

[https://phet.colorado.edu](https://www.google.com/url?q=https://phet.colorado.edu&sa=D&ust=1599072232930000&usg=AOvVaw3USGax7M89xC5sPVpNDS58)

Remote Learning with PhET Simulations

[New PhET user?](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.v1ssco68gika)

[Find the right sim](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.jfc3wfgcloej)

[Provide students access](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.kkuyukfb6vi4)

[Scaffold your lesson](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.kdqnfb80htmo)

[Maintain student inquiry](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.5878lxa2gqvu)

[Show student thinking](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.5kwo7l1rh7yc)

[Help students to test their knowledge](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.y8y1c5ytrnfn)

[Find remote lessons](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.kehh4yz374us)

[Use Java or Flash simulations](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.jyfmqhl3l6sx)

[Access HTML5 prototypes](https://docs.google.com/document/u/1/d/e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8/pub#h.ag0yzhd3ir2g)

**New PhET user?**

Welcome to the PhET community! Review our [Welcome Letter](https://www.google.com/url?q=https://docs.google.com/document/u/1/d/e/2PACX-1vTAttB4-x16FDETl4VIhlqPC2P2vyeZ1ZUPZttpVQOoT2WcmMZ-mMWHN8GMdshryAiJ-lVp_5yMaS9e/pub&sa=D&ust=1599072232932000&usg=AOvVaw39rvzYusDip1xKeqFeosZe) with tips and recommendations to get started with PhET sims.

**Find the right sim**

Refer to our topic alignment documents:

[Physics sim alignment](https://www.google.com/url?q=https://docs.google.com/document/d/e/2PACX-1vTieWRwYPLkNzQSDe8TQEfWikQ5bP1Bj19ZcGo8mNZRuOb3D2CJe89uVuzhkb7nZXMr5SljFq72fBFD/pub&sa=D&ust=1599072232933000&usg=AOvVaw341KyIEggdjHS38sfLqpG9)

[Math sim alignment](https://www.google.com/url?q=https://docs.google.com/document/d/e/2PACX-1vRW1pjeAK7tOow4ItGmvpfQs31c0UuB-PH_-PDCqNkJ5Epk53IUiTSO5H0jex2na_3mh8AYZ-JOh7KC/pub&sa=D&ust=1599072232933000&usg=AOvVaw2iyqI4YYheLqDyMEgG2hmO)

**Provide students access**

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

Direct sim link: [https://phet.colorado.edu/sims/html/ph-scale/latest/ph-scale\_en.html](https://www.google.com/url?q=https://phet.colorado.edu/sims/html/ph-scale/latest/ph-scale_en.html&sa=D&ust=1599072232934000&usg=AOvVaw39la2m2bE0nhwIDNFJUDCr)  (RECOMMENDED)

Sim page link: [https://phet.colorado.edu/en/simulation/ph-scale](https://www.google.com/url?q=https://phet.colorado.edu/en/simulation/ph-scale&sa=D&ust=1599072232934000&usg=AOvVaw3RLepxddPHvhKxb6sBJdkn) (NOT RECOMMENDED)

Embed the simulation:

In a webpage, using an iframe: copy-paste the embed code https://lh5.googleusercontent.com/-ff9fsg-iyZXvZ1vaKHIBNFnAfYFI_cZaF6I36Ov9O4CnlceWk9AesSBVA6tTmD5YioD8yUn0FSgv0-VdRVh7sZN5IlmjYOJ9GsB3X9KnMUOr15XqDsTC2VT8tuug1W49WI3tEaQ

In OneNote: paste the link ([video tutoria](https://www.google.com/url?q=https://www.youtube.com/watch?v%3DrNtJ7-H4Bc8&sa=D&ust=1599072232935000&usg=AOvVaw0f5R-ZgoKz0CF-DYPhmVbB)l)

In Canvas: use embed code ([video tutorial](https://www.google.com/url?q=https://www.youtube.com/watch?v%3DJkxmJ6u8pIs&sa=D&ust=1599072232935000&usg=AOvVaw2jJbrkcmgjYW-ChDYv7VVx))

In Moodle: multi-step ([how to document](https://www.google.com/url?q=https://docs.moodle.org/38/en/PhET_simulations%23Translating.2Fcustomizing_the_English_language_strings_inside_a_PhET_simulation&sa=D&ust=1599072232936000&usg=AOvVaw1FqAzpngPlb8LHvyKm4hOZ))

In Edulastic/Fromative: use embed code ([video tutorial](https://www.google.com/url?q=https://www.youtube.com/watch?v%3DhJym3Yh-6nc&sa=D&ust=1599072232936000&usg=AOvVaw0qvIS4yTJL7tSGh0HUBgfH))

In Google Classroom: click Google Icon on sim page

Offline access:

Download all or individual sims, or an offline version of the website at our [Offline Access](https://www.google.com/url?q=https://phet.colorado.edu/en/offline-access&sa=D&ust=1599072232937000&usg=AOvVaw2IrpCbYGM4AolbbPYWYKw2) page

**Scaffold your lesson**

Limit students to a specific screen using “?screens=” ([video tutorial](https://www.google.com/url?q=https://www.youtube.com/watch?v%3DFCnORSSiBbE&sa=D&ust=1599072232937000&usg=AOvVaw3aixHyvgA86klLhdf8X4SR))

Example full sim URL: [https://phet.colorado.edu/sims/html/beers-law-lab/latest/beers-law-lab\_en.html](https://www.google.com/url?q=https://phet.colorado.edu/sims/html/beers-law-lab/latest/beers-law-lab_en.html&sa=D&ust=1599072232938000&usg=AOvVaw23T6RL6Y2SHwzFTcSEpcgn)

Example sim URL with screen 2 only: [https://phet.colorado.edu/sims/html/beers-law-lab/latest/beers-law-lab\_en.html?screens=2](https://www.google.com/url?q=https://phet.colorado.edu/sims/html/beers-law-lab/latest/beers-law-lab_en.html?screens%3D2&sa=D&ust=1599072232938000&usg=AOvVaw0RwIyN-FX6qCfPT4uhyXQq)

Use screenshots to help communicate specific set-ups.

Example:

|  |  |
| --- | --- |
| **Measuring Current** | **Measuring Voltage** |
| “Current” is the flow of charge, measured in Amps (Coulombs/s). An ammeter measures the current past a single point in a circuit.  https://docs.google.com/drawings/d/s8D7os0q7isqIUORzHyC1Ww/image?parent=e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8&rev=1&h=212&w=206&ac=1  The current flowing through point 1 can be written as I1 = 0.09 A. | “Voltage” is a measure of the difference in electric potential between two points. The voltmeter measures this difference by placing the two leads at two different points.  https://docs.google.com/drawings/d/sgBqO_2Ewmm1MQHPvkihiVQ/image?parent=e/2PACX-1vQMwNbLNOtwTdS4sWbXx4dXnJHDoENTgyvVl4Vwrq6NbC3ijlCrpPncSTItitHFRv9mp6-FFCL2uYp8&rev=1&h=214&w=249&ac=1  The voltage between points A and B can be written as VAB = 9 V. |

Use table scaffolds for qualitative or quantitative data collection (but try to maintain student agency in sim use).

Example:

|  |  |
| --- | --- |
| Action | Gravity Force |
| Put star and planet closer together | 𝥁 Increases        𝥁 Decreases |
|  | 𝥁 Increases        𝥁 Decreases |
|  | 𝥁 Increases        𝥁 Decreases |

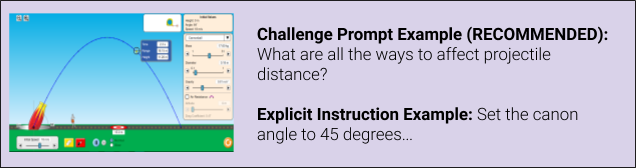
General teacher pedagogical resources and guides [are available here](https://www.google.com/url?q=https://phet.colorado.edu/en/teaching-resources/tipsForUsingPhet&sa=D&ust=1599072232946000&usg=AOvVaw3JmyXAnL0eui0oD4KTvLQA).

**Maintain student inquiry**

Invite students to play with the sim before the lecture as an introduction to the topic.

Start with an “open explore” question.

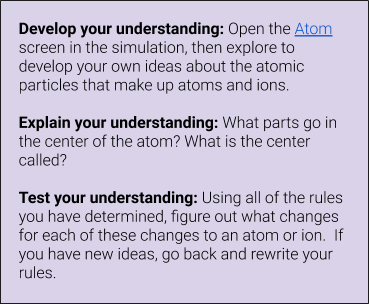
Example:

Use challenge prompts to engage students in STEM practices, rather than explicit instruction on how to use the simulation.

Example:

Include headers in your worksheets to help students to know what is expected in each part of the activity.

Example from [Build an atom Remote Lab](https://www.google.com/url?q=https://docs.google.com/document/d/1toHhsGEo6OB8ldRLFtPt7HNWaDIObj89W8mFUP-Xb3s/edit&sa=D&ust=1599072232947000&usg=AOvVaw2gOLhvWZkBoUDIOoWMxBd5) by Patricia Loeblein:



**Show student thinking**

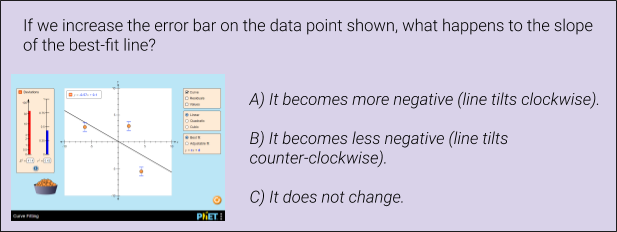
Qualitative: Have students take screenshots of the sim (using their favorite snip tool) to use as forms of evidence and add supporting explanations to explain an idea.

Quantitative: Have students take data with the sim, make tables and graphs in Google Sheets (or similar), and paste screenshots of their work into their labs.

**Help students to test their knowledge**

Add some [concept questions](https://www.google.com/url?q=https://phet.colorado.edu/en/teaching-resources/clickersDemo&sa=D&ust=1599072232949000&usg=AOvVaw2RAdOYljN36nJk6qu6KOfQ) for students to apply the ideas at the end of the activity/lab.

Example:



If the sim has a game: Have students play the game in the sim and take a screenshot of their completion/score.

**Find remote lessons**

Example Physics lab: [Introduction to Circuits Remote Lab](https://www.google.com/url?q=https://docs.google.com/document/u/1/d/1TXHxquIwDgqeFpOVtS5bdKy_f-_kuKC2jETjt35uKgA/edit?usp%3Ddrive_web%26ouid%3D104454291406272002296&sa=D&ust=1599072232950000&usg=AOvVaw0BlrehQNPjHVhU_a0Rjuqb)

Example Chemistry lab: [Isotopes‌ ‌and‌ ‌Atomic‌ ‌Mass‌‌ ‌Remote Lab](https://www.google.com/url?q=https://docs.google.com/document/d/1rob30zuC-cyVsjxOwcIlUNUIsrJB9DISw_0gi3ANvOE/edit?usp%3Dsharing&sa=D&ust=1599072232950000&usg=AOvVaw1je_N4FumeENFkcVusV_Py)

Example Math lesson: [Exploring Slope-Intercept Form of a Line](https://www.google.com/url?q=https://docs.google.com/document/d/1A_b6nolp9Nuu16i5bd3gIuEhbv2L1xlCSgvjUSu_vgE/edit&sa=D&ust=1599072232950000&usg=AOvVaw0ut_0DU0P_oqZBp7CI2J4n)

Browse all [remote learning activities](https://www.google.com/url?q=https://phet.colorado.edu/en/teaching-resources/browse-activities?sims%3Dall%26types%3DREMOTE_LEARNING%26subjects%3Dall%26levels%3Dall%26locales%3Dall%26query%3D&sa=D&ust=1599072232951000&usg=AOvVaw1Um4AKmlOnbdqgJFiwAFaL) on the PhET website.

Note: You don’t need to request access to Google Docs. Simply download the document or make a copy to your drive. From there you can edit and share your document with students.

**Use Java or Flash simulations**

Since Java and Flash can sometimes be problematic for student computers (especially Chromebooks), teachers are encouraged to create mini screencast experiment videos to demonstrate a concept.

1. Java and Flash sims will run on full computers ([PhET System Requirements](https://www.google.com/url?q=https://phet.colorado.edu/en/help-center/running-sims/general&sa=D&ust=1599072232952000&usg=AOvVaw3ZUAwwreO_Fxz50zXYYP1D), [MacOS troubleshooting](https://www.google.com/url?q=https://phet.colorado.edu/en/help-center/running-sims/mac&sa=D&ust=1599072232952000&usg=AOvVaw12nCeXYLfwswTGtJmyfJq7), or [Windows troubleshooting](https://www.google.com/url?q=https://phet.colorado.edu/en/help-center/running-sims/windows&sa=D&ust=1599072232952000&usg=AOvVaw2RjesbFlv11NsTluvsh4c2))
2. Use Zoom (or another tech) to capture your screen as you run experiments with the sim.
3. Post videos for students, and write your sim lesson/activity with links to these videos as opposed to the sim.

**Java via CheerpJ**

We are constantly working to port our Java simulations to HTML5. In the meantime, we are utilizing CheerpJ to allow Java sims to run in a browser. You can find all of these browser-compatible sims on our [Java via CheerpJ page](https://www.google.com/url?q=https://docs.google.com/document/d/e/2PACX-1vQGvm1uzGzSvzLOpd61QETqHaDOQnOvDc3TtlhqDQxAjahpj6HBrU3UrLtHfUJ1nDJk9IjUv-WcRxab/pub&sa=D&ust=1599072232953000&usg=AOvVaw0Jp7fXOMIAubAzd-YO4Suz).

**Access HTML5 prototypes**

[**HTML5 prototypes**](https://www.google.com/url?q=https://docs.google.com/document/d/e/2PACX-1vR-9enG4gyG3xoxNMJxzd0UFX5etx-49fxY4EckcREoENBG1peWZIsE8y2m1N6V0Acj01Wf2BKSx4GR/pub&sa=D&ust=1599072232954000&usg=AOvVaw1QuaS4M2hA8CF_k9zVfBsu)**are only available in English but will be made translatable once published to the PhET website.**

(Caution: these simulations are not feature complete or fully tested, so you may find bugs or other issues.)

Thank you for being a part of our wonderful teacher community! If you write any lesson for remote learning, please [share them](https://www.google.com/url?q=https://phet.colorado.edu/en/teaching-resources/submit-activity&sa=D&ust=1599072232954000&usg=AOvVaw1nmrHbNQsTaa9EzHeIrz4-) with other teachers on the PhET website. If you have any questions, check out our [help center](https://www.google.com/url?q=https://phet.colorado.edu/en/help-center&sa=D&ust=1599072232955000&usg=AOvVaw2C9DiQjwzkC9uEBRw4Hshn), or contact [phethelp@colorado.edu](mailto:phethelp@colorado.edu).