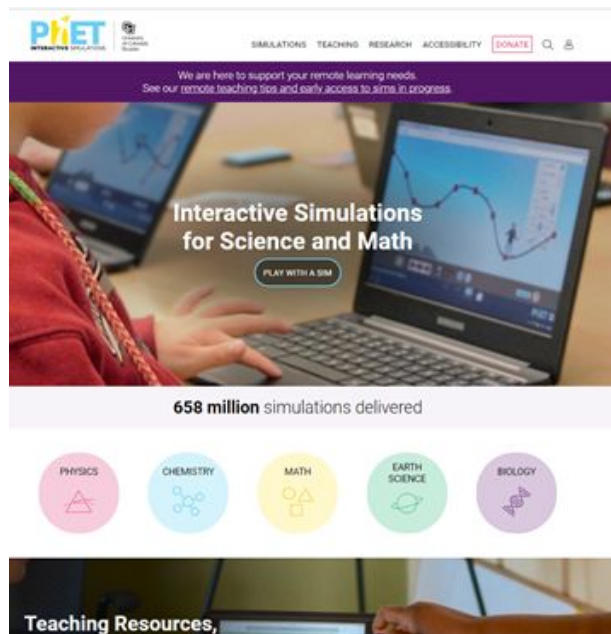
Physics Topic Alignment

106 Physics Simulations ([alignment doc](#))



Supporting remote learning

COVID-19 Specific: Remote teaching, Prototypes



NEW, NEW, AND NEW

Google Doc sharing
Remote Lab tag
Browser-compatible Java sims

HTML5 vs Java/Flash

Next Generation (83) vs Legacy Simulations (75)



HTML5

Runs on any device!

Recommended for:

Student use

Teacher use



Java

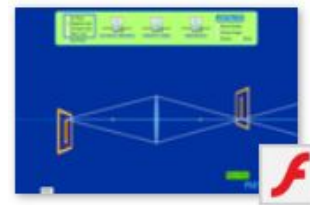
Original runs only on PC's (with effort)

Not useful for students

Recommended for:

Demo/Screencast

Alternative exists now!



Flash

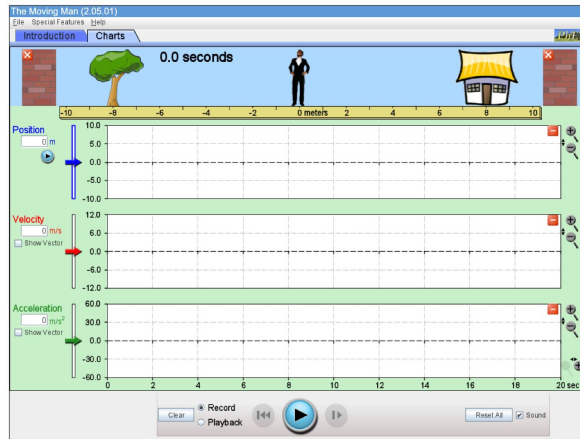
Runs on computers and chromebooks (with flash enabled)

Assign with caution

Recommended for:

Demo/Screencast

Java via
“Cheerpj”



PhET’s legacy Java sims can be run in the browser,
nothing to install!

(Performance does vary with device)

[Java via CheerpJ Simulations](#) document

Finding Sims

Early-release prototypes in HTML5:

Circuit Construction Kit AC Prototype:

http://phet.colorado.edu/sims/html/circuit-construction-kit-ac/latest/circuit-construction-kit-ac_en.html

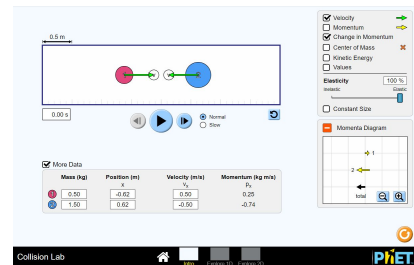
Energy Skate Park (full) Prototype (NEW MEASURE SCREEN!)

http://phet.colorado.edu/sims/html/energy-skate-park/latest/energy-skate-park_en.html

Density Prototype (NEW MYSTERY SCREEN!):

http://phet.colorado.edu/sims/html/density/latest/density_en.html

Collision Lab Prototype coming soon



Finding Lessons

(2000+ lessons)

Browse sim-specific lessons under “Teacher Resources”:

- ▶ ABOUT
- ▶ **FOR TEACHERS**
- ▶ TRANSLATIONS
- ▶ RELATED SIMULATIONS
- ▶ SOFTWARE REQUIREMENTS
- ▶ CREDITS

Teacher-Submitted Activities

TITLE	★	PhET	AUTHORS	LEVEL	TYPE	SUBJECT
Beer's Law Lab - Guided Inquiry Activity	★	PhET	Susan Hendrickson, Julia Chamberlain	UG-Intro	Guided Lab	Chemistry
Investigation of a Solution's Color (Qualitative and Quantitative) - Guided Inquiry Activity	★	PhET	Ted Clark, Julia Chamberlain	UG-Intro	Guided	Chemistry
Beer's Law Warm-Up	★	PhET	Julia Chamberlain	HS UG-Intro	HW	Chemistry
PhET Sims Aligned to the Chemistry		PhET	Julia Chamberlain	HS UG-Intro	Other	Chemistry

Lessons designed for remote learning

“Remote Lesson/Lab” tag in our lesson database

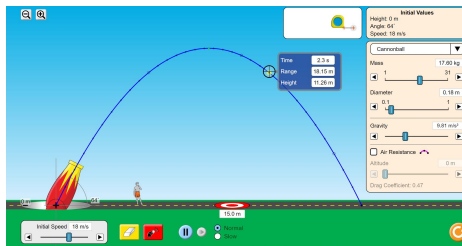
Google docs are also now an accepted format!

How to maintain student inquiry?

Start with an “open explore” question.

Play with this simulation and develop your own ideas about *[insert concept]*.
Record a few discoveries you make here.

Use challenge prompts rather than direct specific instruction.



Challenge Prompt:
(engage in STEM practices)
What are all the ways to
affect projectile distance?

Explicit Instruction:
(tells students exactly
what to do in the sim)
Set the canon angle to
45 degrees ...

Scaffolding students

Limit students to a specific screen using “?screens=” ([video tutorial](#))

(full sim)

http://phet.colorado.edu/sims/html/energy-skate-park/latest/energy-skate-park_en.html

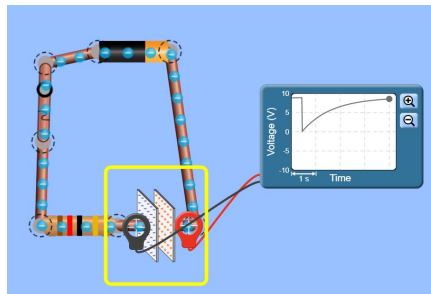
(screen 2)

http://phet.colorado.edu/sims/html/energy-skate-park/latest/energy-skate-park_en.html?screens=2

(screen 2 and 3 only)

http://phet.colorado.edu/sims/html/energy-skate-park/latest/energy-skate-park_en.html?screens=2,3

Use screenshots to help communicate specific set-ups:



Scaffolding students

Tables can provide useful scaffolding for qualitative or quantitative data collection. (While maintaining student agency in sim use.)

Action	Gravity Force
Put star and planet closer together	<input type="checkbox"/> Increases <input type="checkbox"/> Decreases
	<input type="checkbox"/> Increases <input type="checkbox"/> Decreases
	<input type="checkbox"/> Increases <input type="checkbox"/> Decreases

General [remote learning tips/resource document](#)

General teacher pedagogical resources and guides [are available on our website](#)

Collecting student work and thinking

Qualitative:

Students take screenshots as forms of evidence

Add supporting explanations to explain an idea.

Quantitative:

Students collect data with the sim

Make tables and graphs in Google Sheets (or similar)

Paste screenshots of their graphs into their labs.

Supporting
student-
student
interaction?

Students partner remotely:

Students partner on Zoom or in Zoom breakout room

Share screen for experimentation and data collection in sim

Complete activity in a shared Google Doc or Google Sheet.

Invitation

FIND PHET

Website: <https://phet.colorado.edu>

PhET iOS App (\$0.99):



CONTRIBUTE

Lessons or PD materials

Register at <https://phet.colorado.edu>

CONNECT



@PhETsims



/PhETsims

Questions?

Providing access to HTML5 sims


Provide a direct link to the simulation URL in the lesson:

(sim page link) <https://phet.colorado.edu/en/simulation/ph-scale>

(direct link) https://phet.colorado.edu/sims/html/ph-scale/latest/ph-scale_en.html

Embed the simulation:

In a webpage, using an iframe: copy paste the embed code.

 **EMBED**

In OneNote: paste the link ([video tutorial](#))

In Canvas: use embed code ([video tutorial](#))

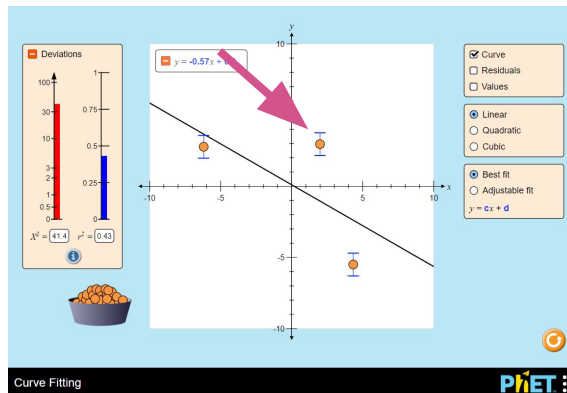
In Moodle: multi-step ([instructions](#))

Offline access:

Multiple options for download/offline. All or individual sims ([learn more](#)).

Helping students test their knowledge

Add some concept questions for students to apply the ideas at the end of the activity/lab ([see more about concept questions](#))



If we increase the error bar on the data point shown, what happens to the slope of the best-fit line?

- A) It becomes more negative (line tilts clockwise).
- B) It becomes less negative (line tilts counter clockwise).
- C) It does not change.

What if
you want
to use a
Java or
Flash sim
in your
activity?

Create mini screencast experiment videos:

Java and Flash sims will run on full computers
(see [mac troubleshooting](#) or [windows troubleshooting](#))

Use Zoom (or other tech) to capture your screen as you run experiments with the sim.

Post videos for students, and write your sim lesson/activity with links to these videos as opposed to the sim.