

Lesson 5 Cross Halving Joint

Learning Objectives

Students will:

1. learn about the history of the Great Sphinx of Giza;
2. be able to use **laserbox** to design and create a mysterious creature.

Preparation

1. Pens
2. Pictures of different animals
3. Engraving materials: 3mm basswood sheets
4. **LaserBox**

Session 1 Lead-in

Story 1 Sphinx

To start this lesson, you can play videos about sphinxes, or have students gather information on sphinxes and discuss what they find. A sphinx was a mythical creature. In the Greek folklore, the sphinx was a female monster with the head of a woman, the body of a lion, the wings of an eagle and the tail of a serpent. In the mythology, she was notorious for her cunning and cruelty and she killed and ate all those who failed to solve her riddles.



By Marie-Lan Nguyen

Unlike the Greek sphinx, the Egyptian sphinx was a male monster that was believed to be a figure of mercy with mighty power. However, either in the Greek or Egyptian mythologies, sphinxes were usually placed outside temples as guards.



If students show interest in sphinxes, you can share the links below with them:

- 1) <https://youtu.be/q3PyWBdKOJs>
- 2) <https://youtu.be/-zAaITf65pl>
- 3) <https://youtu.be/FcgL0Is-pVU>

Story 2 *Coco*

Alternatively, you can start the lesson by bringing up the animal characters in the film *Coco* and show students some pictures of the characters.

Story 3 *Fantastic Beasts and Where to Find Them*

Collect some pictures of the animal characters in the film *Fantastic Beasts and Where to Find them*, and show students the pictures to start the lesson.

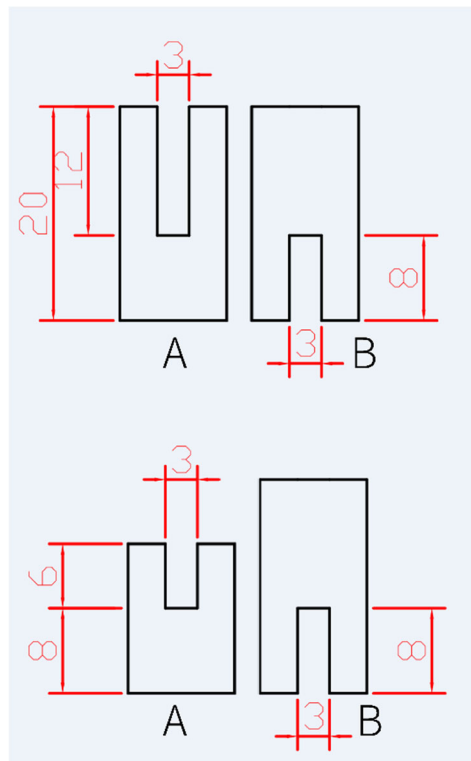
Session 2 Explain New Concept

In this session, students are going to use the **LaserBox** to make a mysterious creature. However, before letting them take up the task, introduce a special structure, **Cross Halving Joint**.

Example:

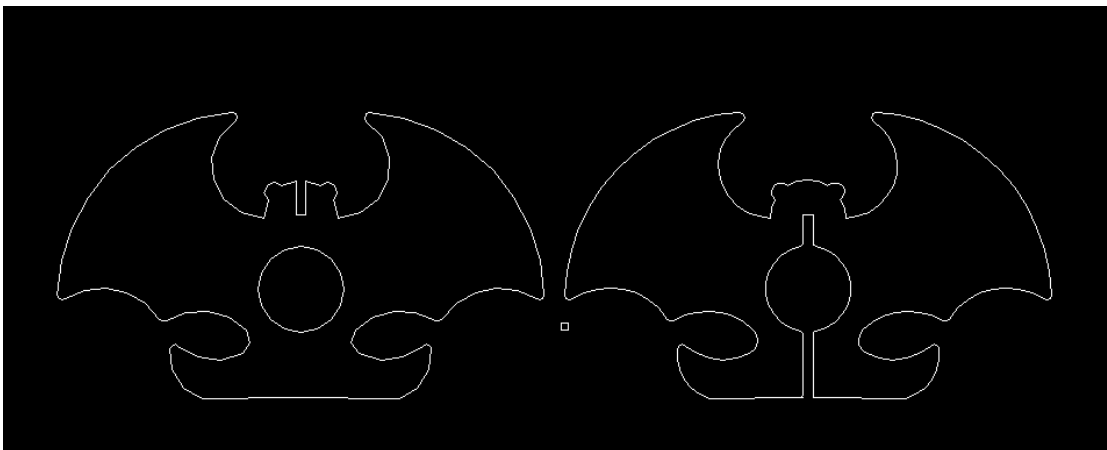


Dimension design:



"When you design a cross halving joint, pay attention to the dimensions of the slots. Shown above is a sketch design for a project made with 3mm basswood sheets. You have to take the thickness of the material into consideration. Given that the thickness is 3mm, the slots should be 3mm wide, otherwise the two parts may not be slotted properly. When it comes to the length of slots, you need to consider the slots as a whole. Assuming that component A and component B have the same length of 20mm: If A's slot is 12mm long leaving a unslotted part with an 8mm length, B's slot should be 8mm long; then the length of B's unslotted part is the same as that of A's slot. In this way, A and B can slot together properly, and the final piece can stand steadily. There are other methods to design slots and what's mentioned above is just one of the commonly-adopted methods. You can adjust the dimensions based on your design."

Example design: Strange Creature



You can get the parts cut beforehand and provide them to students as an example.

Session 3 In-class Task

It's time for students to create their mysterious creatures. Encourage them to use the cross halving joints to make the creature's head, body, limbs, wings, horns or tail. If time permits, students could also make the eyes, nose, mouth or other details. They can make key chains, ornaments or other projects using the cross halving joints.

You can provide them with some pictures of animals for reference, or have them search online. They need to design and draw the creature, then extract their designs with the **laserbox** software. To make the slots on the boards, they need to insert rectangles to the design in the software.



Demonstrate

- Draw the parts of the creature (Remind students to draw the creature in proportion, otherwise it could be difficult to put the parts together.)
- Place the sketch design into the **LaserBox** and use the **Marquee** tool to import the design;
- Insert rectangles to the extracted image in the software and the rectangles will be cut into slots later;

- Use **LaserBox** to cut out the parts;
- Slot the laser-cut parts together.

Independent Practice

- Have students work on their designs.
- Use **LaserBox** to cut and engrave students' drawings.

Session 4 Extension

Task students with the following extension activities when they complete the mysterious creatures:

From the aspect of art: Color the creature and decorate it with ornaments.

From the aspect of history: Collect information about sphinxes and how it differs in the cultures of ancient Egyptian, Roman, Greek and Asian cultures.

From the aspect of biology: Define the mysterious creature by detailing its specie, biological characteristics and living environment. Is it mammalian or amphibious? Is it herbivorous or omnivorous?

From the aspect of creative writing: Write a fiction for your creature. Does it have any magic power? Is it a superhero in a comic?