Intro Screen

Explore the relationships between applied force, spring force, displacement and equilibrium.

VIEW force and displacement vectors

DISPLAY magnitude of the vectors

DRAG the pincer to control the applied force

COMPARE two springs simultaneously

Systems Screen

Investigate how the applied force, spring force, and effective spring constant change when two springs are connected in series or parallel.

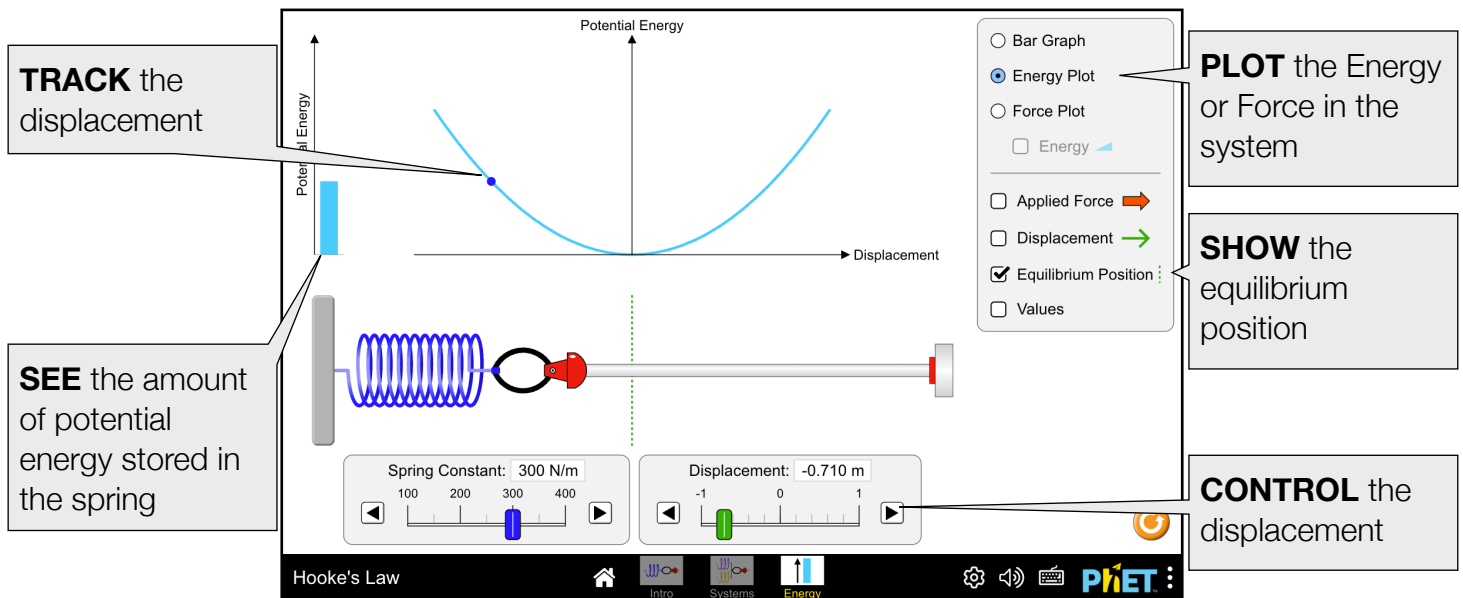**SEE** the spring thickness change as spring const. is adjusted

ADJUST the stiffness of the springs

COMPARE total and component spring forces
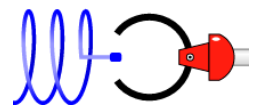
INVESTIGATE springs in series and parallel

Energy Screen

Explore how the applied force, displacement, and spring constant affect the potential energy stored in the spring.

TRACK the displacement

SEE the amount of potential energy stored in the spring

PLOT the Energy or Force in the system

SHOW the equilibrium position

CONTROL the displacement

Model Simplifications

- The thickness of the spring is used to indicate the spring constant. The springs on the Systems screen have fewer coils due to space constraints (which would reduce the spring constant). To maintain consistency, springs with the same spring constant have the same thickness, regardless of the number of coils.
- The pincer will release when the applied force (or displacement) is set to zero. However, the pincer remains closed while being dragged through the equilibrium position.

Suggestions for Use

Sample Challenge Prompts
- Explain how the spring force and applied force are related to one another.
- Predict what happens to the displacement when the spring constant is doubled while the applied force is kept constant.
- Compare and contrast the component spring forces for the series and parallel systems.
- Explain how the spring constant affects the shape of the Energy and Force plots.

Customization Options

Query parameters allow for customization of the simulation, and can be added by appending a '?' to the sim URL, and separating each query parameter with a '&'. The general URL pattern is:

`…html?queryParameter1&queryParameter2&queryParameter3`

For example, in Hooke's Law, if you only want to include the 1st and 2nd screens (`screens=1,2`), with the 2nd screen open by default (`initialScreen=2`) use:
https://phet.colorado.edu/sims/html/hookes-law/latest/hookes-law_all.html?screens=1,2&initialScreen=2

To run this in Spanish (`locale=es`), the URL would become:
https://phet.colorado.edu/sims/html/hookes-law/latest/hookes-law_all.html?locale=es&screens=1,2&initialScreen=2

⚙ Indicates this customization can be accessed from the Preferences menu within the simulation.

Query Parameter and Description	Example Links

`screens` - specifies which screens are included in the sim and their order. Each screen should be separated by a comma. For more information, visit the Help Center.	`screens=1`
	
	`screens=2,1`

`initialScreen` - opens the sim directly to the specified screen, bypassing the home screen.	`initialScreen=1` `initialScreen=3`
⚙ `audio` - if muted, audio is muted by default. If disabled, all audio is permanently turned off.	`audio=muted` `audio=disabled`
⚙ `interactiveHighlightsInitiallyEnabled` - opens the sim with interactive highlights enabled.	`interactiveHighlightsInitiallyEnabled`
⚙ `locale` - specify the language of the simulation using ISO 639-1 codes. Available locales can be found on the simulation page on the Translations tab. Note: this only works if the simulation URL ends in "_all.html".	`locale=es` (Spanish) `locale=fr` (French)
`allowLinks` - when `false`, disables links that take students to an external URL. Default is `true`.	`allowLinks=false`
`supportsPanAndZoom` - when `false`, disables panning and zooming using pinch-to-zoom or browser zoom controls. Default is `true`.	`supportsPanAndZoom=false`

See all published activities for Hooke's Law here.
For more tips on using PhET sims with your students, see Tips for Using PhET.