

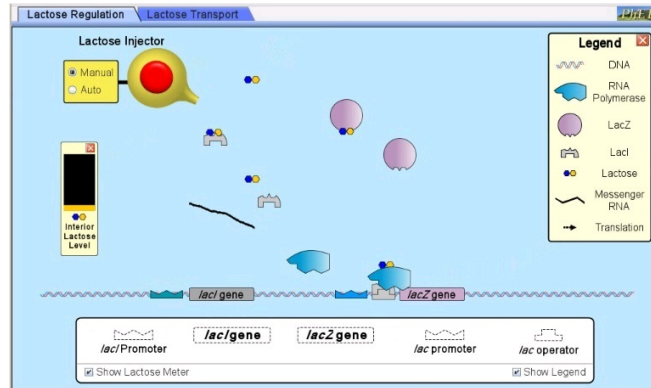


Community Spotlight

Each [Community Spotlight](#) features an outstanding group, partner, resource, or member of our community.

Gene Machine: Lac Operon Simulation Software

By PhET Interactive Simulations, University of Colorado
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Module Description:

Build a gene network! With this simulation software, students can add or remove genes from the DNA to explore the effects of mutations within the lac operon on lactose regulation and transport.

This software is designed to address student learning goals such as:

- Predict the effects on lactose metabolism when the various genes and DNA control elements are mutated (added or removed).
- Predict the effects on lactose metabolism when the concentration of lactose is changed.
- Understand the dynamics of a cell's response to signaling under transcription level regulation.
- Explain the roles of LacI, LacZ, and LacY in lactose regulation.

Teaching Setting:

This resource is suitable for implementation in a variety of biology classrooms, including, but not limited to, high school and introductory undergraduate courses.

Citation:

(2018), "Gene Machine: The Lac Operon,"
<https://qubeshub.org/resources/phetlacoperon>.

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Related Materials and Opportunities:

This week's featured resource is a simulation that students run directly on the QUBES website.

[Launch the Lac Operon simulation.](#)

You must be logged into your QUBES account to launch the simulation. If you do not have a QUBES Hub account, register for one at www.qubeshub.org/register.

This resource was developed by the [PhET Interactive Simulations](#) project at the University of Colorado Boulder. Founded in 2002 by Nobel Laureate Carl Wieman, PhET creates free interactive math and science simulations. PhET sims are based on extensive education research and engage students through an intuitive, game-like environment where students learn through exploration and discovery.

Check out [Modeling the lac Operon to Understand the Regulation of Gene Expression in Prokaryotes](#), an activity designed for introductory biology students that uses the lac operon simulation featured here. It consists of several short activities and guiding questions that support students' exploration of the simulation.

This resource is one of several software tools available on QUBES. Other QUBES-hosted software include RStudio, NetLogo, and Jupyter notebooks that can be used in a browser without having to worry about installation on a local machine or maintaining a campus server. QUBES users can create their own customized activities and datasets which students can run using free software without having the need to purchase and install locally. [Browse software hosted by QUBES.](#)

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