



Media Pembelajaran *Virtual* *Laboratory* Berbasis PhET

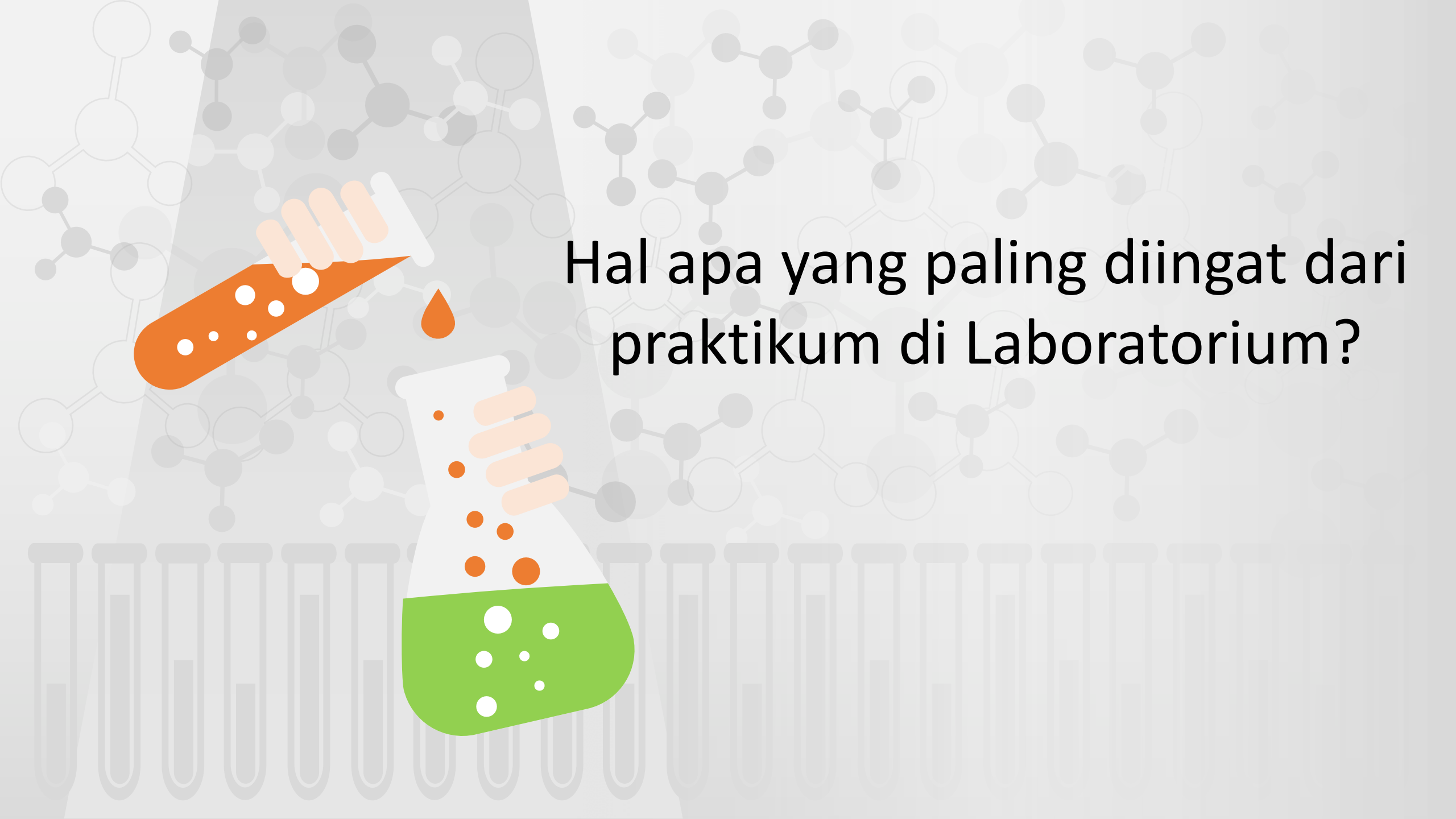
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Fakultas Ilmu Tarbiyah dan Keguruan

UIN Sunan Kalijaga Yogyakarta



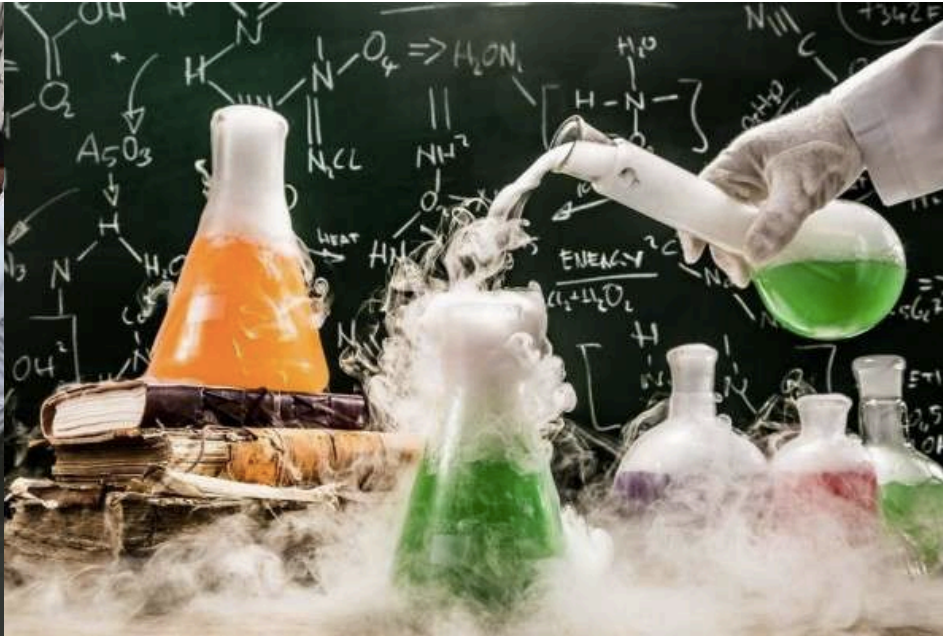
The background features a light gray grid with various molecular structures and laboratory glassware. On the left, a hand in an orange glove holds a test tube tilted to the right, pouring orange liquid into a flask. The flask, also held by a hand, contains green liquid with white bubbles. A single orange drop is shown falling from the test tube into the flask. At the bottom, a row of test tubes is visible, each containing a different amount of gray liquid. The overall theme is chemistry and laboratory practice.

Hal apa yang paling diingat dari praktikum di Laboratorium?

Sebelum Pandemi



Sumber: <https://neuhauslabs.com>



Sumber:
<https://idntimes.com/science/experiment/Abraham-herdyanto/percobaan-rumahan->



Sumber:
<https://sman3jogja.sch.id/fasilitas/laboratorium-fisika/>

Saat Pandemi



Sumber: <https://m.medcom.id>



Sumber: <https://britamagelang.id>



Sumber: <https://republika.co.id>



“... BDR dilaksanakan untuk memberikan pengalaman belajar yang bermakna bagi peserta didik...”

Guru berperan penting dalam merancang terciptanya pembelajaran yang bermakna

Belajar Dari Rumah (BDR)

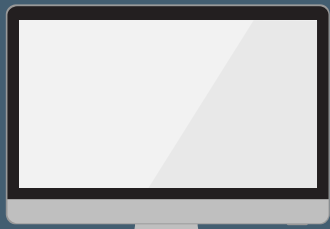
SE Sesjen Nomor 15 Tahun 2020





“Teknologi membantu manusia menghadapi keterbatasan keadaan”

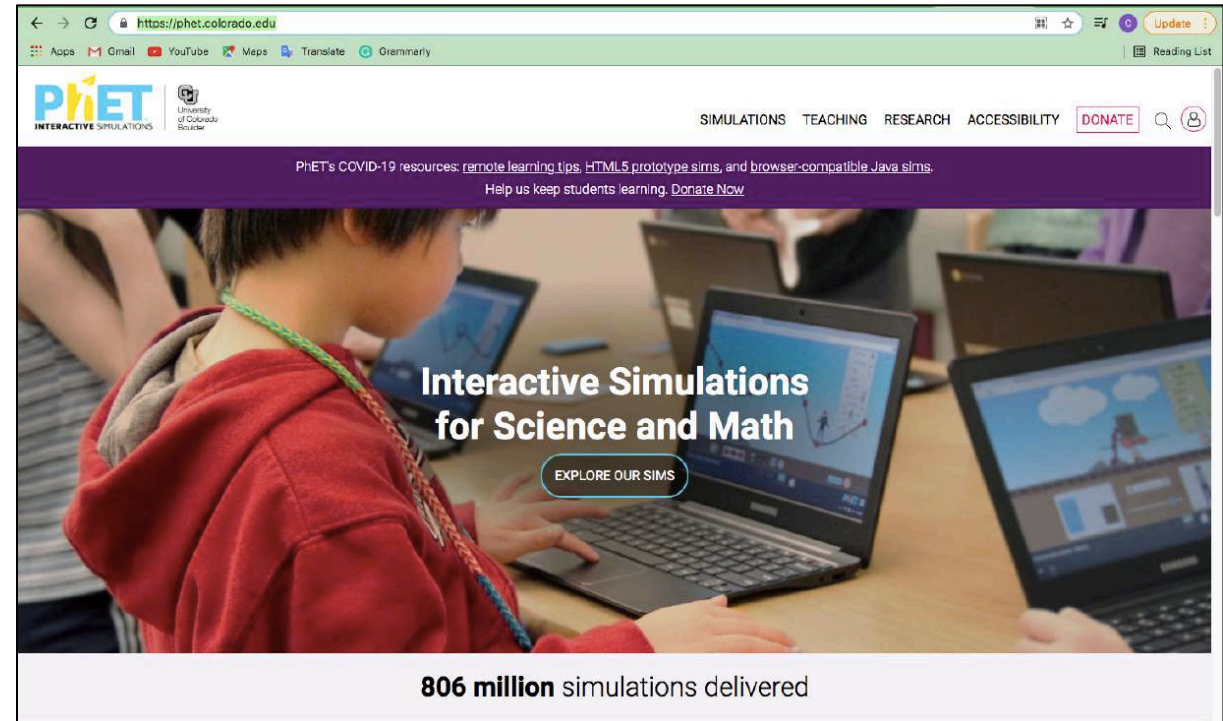
Content Here



Alternatif Virtual Lab yang **Asyik** dan **Gratis**



<https://vlab.belajar.kemdikbud.go.id/>



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

01 Keunggulan Virtual Laboratory

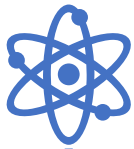
- Praktikum yang aman
- Eksperimen dilakukan dengan cepat
- Waktu fleksibel
- Dapat dilakukan dimana saja

02 Keterbatasan Virtual Laboratory

- Tidak semua praktikum tersedia
- Harus terkoneksi internet
- Menggunakan perangkat pendukung



PHET (Physics Education and Technology)



PhET: serangkaian simulasi yang mengintegrasikan teknologi computer ke dalam pembelajaran.



Simulasi PHET dirancang interaktif sehingga user dapat melakukan pembelajaran secara langsung.



Youtube: PhET Simulations
<https://www.youtube.com/channel/UCMRZ0-ci4ifGBF1bJvrcDRQ>

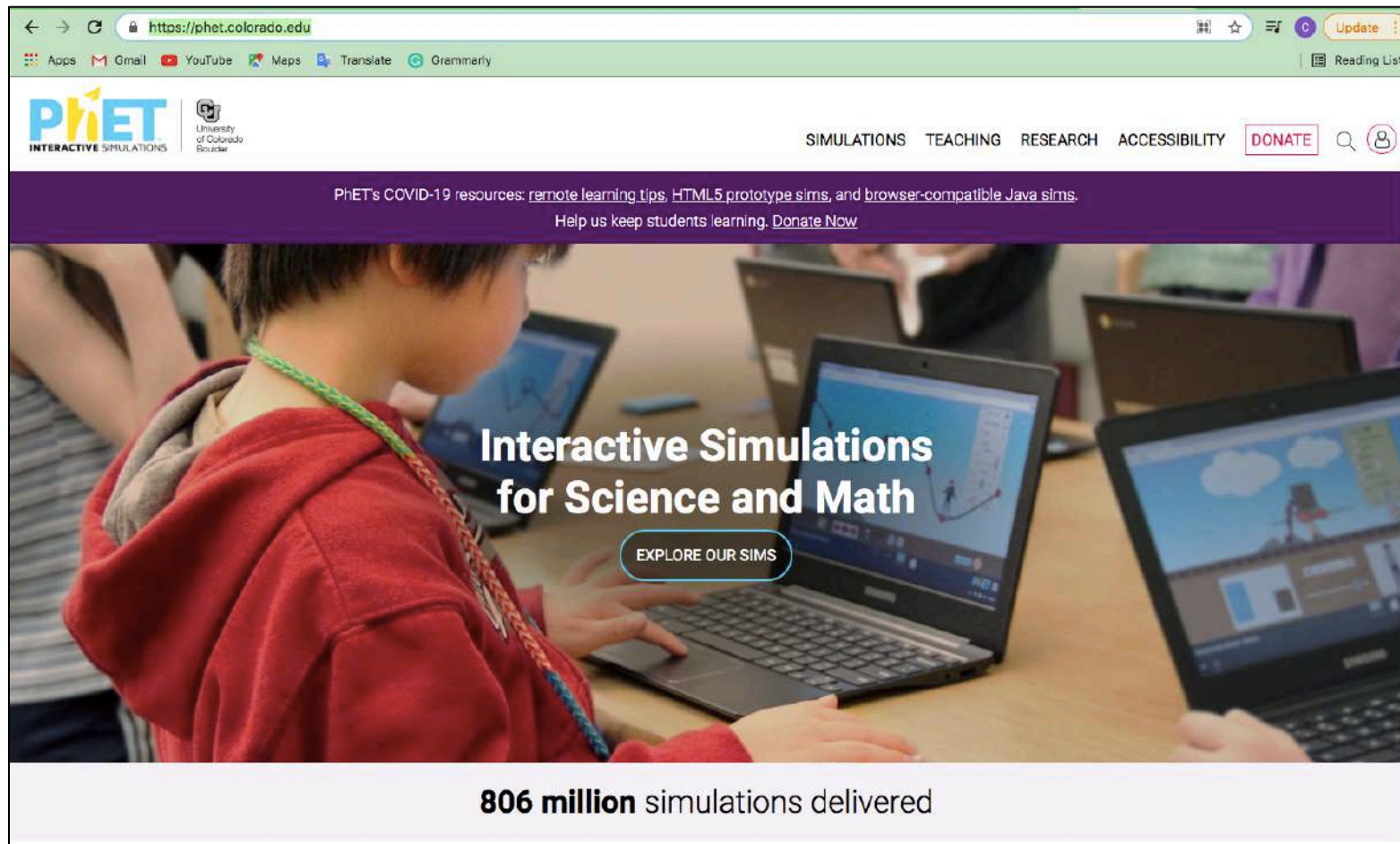


Simulasi-simulasi ini mudah didapatkan, dapat dijalankan secara online maupun offline dengan cara mendownloadnya.



Simulasi yang ada:
Fisika, Kimia, Biologi,
Matematika, Kebumihan.

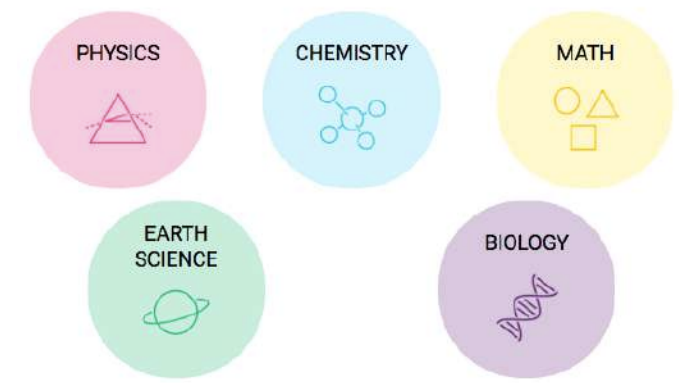
Memulai PheT: <https://phet.colorado.edu/>



Register

Log in

Search



Register

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

Sign In ✕

Email address

Password

Remember me [Forgot password?](#)

SIGN IN

Don't have an account? [Register.](#) [Resend Confirmation](#)

Log in with Clever



Siapkan alamat email yang aktif.

PHET
INTERACTIVE SIMULATIONS
UNIVERSITY OF COLORADO

Tell Us About You

Account Type Contact Info Additional Info

Primary Email Address

Re-enter Primary Address

Password ?

Confirm Password

First Name

Country

State/Province

City

Twitter Handle (optional)

Email Subscriptions
 Receive PhET Emails

Secondary Email Address (optional) ?

Last Name

NEXT

PHET
INTERACTIVE SIMULATIONS
UNIVERSITY OF COLORADO

Tell Us About Your Classroom

Account Type Contact Info Additional Info

School
 [Can't find your school?](#)

Subject(s)

General Sciences

Astronomy

Earth Science

Biology

Physics

Chemistry

Math

Other

Grade(s)

Elementary (K-5)

Middle (6-8)

High (9-12)

University

Other

Teaching Experience

years

In the classroom, I am a ... (select all that apply)

General Education teacher

Special Education teacher

Paraprofessional Educator

Substitute teacher

Student teacher

Other

PhET Experience

New User

Occasional User (I've used a few sims)

Experienced User (I regularly use sims)

Power User (I tell everyone about PhET)

REGISTER NOW

[By clicking register, you agree to the University of Colorado's privacy policy](#)

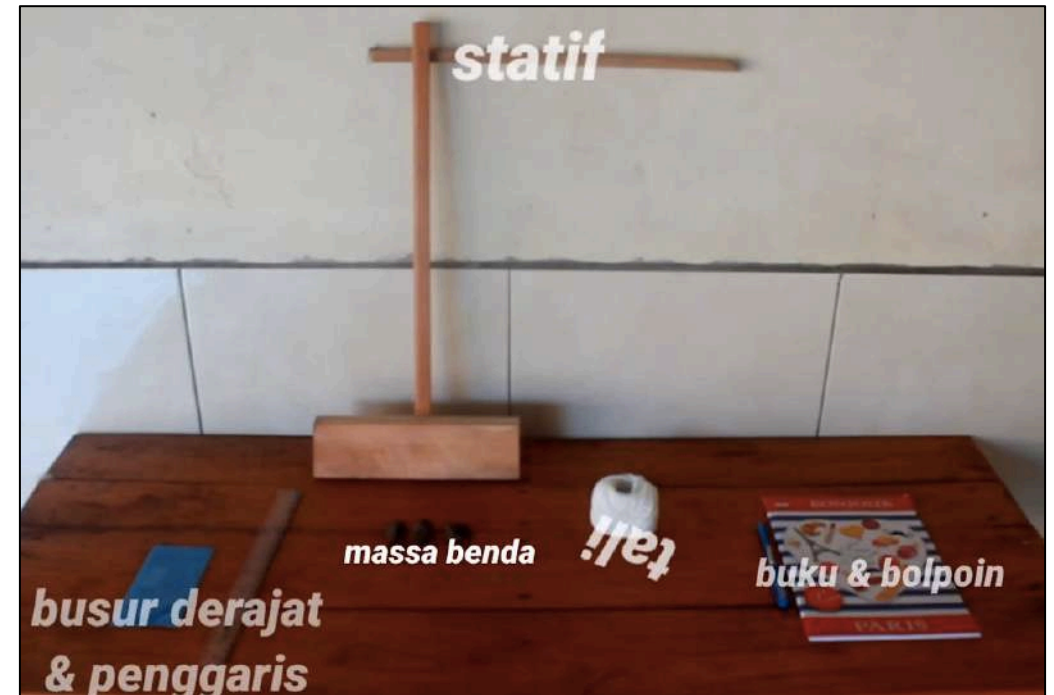
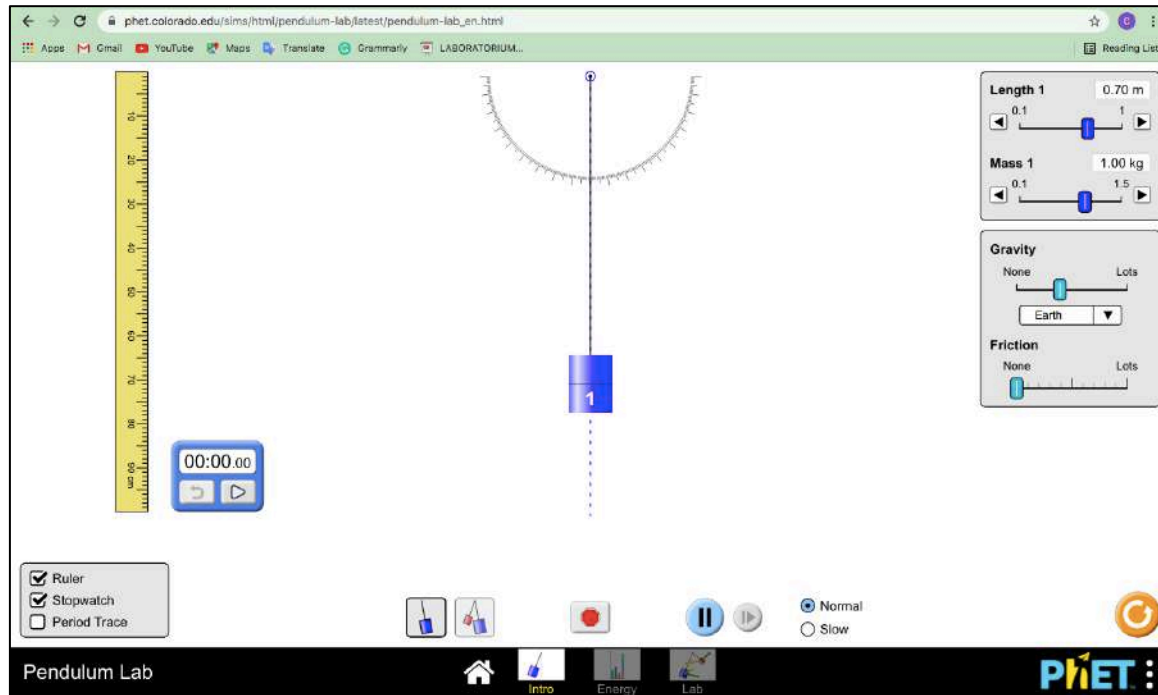
Search

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

The screenshot shows the PhET website interface. At the top, there are five circular icons representing different subjects: Physics (pink), Chemistry (light blue), Math (yellow), Earth Science (light green), and Biology (purple). Below these is a browser window showing the URL phet.colorado.edu. The website header includes the PhET logo, navigation links for SIMULATIONS, TEACHING, RESEARCH, ACCESSIBILITY, and DONATE, and a search icon. A purple banner contains the text "PhET's COVID-19 resources: remote learning tips, HTML5 prototype.s" and "Help us keep students learning. Don". A dropdown menu is open over the "SIMULATIONS" link, listing: Physics (highlighted with a red box), Chemistry, Math, Earth Science, Biology, Browse Sims, Prototypes, and Translated Sims. The main content area features a large image of a child using a laptop with the text "Interactive Simulations for Science and Math" and a button "EXPLORE OUR SIMS". At the bottom, it states "806 million simulations delivered".

Contoh Percobaan: Bandul Sederhana

https://phet.colorado.edu/sims/html/pendulum-lab/latest/pendulum-lab_en.html



PENYELIDIKAN PERCEPATAN GRAVITASI BUMI DENGAN PERCOBAAN AYUNAN BANDUL

A. Tujuan Percobaan

Melalui percobaan ini peserta didik dapat menentukan nilai percepatan gravitasi bumi.

B. Teori

Periode dan percepatan gravitasi bumi dari sebuah ayunan bandul matematis dapat tuliskan sebagai:

$$T = 2\pi \sqrt{\frac{l}{g}} \qquad g = \frac{4\pi^2 l}{T^2}$$

dengan T merupakan periode (s), l merupakan panjang tali (m) dan g merupakan percepatan gravitasi (m/s^2).

C. Langkah Kerja

The screenshot displays the PhET Pendulum Lab simulation. The central part shows a pendulum with a blue bob labeled '1' swinging at a -15° angle. The control panel on the right includes sliders for Length 1 (0.60 m), Mass 1 (1.00 kg), Gravity (Earth), and Friction. A stopwatch shows 00:00.00. The bottom toolbar contains icons for Ruler, Stopwatch, Period Trace, and playback controls.

01

Membuka aplikasi PhET: Percobaan Pendulum.
https://phet.colorado.edu/sims/html/pendulum-lab/latest/pendulum-lab_en.html

02

Menentukan massa bandul, misal 1 kg dan Mengatur panjang tali mulai dari 20 cm, 40 cm, 60 cm, 80 cm.

03

Mengamati ayunan bandul hingga bergerak harmonis dengan simpangan maksimal 15 derajat.

04

Menghitung waktu yang diperlukan sampai 10 getaran dengan stopwatch.

05

Mencatat waktu yang ditunjukkan stopwatch pada tabel pengamatan.

D. Tabel Data Percobaan

n = 10 getaran

No	l (m)	t (s)	T=t/n (s)	T ²	$g = \frac{4\pi^2 l}{T^2}$
1	0.2				
2	0.4				
3	0.6				
4	0.8				
5	1.0				

- 1 Variabel Kontrol
- 2 Variabel Bebas
- 3 Variabel Terikat

E. Analisis Data

n = 10 getaran

No	l (m)	t (s)	T=t/n (s)	T ²	$g = \frac{4\pi^2 l}{T^2}$
1	0.2	9.0	0.9	0.81	9.737876543
2	0.4	12.72	1.272	1.617984	9.750009889
3	0.6	15.5	1.55	2.4025	9.849340271
4	0.8	17.99	1.799	3.236401	9.748705429
5	1.0	20.14	2.014	4.056196	9.723001551
					9.767764285

- 1 **Variabel Kontrol:** massa bandul, sudut simpangan
- 2 **Variabel Bebas:** Panjang tali.
- 3 **Variabel Terikat:** periode

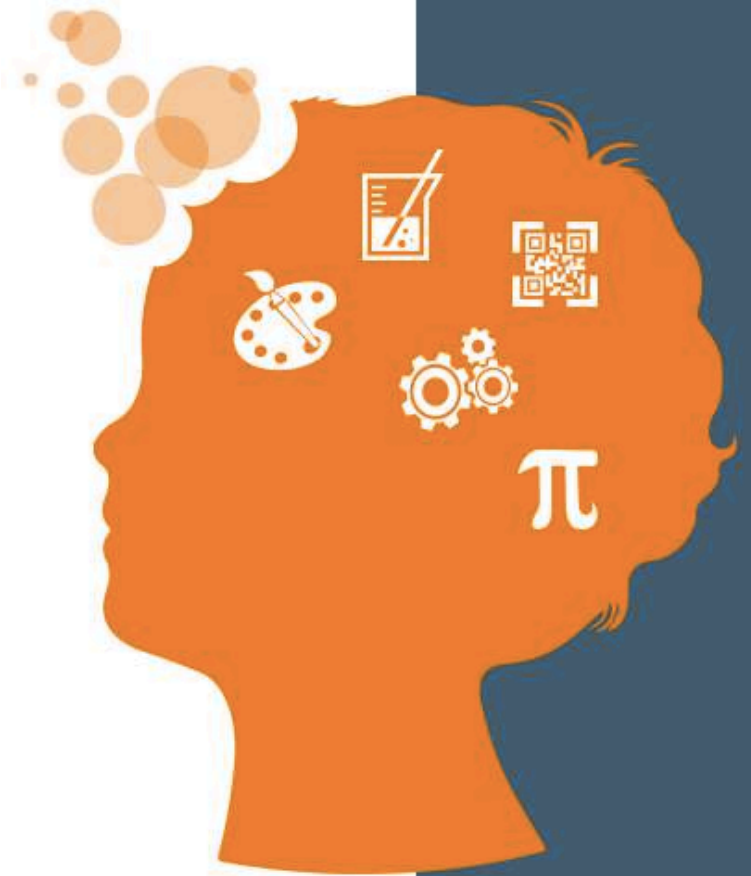
F. Diskusi

01

Apakah dari data dan analisis yang diperoleh dari percobaan mengubah-ubah panjang tali bandul menunjukkan ada pengaruh terhadap periode ayunan bandul? Mengapa ?

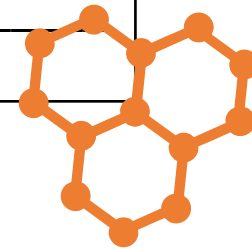
02

Apakah ada perbedaan antara hasil penyelidikan ini dengan ketetapan percepatan gravitasi bumi? Jelaskan?





G. Kesimpulan



Designed to support inquiry learning

The image shows a screenshot of a pendulum simulation interface. The simulation area displays a pendulum with a blue bob and a white arc indicating its path. A stopwatch shows a time of 00:15.67. On the right, there are control panels for 'Length 1' (0.60 m), 'Mass 1' (1.00 kg), 'Gravity' (set to Earth), and 'Friction'. At the bottom, there are playback controls (play, pause, stop) and a speed selector (Normal, Slow). A bottom navigation bar includes icons for 'Intro', 'Energy', and 'Lab', along with the 'PhET' logo.

Callout boxes with arrows pointing to specific features:

- Use accurate, dynamic visual representations and show the invisible:** Points to the pendulum bob and the arc.
- Provide real-time, animated feedback as student plat:** Points to the stopwatch.
- Implicitly scaffold inquiry through design of controls and representation:** Points to the control panels and playback buttons.
- Create a game-like environment:** Points to the overall simulation area.
- Make simulations highly interactive:** Points to the sliders and dropdown menus.
- Allow action that would be difficult or impossible in the real word:** Points to the 'Gravity' and 'Friction' controls.
- Provide an intuitive interface, usable without instructions:** Points to the playback and speed controls.