Lower School PLTW - Launch!

Kindergarten: Pushes and Pulls

Students explore and identify forces as pushes and pulls through books, a scavenger hunt, learning centers, and observation of daily activities. Students identify the effects of different strengths or different directions of pushes and pulls on the motion of an object. Students use the design process to design, build, test, and reflect on a model that can move a heavy object up a ramp using pushes and/or pulls.

1st Grade: Light and Sound Module

All products created by designers and engineers were created to meet a human need or want. One of the most basic of human needs is to communicate over a distance. In this module students investigate light and sound, including vibration from sound waves and the effect of different materials on the path of a beam of light. The students use a design process to sketch, build, test, and reflect on a device that uses light or sound to communicate over a distance. A similar design problem is faced by three fictional characters the students read about. Angelina, Mylo, and Suzi are lost and need to use only the materials in their backpack to communicate using light or sound.

2nd and 3rd Grade: Properties of Matter

Students investigate and classify different kinds of materials by their observable properties, including color, texture, and heat conduction. After analyzing data from materials testing, the students design an insulating cover for an ice pop to prevent melting. All materials have a melting point, or a temperature at which a solid becomes a liquid. The melting point for water is 32 degrees Fahrenheit. Ice pops have a slightly lower melting point, but both water and ice pops are liquid at room temperature because room temperature is above the melting point of the substance. Every material has unique properties of insulation. The better a material is at insulating, the more it keeps an object at its starting temperature. This means a cup made from a good insulator, such as polystyrene foam, keeps hot liquids hot and cold liquids cold better than a cup made from a poor insulator such as paper. Engineers and designers select materials that have properties that are best suited for an intended purpose. Properties such as color, texture, and heat conduction may influence design choices.

4th and 5th Grade: Infection Detection and Infection Modeling and Simulation

Students are presented with a problem where a large number of students at a school are sick. Students learn about transmission of disease through a simulation and compare communicable and non-communicable diseases. Students design, run, and analyze data from an experiment related to preventing the spread of germs. Student groups present ways to prevent the spread of infection using evidence from their experiments. Students investigate how the body protects us from these germs to keep us healthy. Bacteria and viruses are introduced as agents of disease, and students use information learned and patient symptoms to identify the disease agent causing a simulated disease outbreak. Using epidemiology practices, students deduce a likely source of an infection that is spreading through a fictional school.

Students are invited to discover how modeling and simulation provide powerful insight into complex systems. As they engage in building their own simple computer models, they come to understand the indispensable role computers play in helping scientists study systems through modeling and simulation. The module begins with a game in which students act as agents in an illness transmission simulation. Students then observe a computer model in action when they run a susceptible-infected-susceptible (SIS) simulation on tablets. Running multiple simulations with different parameters helps students build understanding about how different conditions affect the system. Students dive into computer programming while building a game on a tablet. They extend these new skills by building a predator-prey ecosystem model and simulation. The final problem challenges students to create their own SIS model to investigate how hand washing affects the spread of an illness in a classroom. Students learn that technology makes it possible for humans to accomplish things that would be impossible, or very time consuming, without the help of computers.