



THIS IS AN EXAMPLE OF A LESSON PLAN USING JUSTIN.TV THAT COULD BE USED TO TEACH A 11TH GRADE CLASS.

INDUSTRIAL TECHNOLOGY: GLIDE AWAY

Overview	In this lesson the students design and construct a gliding aircraft. They use the Internet as a research tool to gain background information about specific flight principles. Using their research, students consider various aircraft designs, choose one, and construct it using provided tools and materials. After they test their gliders and record data from each flight, students redesign their aircrafts, making appropriate adjustments in order to achieve a successful flight.
Objective	Students will : <ul style="list-style-type: none">• Use the Internet to aid in research and design• Identify lift, weigh, thrust, and drag as forces that impact an aircraft's flight.• Define Bernoulli's Principle as it pertains to flight principles.• Explain how lift force is produced using an airfoil shape
Learning Environment	Shop Lab or Science classroom with adequate space for building a glider.
Students	Students will be technology students with prior knowledge of basic technology principles and design principles.
ISTE/NETS Standards	<ol style="list-style-type: none">1. Facilitate and inspire student learning and creativity2. Design and develop digital-age learning experiences and assessment3. Model digital-age work and learning4. Promote and model digital citizenship and responsibility5. Engage in professional growth and leadership

<p style="text-align: center;">Materials</p>	<ul style="list-style-type: none"> • Paper • Scissors • Hot glue gun • Hot wire Styrofoam cutter • Masking tape • Plastic wrap • 12 craft sticks per student • One strip of approx 1/8" x 1/8" x 36" balsa wood per student • One Styrofoam tray per student. • One 1' x 1' x 2' Styrofoam block per student • Hot glue • Elmer's glue • Chip board • Pencils • Computer
<p style="text-align: center;">Procedure</p>	<ol style="list-style-type: none"> 1. Before class bookmark the following sites into the computers to be used <ol style="list-style-type: none"> a. Force on a wing <ol style="list-style-type: none"> i. http://www.ppsa.com/science/wingforce.html ii. Make sure the Macromedia Shockwave plug in (http://www.macromedia.com/shockwave/download/) in order to use the site. b. Aeronautic Learning Laboratory for Science, Technology and research <ol style="list-style-type: none"> i. http://www.alstar.fiu.edu c. Aviation Resource Center <ol style="list-style-type: none"> i. http://www.geocities.com/CapeCanaveral/4294/aerodynamic d. See How It Flies <ol style="list-style-type: none"> i. http://www.monmouth.com/~jsd/fly/how 2. Introduce the Design Brief to the students and begin a brief class discussion by asking the students the question, "How do planes fly?" 3. Break students into groups of two. Give each group a copy of the research log and have the students examine each site and record the relevant information. 4. Have the students sketch at least four different designs for their glider with appropriate annotations. 5. Have the students choose the design that they think will work the best. 6. Have the students complete a detailed working drawing of the glider that they will actually construct including dimensions and other important information. 7. Give the students the material and allow them to start construction of their glider 8. Organize a "Flight Day" event in an open area of the school, perhaps in the gymnasium, or outside if weather permits. Have the students

	<p>record the distance, time and pattern of each test flight that their glider makes. Have the students graph the resulting data from the entire class's test flight</p>
Application	<p>The students will be designing and building the gliders. After they have tested the gliders they will then be able to discuss what kind of changes they could make that would allow the gliders to perform better.</p>
Evaluation	<p>Have the students answer the following Questions</p> <ol style="list-style-type: none"> 1. Find and record a definition of Bernoulli's principle as it is applied to flight. Be sure to note the source of the definition. 2. Make a sketch, on a separate sheet of paper, of the four forces that act on an aircraft in flight. Circle the forces which are desirable in order to achieve flight. Box the forces which are not desirable. 3. Explain in your own words how lift is created by the use of the shape of an airfoil. 4. Define the following terms <ol style="list-style-type: none"> a. Thrust b. Lift c. Weight d. Drag e. Airfoil f. Air pressure g. Angle of incidence h. Stall angle i. Yaw j. Roll <p>After testing, have each student complete a one-page evaluation of their glider's flights. Included in the evaluation should be a description of the testing procedure, summary of flight data, and ideas for the Redesign of their glider</p>
Resources	<p>http://www.thirteen.org/edonline/lessons/glide/index.html</p>