

## RIGGER CREW

### Instructions: (mates read aloud)

This crew packet contains important information for you to know aboard the Balclutha, and it will help you complete your project. First, read the part about your roles. The mate will assign roles to everyone in the crew. If there are not enough roles for everyone, then the mate may assign 2 people to 1 role. Once the mate assigns the roles, there is no switching, but you are allowed to help each other. Once everyone has a role, read the ENTIRE packet through once, taking turns reading aloud. After you have read through once, you can go back and re-read different sections if you need to.

### Roles:

Recorder	While the crew is taking turns reading the packet out loud, the recorder is responsible for writing down important information for the presentation. The recorder should have legible handwriting, and the rest of the crew should be sure to give the recorder enough time to write things down before moving on.
Researcher	The researcher is responsible for finding new information online or in books that will help with the presentation. The researcher should come up with at least three different sources to get more information from. Once the researcher has come up with the three sources, the mate can assign some other crew members to help with the research.
Designer	The designer is responsible for the layout of the poster that will be presented to the class. He or she should come up with a theme for the poster that includes how big (or small) items will be, how many pictures to use, color scheme, and other elements of design.
Artist	The artist is responsible for either picking or drawing the images that will be displayed on the poster during the presentation. The images should fit into the theme determined by the designer.
Writer	The writer is responsible for writing one to two sentences for each image, to be displayed on the poster. These sentences should answer the Presentation Questions and should be coordinated with the images on the poster.
Presenter	The presenter is responsible for coming up with a script for the presentation. The presenter should NOT be the only person who talks during the presentation. This person will decide what can be read off the poster, what should be said that is not on the poster, and what order different people in the crew will speak in.

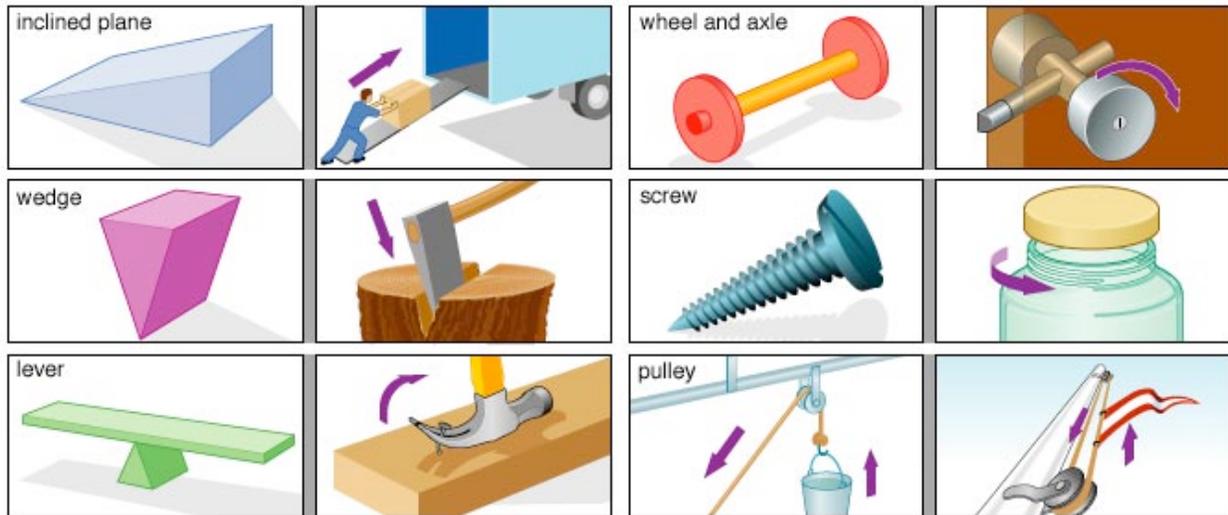
### Presentation Questions:

1. What are the six basic simple machines? Why do people use them?
2. What are the most common simple machines that you find on a ship? (name the different ship parts as well!)
3. What is “mechanical advantage”? How do you figure out mechanical advantage when you are using a pulley?

## Simple Machines

Simple machines are the most basic elements of complex machines, and they provide something called mechanical advantage. When we think about machines, we picture certain things in our head like a car or tractor, a large engine, a computer, or even a robot. These things are all machines, but they are very complex. Each one of them is made up of hundreds or thousands of smaller parts. If you can picture a set of Legos then you can understand how simple machines relate to complex machines. In a set of Legos, you start out with lots of little pieces. There are some big, some small, some skinny, some slant shaped. When you put them together in a certain way you can build a house or a fortress or a car, whatever you want really. But the pieces that you start with are always the same. The big difference between Legos and simple machines is that one Lego on its own doesn't really do anything. That is not true for simple machines, each one can do an important job all by itself, or it can be combined with other simple machines to make a complex machine.

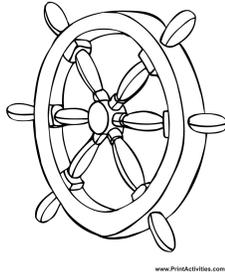
There are six different things that are considered "simple machines": The incline plane, the wedge, the level, the wheel and axle, the screw, and the pulley. Each of these simple machines helps to make a job easier. Another way of saying that is to say that each of these machines provides mechanical advantage. Look at the pictures below to get a better idea of how simple machines work. Can you think of some places in your daily life where you see simple machines?



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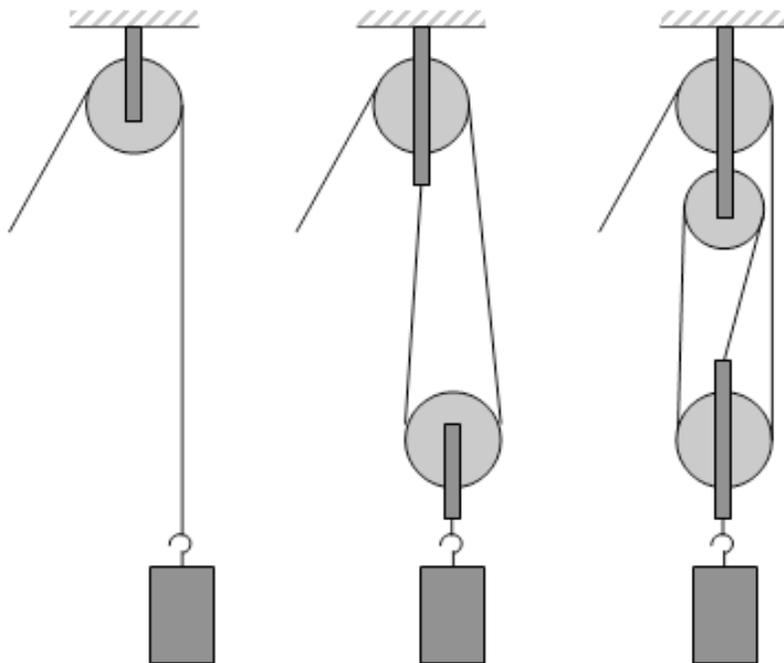
## Simple Machines on Ships

The reason that people use simple machines is to make their work easier, and on ships there is a lot of work to be done. There are many places that you find simple machines on a ship. Below are some pictures of ship parts, can you identify which simple machine each ship part is using?



## Block and Tackle

The most common type of simple machine on a ship is a pulley, but on a ship, like most things, it has a different name. Pulleys on ships are called blocks. You see blocks everywhere in the rigging, and they are bigger or smaller depending on how much mechanical advantage they need to provide. The place where a rope goes through a block is called the sheave. For each sheave that a rope (called a line on a ship) goes through, you can divide the amount of weight you are lifting by that number. If you have a 100 lb weight and the line only goes through 1 sheave, you are still lifting 100 lbs. ( $100 \div 1 = 100$ ). If you now run the line through 2 sheaves, you are only lifting 50 lbs. ( $100 \div 2 = 50$ ) and if you have 3 sheaves then your work is cut down even more, so you are only lifting 33 lbs. ( $100 \div 3 = 33$ ). The more sheaves you have, the less weight it feels like you are lifting, but the extra weight doesn't just disappear, there's a catch! Each time you add a sheave, you have to pull more line through it to make the weight go up the same distance! This time to figure out how much line you will need to pull, you multiply by the number of sheaves. If you want to lift your weight 10 feet in the air and your line passes through 1 sheave, you need to pull 10 feet of line ( $10 \times 1 = 10$ ). You'll need to pull 20 feet with 2 sheaves, 30 feet with 3 sheaves, and so on.

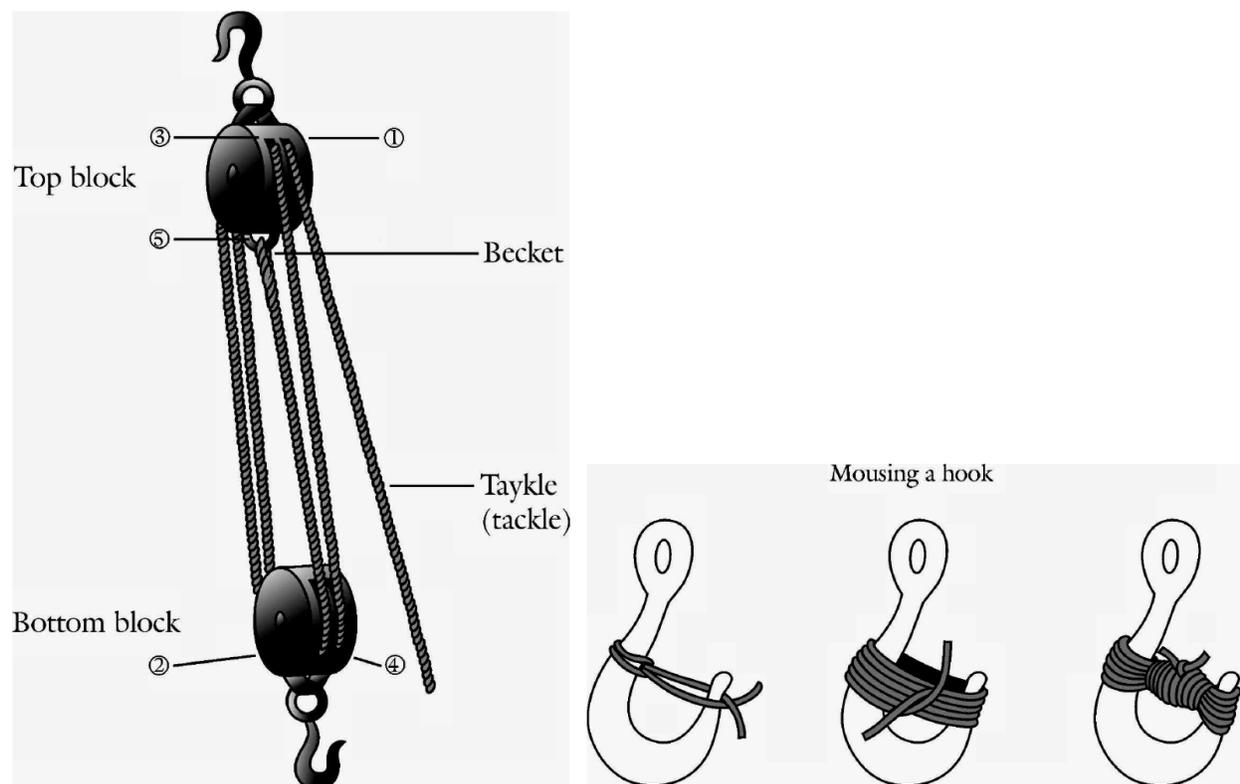


## Rigger Crew Responsibilities

The Rigger's main task is to put together a block and tackle (pronounced "tay-kle") and operate a bosun's chair. The Rigger Crew will also stand a two hour night watch.

There are two types of rigging on any vessel: the **standing** rigging and the **running** rigging. The standing rigging is stationary and consists of wires called stays and shrouds, which hold the masts in place. The **running** rigging is moveable and consists of lines (ropes) attached to one or more blocks for lifting power. **Running** rigging is used for hoisting sails and flags and lifting cargo or people (in the Bosun's chair). As with all crews, the Rigger crew will perform any and all orders given by the Captain.

The Mate has to know how to give and receive orders; the crew must know that they have to wait for the mate's orders before doing anything. The Mate is responsible for the crew's well-being, behavior of the crew and all the work assigned to the crew; therefore the Mate makes all decisions regarding the crew's activities and tasks and the crew reports directly to the Mate upon completion of a task or if any questions need asking. Working together, mate and crew will need to assemble a double-sheaved block and tackle and mouse a hook.



## VOCABULARY

**Bosun's Chair** – a swing-type chair used to reach parts of the mast that cannot be reached by climbing the rigging

**Becket** – see Block diagram

**Bitter End** – end of a line

**Standing Part** – working part of a line that is attached to something

**Block-and-Tackle** (pronounced tay-kl) – One or more pulleys and lines used to create mechanical advantage (or lifting power) for heavy objects; the block is the pulley and the tackle is the moving line through the block

**Check** – see block diagram

**Mousing** – see diagram

**Tag Line** – a line used in conjunction with a block and tackle to guide an object that has been hoisted aloft to the intended target.

**Seize** – to secure or fasten something by means of a smaller binding line (similar to mousing)