

HOW DO I CONSTRUCT MY GLIDER?

INTRODUCTION

In this lesson students will use their design information to construct a glider. Students will get an overview of tools, tool safety and construction techniques

LEARNING OUTCOMES

Students will be introduced to the safe use of tools. Students will get an overview of some building techniques (composite, hollow / rib, solid and paper wrap) and experience the construction process.

Students will safely use the provided tools to construct a balsa glider. Students will construct a basic glider and use their own design to construct the wing.

CURRICULUM ALIGNMENT

8108 EXPLORING TECHNOLOGY SYSTEMS BLUEPRINT

01.01 Explain appropriate lab, classroom, and teaming skills.

005.02 Use computers and other tools of technology in various applications.

007.03 Design and fabricate a transportation vehicle.

NATIONAL TECHNOLOGY STANDARDS - TECHNOLOGY RESEARCH TOOLS

Students use technology to locate, evaluate, and collect information from a variety of sources.

Students use technology tools to process data and report results.

Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

CLASSROOM TIME REQUIRED

Three 45-minute classes or one and a half 90-minute blocks

TEACHER PREPARATION

Start examples of the recommended construction techniques to show students. Check the suggested websites to find examples of techniques or create your own design based on your knowledge and research.

Ensure that there is space available for storing the “in progress” work of students.

MATERIALS AND TOOLS NEEDED

- Snips for cutting balsa wood
- Scissors
- Balsa wood sticks
- Balsa wood sheet
- Basic glider drawing (see lesson #3)
- White glue
- Hot glue guns
- Hot glue sticks
- Tissue paper
- Drawing Paper
- Plastic wrap
- Wax paper
- Aluminum foil

TECHNOLOGY RESOURCES

Each student will need a computer with Internet access to research wing designs.

Each student will need a computer with word processing software. Students can complete this activity with paper and pencil if needed.

A projector or overhead is needed to project the basic glider drawing for the class.

PRE-ACTIVITIES FOR STUDENTS

Show students the basic glider drawing with a projector or overhead. Review how to determine lengths, widths and depths of parts.

Demonstrate the correct use of each tool provided. Discuss safety concerns (hot glue is hot, snips should be used with caution, etc.) and remind students of the consequence for misusing tools in a harmful manner.

Students will continue keeping a project log. This can be paper and pencil or a computer word-processing file. Some work with paper and pencil will be required even if the project log is kept electronically.

ACTIVITIES

Have students search the Internet for construction methods for a balsawood glider. Make a list of pros and cons of each method they find and record in their project log. (This activity is about being creative and working through a design process. Check to make sure that students are finding ideas and working to bring those ideas into existence).

Ask students to share the methods they have found along with how each method might be beneficial. As students mention the types you have built as samples show the wings and discuss the process for making them along with tools used.

GUIDED PRACTICE

Provide students with tools (see materials list), a basic glider drawing (projection) and raw materials (balsawood, paper, etc.). Students will work to create a basic balsa wood glider. Teacher should watch the students, looking for use of the construction techniques and design characteristics discussed. For students choosing their own techniques and design ideas, discuss what they plan to do and how they will accomplish the task to ensure that their idea is feasible.

Check student's work as they begin measuring parts for the basic glider. Ensure that they are correctly reading the part drawing. Observe how they use the tools to ensure that students are using them properly and safely.

ASSESSMENT

Students will use tools properly and safely to construct their wing and attach to the basic glider already constructed. Students may make modifications to the basic glider but must document reason and potential benefits of any design changes in their project log.

MODIFICATIONS

Make sure that the main glider meets the basics of the basic glider drawing. If necessary, provide student with a premade basic glider.

Students can be paired so that at least one of the students is capable of reading instruct sheet.

ALTERNATIVE ASSESSMENTS

Arrangements can be made for students with special needs to have the directions read to them and to answer the questions orally.

WEBSITES AND RESOURCES

Museum of Flight

<http://www.museumofflight.org>

Kennedy Composites

<http://www.kennedycomposites.com/organic.htm>

Flyby Hang Gliders

<http://www.flyby-fester.no/sider/HG/HG.htm>

Experimental Soaring

http://esoaring.com/steve_arndt_cd.htm

Walkalong History

<http://www.sciencetoymaker.org/tumblewing/peopleHistory.htm>

The Wings the Thing

<http://www.continuo.com/video webpage/lloydupdate2/photo.htm>

Baron's Hobby

<http://baronshobbies.com/2010/04/jarel-aircraft-design/>

Small Flying Arts

www.smallflyingartsforum.com

Air, Land and Sea Hobbies

<http://www.airlandseahobbies.com/product/rcpl71002-ep>

AUTHOR INFORMATION

Russell Sparks teaches Exploring Technology to students in 6th – 8th grades at East Wilkes Middle School, Wilkes County Schools

Exploring Technology is an entry level CTE course giving an overview of various areas of technology and careers associated with these areas. The externship involved work in the applied engineering school of Wilkes Community College and local aerospace industries. Mr. Sparks was introduced to the tools and concepts used to prepare students for careers in the aerospace industry and given an opportunity to see the industry processes. This will allow him to give his students a better understanding of the steps needed to prepare themselves for the future. Lyndell Duvall, Chair of Applied Engineering Technologies, Industrial and Engineering Technology at Wilkes Community College mentored Mr. Sparks.

ACKNOWLEDGEMENT

Lesson developed through the Flight Fellowships: STEM in Aerospace Science and Aeronautics, a program of the Kenan Fellows Program and the North Carolina Science, Mathematics and Technology Education Center.

Funding provided for the Flight Fellowships by NASA K-12 Cooperative Agreement #NNX10AU89A.



KENAN FELLOWS PROGRAM



SMT

North Carolina Science,
Mathematics, and Technology
Education Center