Integrative STEM Education
Aerodynamics

Highlights

- Demonstrate aerodynamics principles.
- Design and build an airfoil prototype.
- Measure an airfoil's characteristics in a wind tunnel.
- Simulate wind currents in the atmosphere.
- Measure negative lift and drag performance in a wind tunnel.

STEM Connections

In the STEM Aerodynamics course, students will discover how the four disciplines connect as they design and develop a wing airfoil prototype.

Once they are familiar with the principles of aerodynamics, they will have the opportunity to design innovative solutions to real-world problems, challenges, and needs.

Science

- Measurements of pressure, temperature, and relative humidity
- Wind speed measurements
- Bernoulli's principle
- Mass flow
- Airflow and viscosity

Technology

- Wind tunnel operation
- Software tools
- Prototyping

Engineering

- Airfoil design
- Stability control

Math

- Drag coefficient
- Lift coefficient
- Coordinates
- Scaling dimensions
- Graphing

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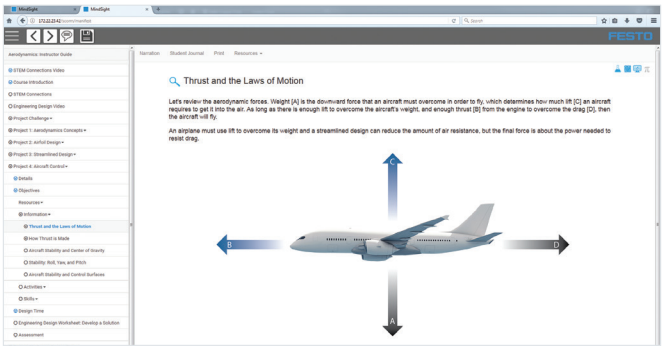
STEM Aerodynamics
The purpose of the STEM Aerodynamics course is to provide learners the opportunity to explore and design objects with shapes that minimize the impact of opposing airflow.

Learners will be challenged to design and develop a wing airfoil prototype by taking on the role of an aerodynamics engineer. They must also adhere to the given specification requirements and constraints as they learn about various aerodynamics concepts. FInally, they must acquire the necessary skills to apply those concepts while designing their streamlined airfoil model, and then test it in the wind tunnel.

MindSight LMS



Upon completion of the STEM Exploring Electricity course, students will be able to:

- Demonstrate tools and functionality of a wind tunnel.
- Apply the engineering design process to develop parts and products.
- Evaluate current designs and incorporate design changes that result in improved products.
- Apply aerodynamics concepts to airfoil design.
- Utilize formulas to calculate aerodynamics coefficients.
- Explore how material properties, forces, and restraints affect part behavior.

Equipment and Supplies
- Multimedia presentation
- MindSight installation and user guide
- Festo Wind Tunnel
- Drag arm assembly
- Model airfoils
- Wooden cars
- Styrofoam gliders
- Safety glasses
- Tacks
- Corrugated cardboard
- Clear plastic posterboard
- Masking tape
- Graph paper
- Ruler
- Drinking straws
- Pipe cleaners
- Hex key wrench

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