Basic Keelboat Manual

March 2023

Basic Keelboat Manual

Congratulations! Basic Keelboat is the first leg of your lifelong voyage in sailing. You are fortunate to take this course on San Francisco Bay, where sailing conditions are among the best in the world. Strong steady winds, swift tidal currents and seasonal fog combine to offer the most challenging and rewarding sailing in the country.

Due to these conditions, you, as a competent Bay Sailor, must carry a more complete package of skills than most recreational sailors in the rest of the country. Once you have these skills, you'll be comfortable sailing medium sized keelboats in cruising grounds anywhere in the world!

USING THIS MANUAL

We have designed the Basic Keelboat Manual as a learning tool to supplement the information in the ASA textbook, the on-the-water portion of ASA 101.

It is not necessary to read this Manual before coming to Basic Keelboat I. The manual won't teach you how to sail; you learn to sail by sailing, not reading. Use this manual as an introduction to what to expect in your class as well as a source to refer to later to review what you learned.

Some of the terms and procedures—in the manual and in your class—may seem intimidating at first. When you start sailing, you enter a new environment. Many new sailors are overwhelmed at times with all the information. Be patient. Don't despair if the terminology or concepts don't sink in the first time around. As you spend more time sailing and reading, these will become more intuitive.

Most importantly, remember that no matter how technical the book seems, or how difficult the concepts appear at first, the most important thing about sailing is to have fun. If nothing else, we hope this manual makes the technical aspects of the sport clearer and easier to learn so you can thoroughly enjoy your time on the water.

SUPPLEMENTAL READING FOR THE COURSE

In addition to your on-board instruction, we've provided written material to enhance what you'll be learning and to give you the opportunity to review important details of ASA 103 in the future. The ASA textbook is a resource that will be valuable for years to come. This Manual complements the text and covers many parts of the training not included in the text.

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SECTION 1: THE BASICS

When you step aboard a sailboat, your entire orientation to the world changes. Your sense of direction shifts from you to the boat, and a force of nature which until recently was mostly a nuisance—the wind—is the most important factor to take into account.

A significant part of this reorientation is becoming familiar with the language associated with this new world. As you add to your sailing vocabulary, you'll find that the language is extensive, colorful, and very precise. It can also be frustrating.

Some words make obvious sense— the "windward" side of a boat is the side that the wind comes from. But other words seem silly, or even arbitrary: There are no "ropes" on a boat, for instance, only "lines." There are no "pulleys," only "blocks." The "sheet" is not the sail, but the line that controls it.

New words will appear on nearly every page of this book. Many of them won't be defined in the text. If you're not sure of the meaning of a word, look it up in the glossary in the back of this manual, or in your US Sailing text.

Whatever it takes, learn the language of sailing. It is the only way to communicate clearly on your boat. Your initial frustration will pay off in clearer, more efficient communication. "Pull that rope hard" will never get you out of a tight spot as efficiently as "sheet in the jib."

The following sections introduce you to the terms used in sailing, focusing on the objects and practices you will be using in Basic Keelboat.

A. DIRECTIONS ON THE BOAT

On land, “forward” normally refers to the direction in which you are pointed. If someone asked you to take a step forward, you would place one foot ahead of the other no matter which direction you were facing.

On a boat, “forward” refers to the front of the boat (otherwise known as the “bow”). Even if you are facing the stern, or back of the boat, a command to go forward means to go toward the bow of the boat.

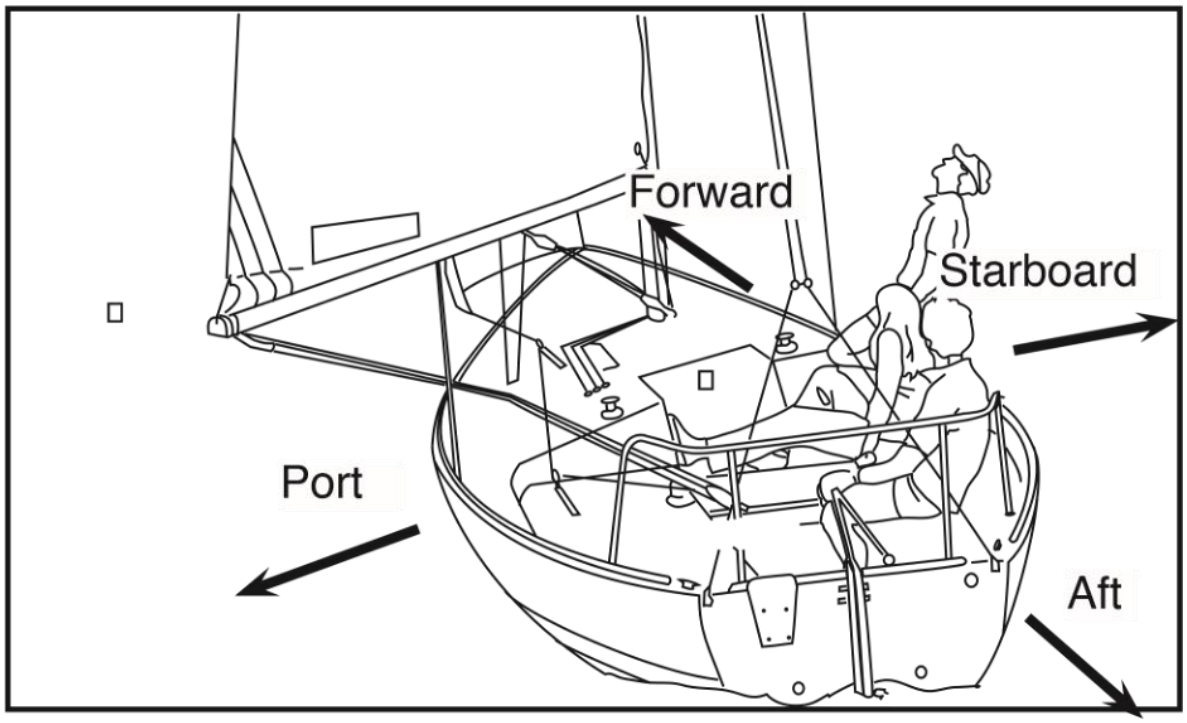
In order to prevent confusion, there are four basic terms used to designate directions on the boat. You probably have heard them before:

Forward: Toward the bow

Aft: Toward the stern

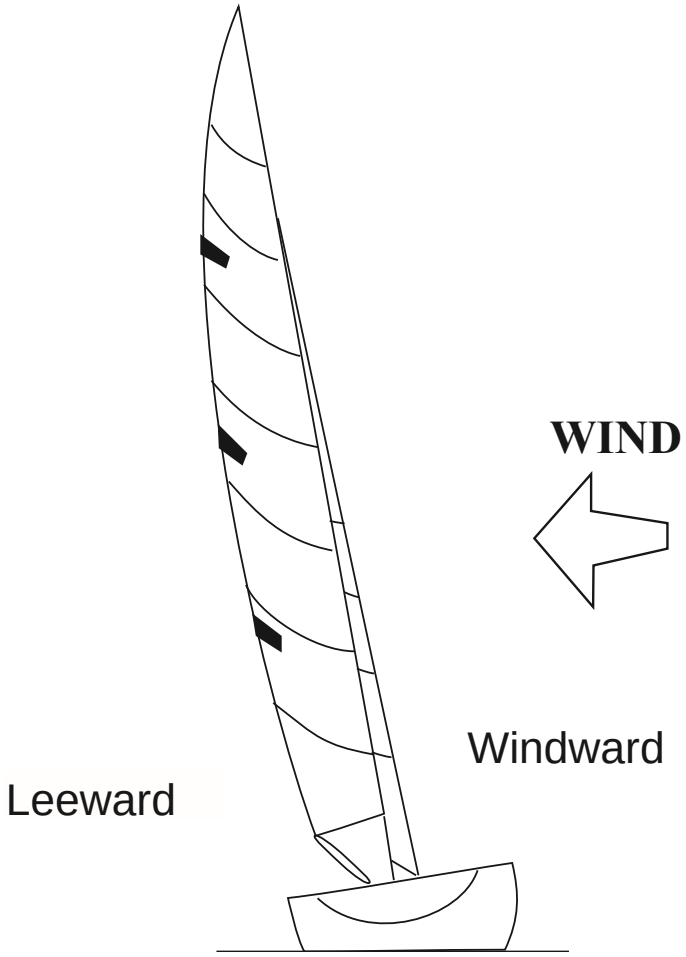
Starboard: To the right, looking forward

Port: To the left, looking forward



B. WINDWARD AND LEEWARD

In addition to the four directions discussed above, you will learn to recognize how the boat is oriented to the wind. One part of a boat will always be the **windward** side— that is, the side closest to the wind—and the side away from the wind is the **leeward** side (pronounced “lew-ward”). The windward and leeward sides of a boat are independent from the starboard and port sides of the boat. For example, the windward side of a boat sailing in one direction may be its starboard; on a boat sailing the other way, the port side might be windward. You will soon become adept at these observations when you start sailing. For now, just realize that when you step on the boat you will be seeing the world in a new way.



C. PARTS OF THE BOAT

Following are a few diagrams to help you learn the names of different parts of the boat as well as some hardware used in sailing. These names will all seem confusing at first but will soon become second nature. You will also find these terms in the glossary at the back of this manual, and in the US Sailing Basic Keelboat textbook.

Diagram 1: The Hull

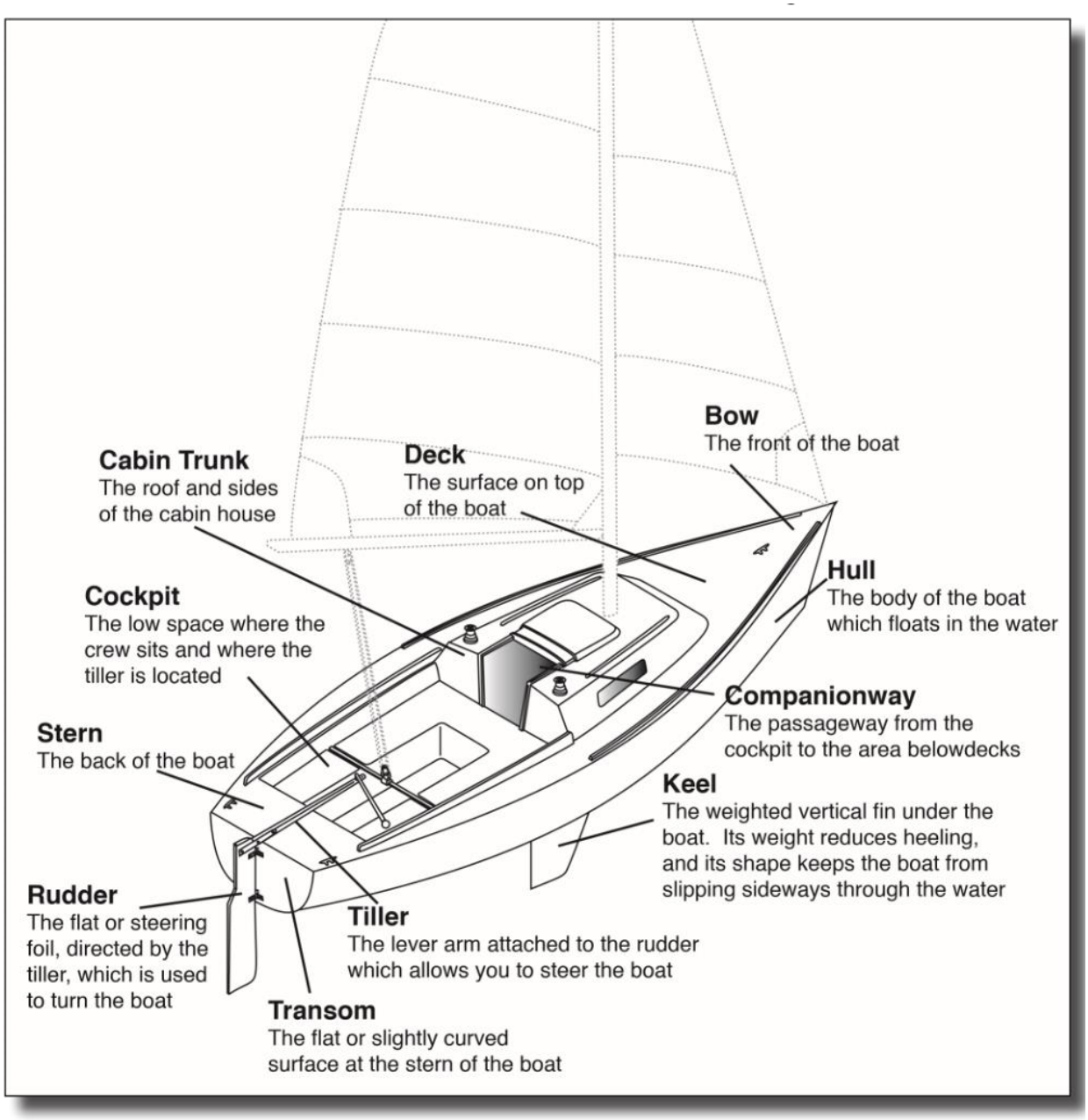


Diagram 2: The Rigging

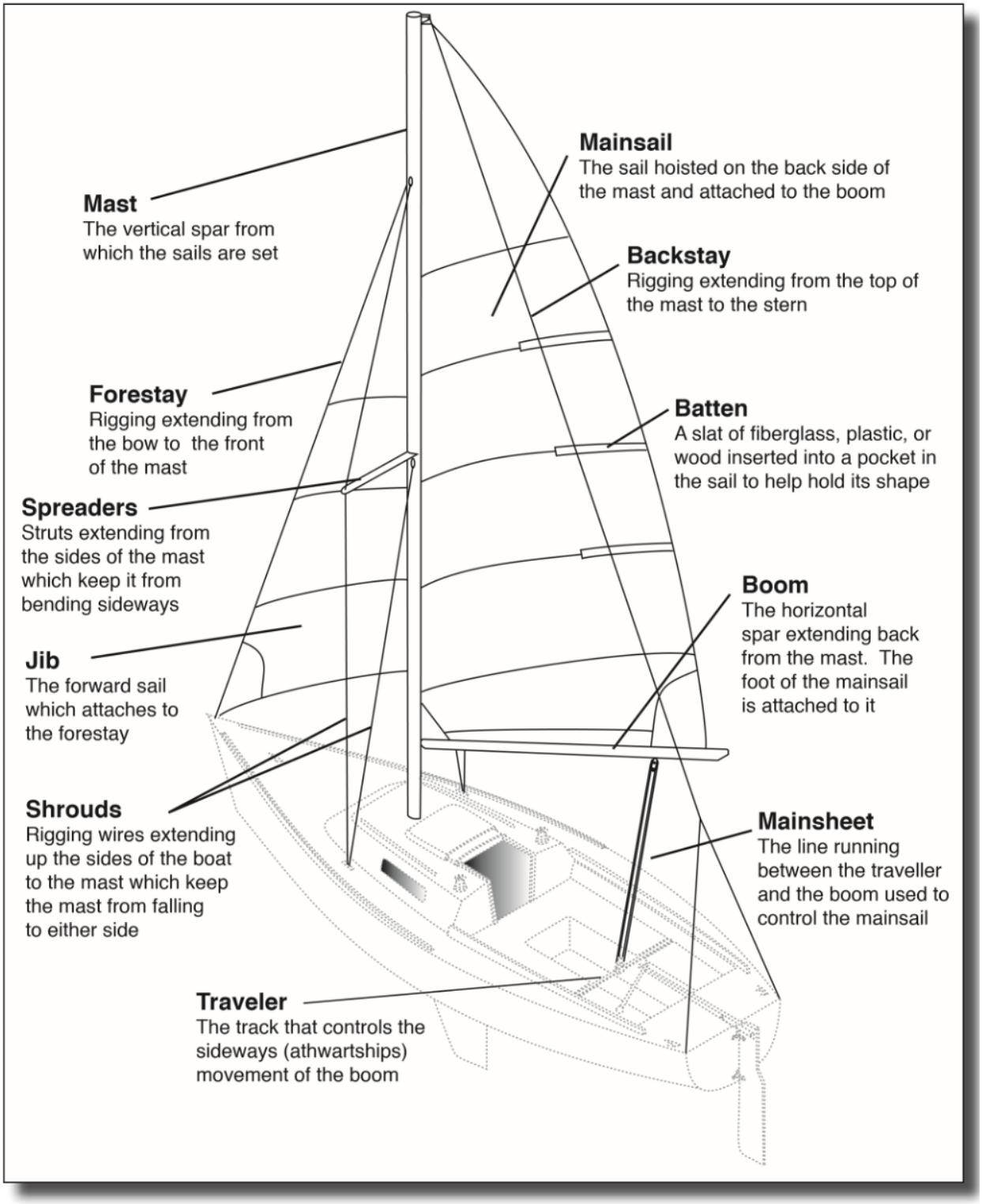


Diagram 3: Parts of the Jib

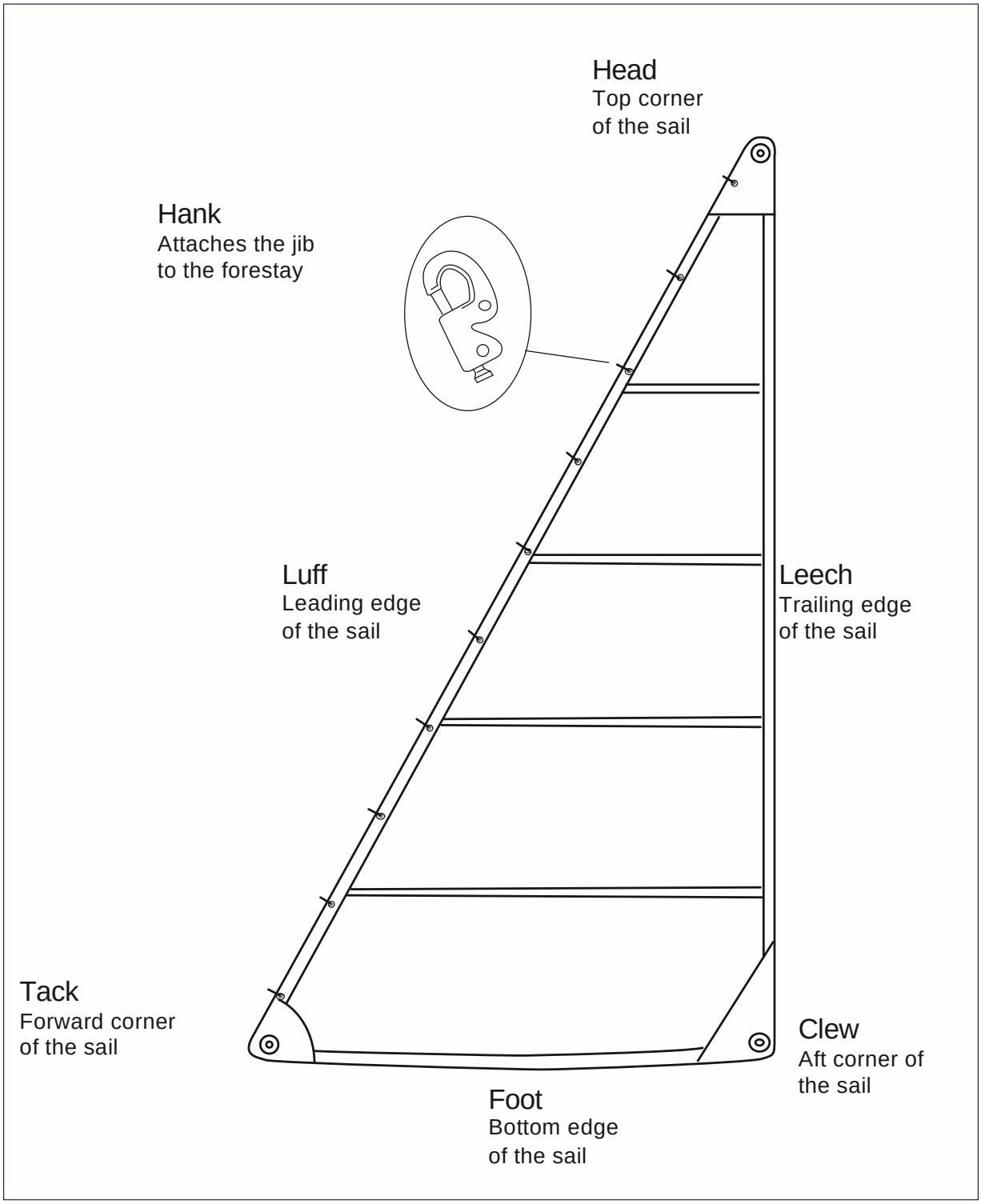
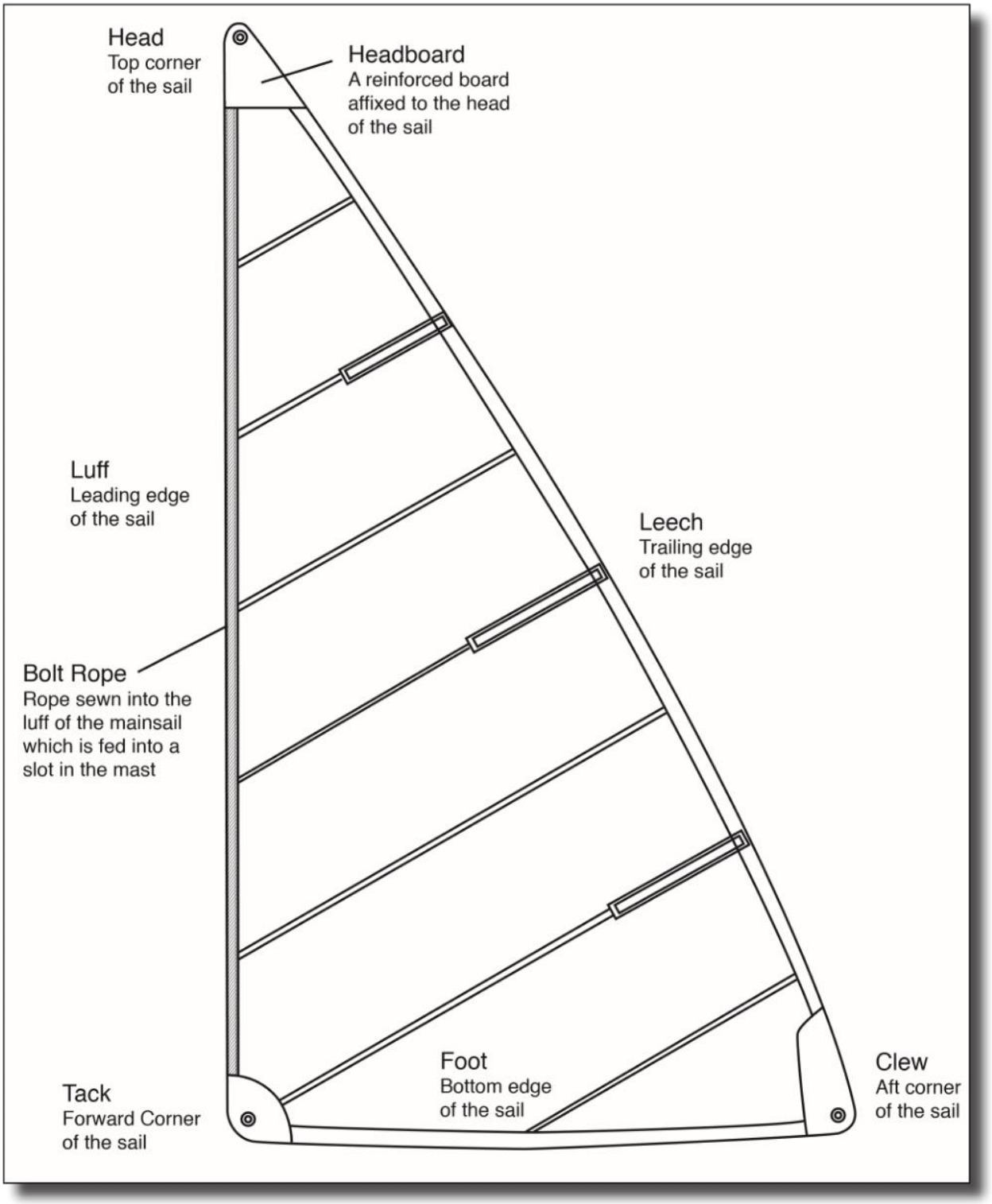


Diagram 4: Parts of the Mainsail



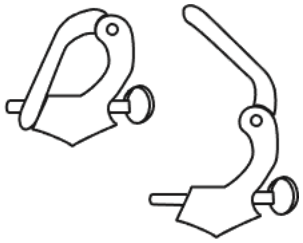
C. PARTS OF THE BOAT (Continued)

In addition to the parts of the boat, there are also a few items of hardware you will be working with. Below are some of the most common pieces of hardware used to secure lines, which are called shackles and cleats. At first, the names will be confusing, but with a little experience and study, you'll soon be able to distinguish a cam cleat from a clam cleat like a pro!

Diagram 5: Common Types of Shackles

Key Shackle

A key shackle secures one line (*e.g.*, the main halyard) to a part in the rigging (*e.g.*, the main sail). The key in the pin locks into place, making a more secure connection.



Snap Shackle

A snap shackle secures one line (*e.g.*, the spinnaker halyard) to a part on the rigging (*e.g.*, the spinnaker). The bullet is spring loaded. To open, pull the ring back. The bullet will spring back into place when the ring is released.

Hook Shackle

A hook shackle secures one line (e.g., a pole topping lift) to a part on the rigging (e.g., spinnaker pole). closure is spring loaded. To open, push the closure in. It will spring back into place when released.

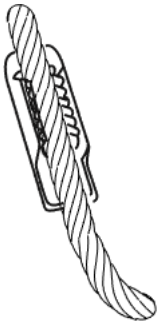
Diagram 6: Common Types of Cleats

Jam Cleat

A jam cleat holds a line by pinching it into the narrow part of an inverted "V". To secure a line, jam the line up into the inverted "V". To release, pull the line down out of the "V".

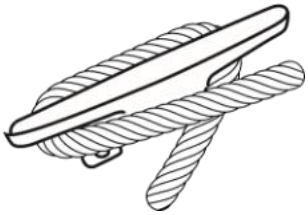
Cam Cleat

A cam cleat holds a line between two spring-loaded jaws. To secure a line with a cam cleat, pull the line through the cleat while pulling it down between the jaws. To release, lift straight up.



Clam Cleat

A clam cleat holds a line between two sets of scalloped teeth. To secure a line, push the line down into the cleat. To release, pull the line while lifting it straight up.



Horn Cleat

A horn cleat holds a line by means of specific knot, i.e., a cleat hitch. To secure the line, tie a cleat hitch. To release, untie the cleat hitch.

SECTION 2: MANEUVERS

As complicated as handling boats may seem, there are only four maneuvers which a sailboat can perform. With these skills, you can sail a boat in any direction. One of the wonderful things about sailing is that you can learn these maneuvers in a short time, but still spend the rest of your life practicing and refining your expertise.

One of our goals in Basic Keelboat is to teach you these basic maneuvers in your first weekend. The following sections explain the maneuvers in detail.

A. THE FOUR SAILING MANEUVERS

The four maneuvers which a sailboat can perform are Tacking, Gybing, Heading Up, and Bearing Away.

- **Tacking** (or Coming About) is when you turn the bow of the boat through the eye of the wind.
- **Gybing** (also sometimes spelled “jibing”) is when you turn your stern through the eye of the wind.
- **Heading Up** means turning the bow of the bow closer to the wind, but not through it.
- **Bearing Away** (or falling off) means turning the bow of the boat away from the wind (without gybing).

You will be introduced to three of these four maneuvers on your first day of Basic Keelboat: Tacking, Heading Up, and Bearing Away. You will learn the fourth maneuver Gybing on your second day.

Each crew member has specific roles when sailing a boat. The boat you will be learning on, the J/24, is what is known as a sloop rigged boat: it has one mast and two sails.

During the on-the-water portion of your class, two students will be maneuvering the boat, and the third will stand in the companion- way. One person will act as the Helmsperson, a second as Crew, and the third will watch and help where necessary. Each person will rotate through each position numerous times in the course of the weekend.

The Helmsperson is responsible for controlling the tiller (which steers the boat) and the main sheet (which controls the mainsail).

The Crew is responsible for handling the jib sheets (which control the jib, or forward sail).

Sailing maneuvers require communication and coordination between the helmsperson and crew. The following sections out- line the steps each crewmember takes to perform the maneuvers listed here. These instructions may not mean much to you if you have not sailed before. Once you’ve tried them on the water, however, these guides should help you remember the proper steps in each maneuver.

B. TACKING

Tacking, or “Coming About,” means turning the bow of the boat through the eye of the wind. A boat cannot sail directly into the wind. Tacking allows a boat to sail to an upwind destination by steering a zig-zag course through the eye of the wind.

Here are the roles and responsibilities for the Helmsperson and Crew for Tacking:

Helmsperson

1. Check traffic

As a new sailor, you will probably be concentrating so much on what is happening on your boat that you will forget to check around you to see what other boats are doing. Taking a full visual sweep around the boat is the best way to avoid tacking into another boat.

2. Pick a destination

One of the most difficult things about tacking is knowing when to stop your turn. Eventually, the feel of the boat and the tiller will be enough. To start, however, it is useful to pick a landmark. That way you’ll be more likely to avoid over- or under-steering. When you are on a close-hauled point of sail, that landmark should be roughly Ninety Degrees through the eye of the wind.

3. Give the preparatory command, “Ready about”

By giving this command, you tell your crew to “Get ready to Tack.” The crew then prepares for the tack. While the crew prepares, make sure you hold a steady course.

Crew

1. Prepare the lazy jib sheet

When you tack, the jib must be brought from one side of the boat to the other. You manipulate the jib by handling the jib sheets.

While you’ve been sailing, the leeward (or “working”) jib sheet has been holding the tension on the jib. Meanwhile, the windward (or “lazy”) jib sheet has been loose. In order to make the tack as smooth as possible, you should take the slack out of the lazy sheet and place one or two wraps (depending on wind conditions) clockwise around the winch.

2. Uncleat and hold the working jib sheet

After you have prepared the lazy sheet, let it go and concentrate on the working sheet. You will need to release this sheet when the jib is fully luffing. In order to make that release happen quickly, uncleat the working sheet but hold it firmly in place. The boat coasts through the turn when it tacks, so you need all the power the sails can muster to make that turn successfully.

3. Say “Ready,” only when you are ready

Once you have (1) taken the slack out of the lazy sheet, (2) taken a turn around the winch, and (3) uncleated the working sheet, you are ready to tack. Tell the skipper you’re ready.

Helmsperson

When the Crew says “Ready,” the helmsperson continues with Step 4 of the helmsperson’s role:

4. Give the executory command, “Tacking”

After the crew says “Ready,” you may start your turn. Once you do, the boat will head into the wind, causing the sails to luff and the boat to flatten out. By saying “Tacking” you let everyone know you are starting your turn. This tells them to make sure they are properly braced for the turn.

5. Push the tiller to leeward

Pushing the tiller to the leeward side of the boat will make the bow turn to windward. The distance you push the tiller depends on the conditions. Trying to turn a boat in 18 knots of breeze with 2-foot wind waves requires a more aggressive turn than one executed in 8 knots and flat water.

In any case, push the tiller away until your arm is fully extended. After you have tacked a few times in different conditions, you will develop a feel for how far the tiller needs to go to lee to make a clean tack.

6. Wait for the boom to cross

When you tack the boat, the sails change sides. The helmsperson and crew also change sides so that they are sitting across from the mainsail. It is best to move across the boat only after the boom has crossed.

Once the boat starts its turn, your first inclination will probably be to get on the other side as soon as possible. It is better to wait for two reasons: (1) There is very little room between the boom and the tiller. By standing up before the boom has crossed, you have significantly increased the possibility of bumping your head or upper body into the boom which is bouncing around because the mainsail is luffing. You avoid this hazard if you wait until the boom is settled; (2) If you wait until the boom is settled on the new side before you cross the boat and sit down, chances are high that you will now be pointed at your destination landmark and can stop your turn. By crossing early, you may stop your turn too soon, causing the boat to linger too long in the “No Go” zone.

Once the boom has crossed, move to the other side. But it is just as important not to wait too long as it is not to cross too soon: If you wait too long and the boat heels too much before you move, it will be difficult to switch sides, especially in strong winds.

7. Pass the helm behind your back and sit down

Once the boom crosses, it is safe for you to cross. The best way to change sides of the boat and still remain fully in control is to stand up facing forward, lift the tiller as you stand, pass the tiller behind your back from one hand to the other, then sit down on the new side bringing the tiller down with you.

Again, your first inclination will be to rush. Resist this inclination. You remain in better control by moving carefully and deliberately across the boat. There is plenty of time to cross over before the boat heels.

8. Adjust Your Course

Once you cross over and sit down, you are ready to find the proper course on your new tack.

Place the tiller in the middle of the boat. If you followed the steps properly, you picked out a landmark as the place to stop your turn. At this stage, it is more important to regain boat speed so the boat can steer effectively. Placing the tiller in the middle of the boat helps the boat achieve that speed sooner, giving you better steering control.

Once the boat is moving well again, find your proper course by following the telltales on the jib. Don’t be surprised if this new course is not directly in line with the landmark you picked. Remember, the landmark is a learning tool. The only way to know when a boat is on a close-hauled point of sail is by sailing the jib.

Crew

Once the helmsperson says “Tacking,” you have a job to do as well. We pick up from the crew’s role Step 3 above, and on to Step 4:

4. Wait for the jib to luff

Remember that the boat coasts through the “No Go” zone during a tack. It is important that the sails stay filled with air as long as possible in order to give the boat enough speed to coast through the turn. Keep the jib in tight until it is fully luffing.

5. Release the jib sheet

As the boat enters the “No Go” zone, the jib will luff. Once it does, it is no longer powering the boat. Go ahead and release the sheet you are holding.

Make sure you not only release it, but also that it comes completely off the winch. This will ensure a well-shaped jib on the new tack. The easiest way to take it off this winch is to pull the sheet straight up. It will quickly uncoil from the winch.

6. Cross under the boom and sheet in the jib

When you release the luffing jib, the boat will be level (there is no wind in the sails to make it heel). At this point, duck under the boom and cross the boat. As you duck under, you can grab the jib sheet next to you (the lazy jib sheet which you prepared earlier), and bring it with you to the other side.

Once you are sitting, brace your legs and pull the new working jib sheet in tight. If you pull the jib in before it fills with air on the new tack, it will come in all the way easily. If you wait until it fills, it may be much more difficult. Most likely, you will have to use the winch handle.

Watch your timing. If you wait until the sail is fully luffing before you release it, then cross under the boom and sheet in, the bow will have passed through the eye of the wind before you start sheet- ing in on the new tack. If, however, you release the jib too soon, and cross under the boom and start sheeting in before the bow passes through the eye of the wind, you may prevent the bow from getting through the eye of the wind, thus stopping the tack.

7. Cleat the jib sheet

Once the jib is sheeted in tightly, use the cleat to hold it tight.

You did it! That’s a tack!

Though this may seem like a lot of steps, once you have tacked a dozen times or so, this entire maneuver will take a matter of seconds. The keys to a successful tack, as with all sailing maneuvers, are preparation and clear communication.

A summary of the steps is shown at the right:

TACKING

Helmsperson
1. Check traffic
2. Pick a destination
3. Give the preparatory command, “Ready About”

Crew
1. Prepare the lazy jib sheet
2. Uncleat and hold the working jib sheet
3. Say “Ready,” only when you are ready

Helmsperson
4. Give the executory command, “Tacking”
5. Push the tiller to leeward
6. Wait for the boom to cross
7. Pass the helm behind your back and sit down

Crew
4. Wait for the jib to luff
5. Release the sheet
6. Cross under the boom and sheet in the jib
7. Cleat the jib sheet

C. GYBING

Gybing means turning the stern of the boat through the eye of the wind. It is the complement to tacking. Just as we sail a zig-zag course to an upwind destination, gybing allows us to sail a zig-zag course to a downwind destination. This allows us to sail safely and more efficiently to that destination.

Unlike tacking, however, where the boat coasts through the eye of the wind, sails are always fully powered when gybing. For this reason, gybes must be executed slowly and carefully.

Take a look at the table below for a brief comparison of the differences between tacking and gybing:

Tacking	Gybing
Bow through the wind	Stern through the wind
90 degree turn	15-20 degree turn
Close-hauled	Deep broad reach
Sails luff (coasting)	Sails full (powered up)
Boat powered by momentum	Boat moving at speed
Team coordination	Skipper focused
Specific commands	Different, but still specific, commands
Mainsail is untended	Mainsail is sheeted in and released
Skipper switches sides after tack	Skipper switches sides before gybe
If poorly executed, mainsail luffs harmlessly	If poorly executed, mainsail and boom are thrown across the boat
Like putting a car in neutral and turning uphill	Like turning a car on ice!

Helmsperson

1. Sail to a deep broad reach

To gybe successfully, the boat must be pointed as far downwind as is safe. This point of sail is known as a "Deep Broad Reach."

To find a deep broad reach, sail downwind until you jib collapses. This means that the clew will drop (as compared to luffing, where the luff flutters). This tells you that the mainsail is blanketing the jib, keeping it from filling with wind. Head upwind slightly, just until the jib starts to catch air. That is a deep broad reach.

2. Pick a landmark

In many ways, it is harder to sail a boat on a straight course down- wind. The force of the wind on the mainsail and the force of the waves hitting the aft quarter of the boat cause it to slew around quite a bit.

Once you have found a deep broad reach, follow the line of the bow and find a landmark dead ahead. This will help you sail as straight a line as possible.

3. Give the preparatory command, "Prepare to gybe"

As with tacking, and every other maneuver on a boat, communication is a key element of success. While the crew prepares, make sure you hold a steady course.

Crew

1. Trim the lazy jib sheet

Unlike coming about, you do not have to coordinate the movement of the jib from one side of the boat to the other with the crossing of the mainsail. When gybing, your concern is not to let the jib get loose and wrap around the headstay.

At this stage, pre-trim the jib using the lazy (windward) sheet. You will then have the jib well-trimmed on the new side when the gybe is completed.

- Take the lazy (windward) jib sheet, wrap it once or twice around the windward winch
- Pull it until it is about the same length as the working (leeward) sheet and cleat it. Use the distance from the clew of the jib to each jib fairlead as a guide.
- Once the windward jib sheet is pre-trimmed, uncleat the leeward sheet and take it completely off the winch— the windward jib sheet will hold the jib in place.
- Tell the Helmsperson, “Ready” and get low so the boom passes above you in the gybe.
- Once the boat is steady after the gybe, check and fine tune the trim of the jib to the new course.

2. Tell the helmsperson, “Ready”

Once you have centered the jib, you are ready to gybe. All you have to do until the gybe is completed is to keep out of the way of the boom. Tell the helmsperson you are “ready.”

Helmsperson

We pick up the action with Step 4 for the helmsperson:

4. Change Sides

Once the jib is secure, stand up, pass the tiller behind your back, and sit down on the leeward side of the boat. This way, if the gybe is unsuccessful and the boat broach- es, you will be on the windward (high) side of the boat. It is much easier to control a boat from the high side than from the low side.

5. Sheet in the mainsail

Once you have switched sides and are secure, start sheeting in the main. When gybing, the goal is to control the mainsail as it comes across the boat. The best way to do this, especially at first, is to sheet it into the middle of the boat then release it in a controlled fashion once the stern has passed through the eye of the wind.

It is essential that you keep your boat on a deep broad reach through this entire process. If you go much further downwind, the boat will gybe before you are ready. This can cause all kinds of problems from broaching to personal injury to boat damage.

On the other hand, if you sail too far upwind, the boat may round up and point to windward even though you don’t want it to. If you think about your mainsail, you can see why. Once the main is pulled to center, it is trimmed for a close-hauled point of sail. If the sails “feel” the wind, there will be enough power in the sails to heel the boat (pulling the rudder partially out of the water) and turn it upwind.

6. Uncleat the mainsheet

After you have sheeted in the main sail all the way, the next step is to uncleat the main and hold it tight.

Once the stern of the boat passes through the eye of the wind, you will need to release the mainsail and let the sheet run out quickly. If the mainsheet is cleated, it will slow this procedure down.
More importantly, once the main- sail fills with air on the new tack, the air pressure in the sail will make it very difficult, and some- times impossible, to uncleat. This will cause you to broach (turn head to wind).

Once you have uncleated the main, make sure it does not become re-cleated. This can easily happen while you concentrate on your turn. The easiest way to prevent accidental re-cleating is to uncleat the mainsheet by placing you fingers on top of the sheet and bending the line to pull it out of the cleat (your instructor will demonstrate this on the boat). Bending the line to a 90° angle will keep it outside of the cleat's jaws.

7. Give the executory command, "Gybe ho"

This tells the crew that you are starting your turn.

8. Push the tiller slightly to windward and hold it in place

Now that the sails are set, it's time to start your turn. We want to sail further downwind, to pass our stern through the eye of the wind, so the tiller goes to the windward side. The tiller should only be moved a small amount to windward. Usually this means 6" to 8". In no case should it ever go past the edge of the cockpit well (the space where your legs and feet are).

Once you have pushed the tiller a sufficient amount to windward, lock your arm in place. Your tendency might be to adjust your course as you sail. Doing this will only prevent the gybe. Holding the tiller in one place will allow the boat to make a slow, steady turn.

9. Be patient

It takes longer to gybe than it does to tack. Remember, when you are gybing, the sails are fully powered. You want to go slowly. Have patience—the boat will keep turning.

10. When the mainsail fills with air, release the mainsheet and stop your turn

As the stern of the boat passes through the eye of the wind, the jib will fill first. Once it does, you know the mainsail is getting ready to fill.

At first, the boom will rock back and forth once or twice. Then, it will settle on the new side. Once this happens, you have to act quickly. Two things must happen simultaneously:

- You must release the mainsheet to let the sail run out, and
- You must pull the tiller to windward to stop your turn.

The mainsail should run freely through your hand (gloves really help make this easier). Don't let it go completely. It can get fouled (tangled) or whip around the boat and harm someone.

It is necessary to stop your turn because the boat's tendency is to head upwind. Your goal is to start on a deep broad reach on one tack, gybe, then stop your turn at a deep broad reach on the other tack. That is how you keep the boat under control. Once you are under control on the new tack, you can change course as desired.

You did it! That's a gybe!

Similar to the tacking procedure, gybing may seem like a lot of steps; but once you have gybed a dozen times or so, you will feel much more comfortable. The keys to a successful gybe, as with all sailing maneuvers, are preparation and clear communication. With the gybe in particular, **good steering** is critical as well!

A summary of the steps is shown at the right:

GYBING

Helmsperson
1. Sail the boat to a deep broad reach
2. Pick a landmark
3. Give the preparatory command, "Prepare to gybe"

Crew
1. Pre-trim the jib
2. Tell the helmsperson, "Ready"
3. Stay low!

Helmsperson
4. Change sides
5. Sheet in the mainsail
6. Uncleat the mainsheet
7. Give the executory command, "Gybe ho"
8. Push the tiller slightly to windward and hold it in place
9. Be patient, let the boat slowly turn
10. When the mainsail fills with air, release the mainsheet and stop your turn

D. HEADING UP AND BEARING AWAY

Tacking and Gybing are two of only four sailboat maneuvers. The other two are more subtle, but just as essential. They are Heading Up and Bearing Away.

1. Heading Up

Heading up means bringing the bow of the boat closer to the eye of the wind. Like tacking, it takes coordination between the helmsperson and crew, but is far less complicated than tacking.

To head up, the helmsperson only gives one command: “Heading up.” At this point, the helmsperson will:

(1) Push the tiller slightly to leeward, and
(2) Sheet in the mainsail
(3) As the boat starts to head up, the crew will also bring in the jib.

2. Bearing Away

Bearing away means turning the bow of the boat away from the eye of the wind. To bear away, the helmsperson only gives one command: “Bearing away.” At this point, the helmsperson will:

(1) Pull the tiller slightly to windward, and
(2) Ease out the mainsail
(3) As the boat starts to bear away, the crew will also ease out the jib.

The difficult part of these maneuvers is finding the proper sail trim once the helmsperson establishes a new course. This will be covered in detail both in class and on the water. For now, it is enough to understand that as a boat comes closer to the wind, the sails must be brought in; otherwise, they will luff, and the boat will lose power. Similarly, as a boat sails away from the wind, the sails must go out. Otherwise, the sails will be over-trimmed, causing excess heeling and weather helm. In very high wind days, a J/24 will not even bear away from the wind until the main is eased.

Learn to coordinate moving the tiller with trimming the sails. It will help make your sailing smoother.

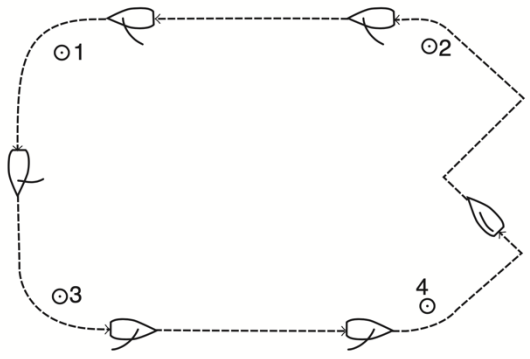
Test your knowledge: What maneuver does the boat make in the following scenarios?

A. To get from Point 4 to Point 2?

B. To round Point 2?

C. To round Point 3?

D. To round Point 4?



Answers: A. Tack B. Bear Away C. Gybe D. Head Up

SECTION 3: RIGGING THE BOAT

On your first day of class, you will learn how to rig the J/24. Starting from the second day, you and the other students will arrive before class starts and rig the boat by yourselves. As with most things you will learn, rigging may seem complicated at first. With practice, it will become easier in a very short time.

We have included a rigging guide to the J/24 to help make it easier to learn how to rig the boat. As you get more practice, this guide will become unnecessary. In the meantime, the rigging guide will help you get started toward developing your own checklist when rigging any boat by getting you to think about what preparations should be done before a boat leaves a slip.

A. RIGGING GUIDE FOR THE J/24

Foredeck

1. Replace the permanent bowline with a walking (20') bowline.
2. Remove the spinnaker lines from the bow pulpit and secure them to the padeyes at the base of the mast.
3. Re-tension the spinnaker lines and secure the excess line.
4. Secure the tack of the jib to the tack horn and hank on the jib to the forestay.
5. Attach the jib halyard to the head of the jib.
6. Tie jib sheets to the clew of the jib.
7. Run the jib sheets through the fairleads on the foredeck, inside the shrouds, and through the turning block (the aftermost cheek block) by the cockpit.
    - *Note: If you are rigging the Genoa (150%), run the sheets outside of the shrouds and through the genoa fairleads which are located in the cockpit, just outboard of the jib winches.*
8. Tie a Figure-8 knot in the end on the jib sheet.
9. Furl the jib and secure with a Highwayman's hitch.
10. Dog Forward Hatch

Amidships

1. Remove the spring line and coil it neatly by the cleat.
2. Remove and stow the mainsail cover.
3. Pre-feed the mainsail into the mast track about 1 foot.
4. Attach the main halyard to the head of the mainsail. Re-tension the halyard and loop it around the halyard winch.
5. Ensure that the mainsail is clear to hoist: Cunningham removed, outhaul uncleated, boom vang uncleated, and reefing lines clear.

Cockpit

1. Rig the horseshoe ring and place the winch handle in pocket.
2. Center the traveler.
3. Uncoil the mainsheet and recoil it neatly.
4. Set up the engine (See separate Outboard Engine Operation Guidelines).

Complete Boat Paperwork

(Starting in Basic Keelboat II)

B. SHAPING THE MAINSAIL

Once the boat is rigged, you will head out to sail. You will learn how to hoist the mainsail while pointing into the wind. Once the sail is raised, you will learn how to shape it.

This process has an acronym: **COBRA**.

The letters stand for the various shaping tools as shown below:

1. Cunningham

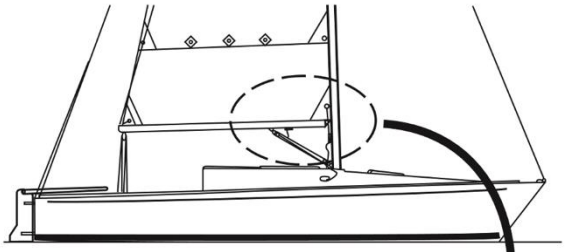
2. Outhaul

3. Boom Vang

4. Reefing Lines

5. Backstay Adjuster (or Adjustable Backstay)

The diagrams on this page demonstrate the location of the first four tools, which are located on or near the mast. The backstay adjuster is located in the cockpit.



1. Cunningham

The line and hook which attach to the lower-most cringle (grommet) in the luff of the sail. The cunningham adjusts the luff tension of the sail.

Apply the cunningham by inserting the hook into the cunningham cringle, then pulling down on the line and securing it with a cleat.

2. Outhaul

The line attached to the clew of the mainsail. The outhaul adjusts the tension along the foot of the sail. Set the outhaul by tensioning the line running under the boom, then securing the line to the cleat.

4. Reefing Lines

Reefing lines attach to the leech of the sail and are used to help shorten the sail when winds are strong. For now, you'll just make sure the slack is out of the lines. Tension the lines by pulling them out of the front of the boom and secure them in place with the cleats.

3. Boom Vang

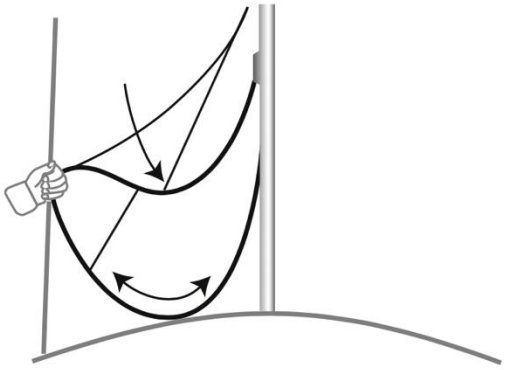
The boom vang is a block and tackle assembly running from the base of the mast to the boom. It controls the twist in the leech of the sail when sailing away from the wind. Set the boom vang by tensioning the line at the base of the vang and securing it in the cam cleat near the base of the mast.

C. SEAFURLING THE MAINSAIL

After your sail, you will need to douse (lower) the mainsail before you dock the boat. You will "seafurl" the mainsail; that is, stow it in a temporary furl just to keep it out of the way. Once you are safely docked, you will furl the sail more neatly.

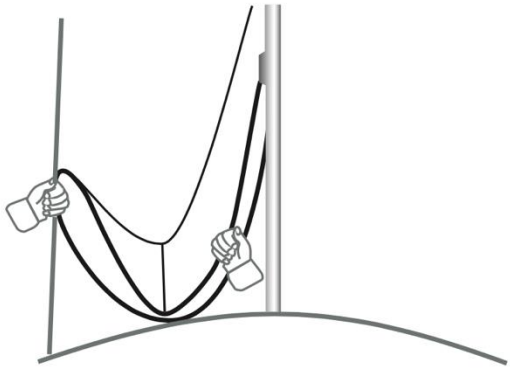
The following diagram demonstrates the steps to seafurling the mainsail:

Step 1



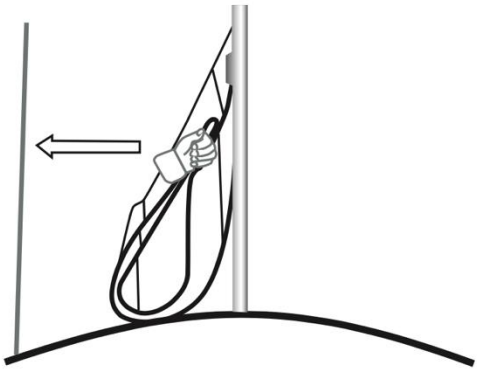
Pull the bolt rope out of the luff track gate and over to the shrouds. This will form a large pocket into which you will stuff the mainsail.

Step 2



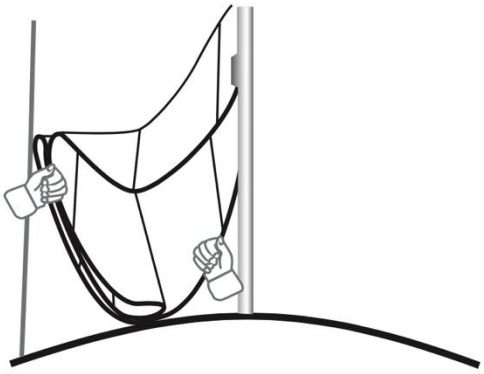
Hold the pocket open with one hand while using the other to pull a second bight of the sail into the pocket. Make sure you keep the bolt rope at the front; don't let it blow back away from you.

Step 3



Use your first hand to grasp the bolt rope at the level of the tack. Holding all parts, carry them out away from the mast and over to the shrouds. This will create a new pocket.

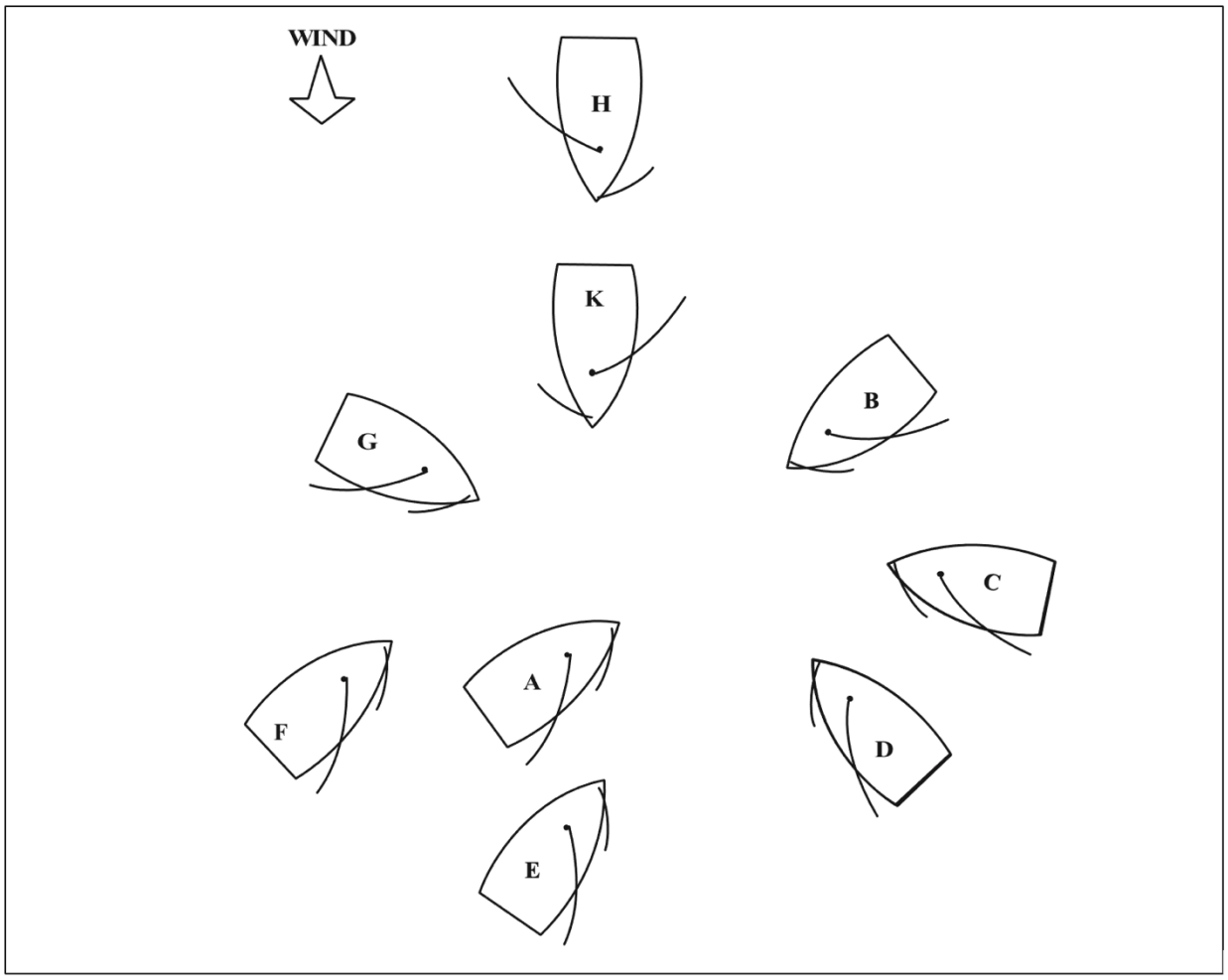
Step 4



Continue to hold the pocket open with your first hand and pull another bight of the sail down into the new pocket. Repeat as necessary until the head of the sail is about 18" above the track gate. At this point, cleat the main halyard and tightly roll the sail into itself. Secure it to the boom with sail ties.

SECTION 4: RULES OF THE ROAD

Who has the right of way in the situations shown below? Let's find out!



Rules governing nautical conduct have been around for a long time. The purpose of navigation rules is to avoid collisions between vessels. Though there are many rules, designed to cover every situation which involves a risk of collision, there are a few basic rules which you should learn early in your sailing career.

In this section, we discuss a few of the fundamental rules. Sailing in and around a busy marina such as Berkeley Marina, you will have plenty of opportunities to practice complying with the "Rules of the Road."

A. DEFINITIONS

Before we cover the actual Rules of the Road, we need to define some terms.

Stand-on Vessel

The “Stand-on Vessel” is the vessel which has the right of way. But, the Stand-on Vessel also has a duty: it must maintain course and speed. This is what allows the other vessel to steer around the Stand-on Vessel.

Give-way Vessel

The “Give-way Vessel” is the vessel which must maneuver around the Stand-on Vessel. In doing so, the Give-way Vessel must make an early and substantial maneuver. As you will experience on the water, it is not always clear what another boat is doing. By making and early and substantial change of course, the Give-way Vessel lets the Stand-on Vessel know that it is in fact giving way.

Bear in mind that no matter which vessel you are on, at no time may you hold your course if it will cause a collision. It is always every vessel’s duty to avoid a collision even if it has the right-of-way.

B. RIGHT-OF-WAY SITUATIONS

Now let's define a couple of situations.

Overtaking

A vessel overtaking (i.e., passing from behind) another vessel is always the give-way vessel. This applies even if, for example, a sailboat is overtaking a boat under power. When overtaking another vessel, you are considered to be overtaking until you are free and clear of the vessel being overtaken.

Other Situations

For other situations, you can employ a "Flow Chart" approach to determine which right-of-way rule applies.

1. Are both vessels under power?
    - If yes, the boat on the right is the stand-on vessel.
    - If no, and one is under sail and one is power, the sailboat is the stand-on vessel.
    - If neither are under power (i.e., both are under sail), ask the following questions:
2. Are both sailboats on the same tack?
    - If yes, the boat further to leeward is the stand-on vessel.
    - If no, the boat on starboard tack is the stand-on vessel.
    - Note that if the boats are on opposite tacks, it does not matter which is windward or which is leeward: the boat on starboard tack has the right-of-way.

Rules of the Road

In the following situations, here is the **stand-on vessel**:

Overtaking

The vessel being overtaken from behind

Two Vessels Under Power

The vessel on the right

Sail vs. Power

The vessel under sail

Sail vs. Sail

Same Tack = leeward vessel

Opposite Tacks = vessel on starboard tack

C. REVIEW RULES OF ROAD

Test Your Knowledge!

Refer to the diagram at the beginning of this section. Who has the right of way in the following situations? Why?

1. Between Vessels A and B?

2. Between Vessels A and G?

3. Between Vessels G and K?

4. Between Vessels B and C?

5. Between Vessels H and K, where H is sailing faster than K?

Answers: 1. B (starboard tack) 2. A (same tack, leeward boat) 3. K (starboard tack) 4. C (same tack, leeward boat) 5. K (vessel being overtaken)

SECTION 5: APPENDICES

APPENDIX A: BASIC KEELBOAT TOPICS

BASIC KEELBOAT 1	
Day 1	**Day 2**
Objectives of the Course	Gybing
Orientation	Review the Four Maneuvers
Parts of the Boat	Tacking, Gybing, Heading Up, Bearing Away
Rigging the Boat	
Tacking	
Points of Sail / Sail Trim	
BASIC KEELBOAT 2	
Day 1	**Day 2**
Review BK 1 Skills	Reefing
Crew Overboard Recovery	Introduction to Motoring
	Review All Skills

APPENDIX B: BASIC KEELBOAT EVALUATION

Standard for ASA 101 Basic Keelboat Certification

After completing the 4 days of on-the-water training, a Basic Keelboat student is expected to demonstrate knowledge and practical skills in the following areas:

Nomenclature: Good knowledge of all basic terms-main sheet, jib, keel, tiller, starboard, port, bow, stern, windward, leeward, shrouds, leech, luff, etc.

Rigging the Boat: Can rig sails, can tie the basic knots: fig 8, round turn and 2 half hitches, bowline, cleat hitch (with some assistance)

Hoisting Sails: Can hoist, lower and furl both sails

Steering: Can steer toward a landmark and on a point of sail

Points of Sail: Knows each point, can steer the boat to each, and trims sails (within 10% of proper for each)

Tacking: Can tack the boat without getting stuck in irons, and,

- Without oversteering (in moderate conditions) or,
- Oversteering no more than 10 degrees in (over 15 knots)

Gybing: Can gybe without broaching in less than 15 knots (or in less wind, without oversteering)

Orientation: Knows where the wind is coming from regardless of his/her point of reference

Person Overboard Recovery: Student remembers procedures to be followed immediately after someone goes overboard, sails the Quick Turn (fig 8) course accurately, and returns to the victim. In less than 15 knots, the student should be able to slow the boat to less than 2 knots of boat speed. In more than 15 knots no points should be taken off for problems associated with excessive speed or excessive leeway caused by the wind and waves.

Notes:

(1) The Basic Keelboat student will not need to demonstrate proficiency in slip departure, marina procedures, or docking to meet the Basic Keelboat certification requirements. These skills are learned and practiced in Basic Cruising.

(2) We realize this course covers a lot of material. We encourage students to take the training seriously; this requires some self-study at home to learn the terminology, parts of the boat, command sequences, and procedures.

(3) If a student does not certify after the 4-day course, we offer discounted private lessons as well as Development Sails to give students the chance to get some more practice and to complete their course.

APPENDIX C: GLOSSARY

This glossary is comprised of a list of terms used in the Basic Keelboat Course you may not have seen before. The terms are listed with their definitions; for some terms, a sentence using the term in context is provided in italics after the definition. (You'll see some of these on the Basic Keelboat Written Exam . . .)

This list is meant to be a brief list of the most important and necessary terms at this level. It is organized by subject matter. (Your ASA 101 textbook has a glossary organized alphabetically.) If you see other words you don't understand, please feel free to call us at Modern Sailing or ask an instructor on the docks, and we'll be glad to define them for you.

I. Directional Terms

Port

To one's left when facing the bow of the boat

Starboard

To one's right when facing the bow of the boat

Aft

Toward the back of the boat

Forward

Toward the front of the boat

Windward

Toward the direction the wind is coming from

Leeward

Away from the direction the wind is coming from

II. Parts of the Boat

Bow

Front end of the boat

Stern

Back (aft) end of the boat

Transom

The vertical part of the stern

Hull

The main body of the boat, excluding the mast, sails, and rigging

Keel

The weighted, vertical fin beneath a boat which helps keep it upright and prevents it from slipping sideways through the water

Rudder

Pivoting underwater fin which adjusts the direction of the boat

Tiller

Lever used to control the rudder, thereby steering the boat

Deck

The horizontal surface on top of the boat

Cockpit

The lower area of the boat in which the steering controls and sail controls are located

Cabin Trunk

The roof and sides of the cabin house

Companionway

The area leading from the cockpit or deck into the cabin below

Traveler

The track or bridle that controls the sideways (or “athwartships”) movement of the mainsail

Topsides

The vertical sides of the hull above the waterline

III. Rigging

Standing Rigging

Equipment on a boat which is fixed and not normally adjustable: Standing rigging includes the mast, stays, shrouds, spreaders, and boom.

Mast

Vertical pole (or “spar”) upon which the sails are set

Stays

Wires running forward and backward from the top of the mast for support. The jib hanks onto the forestay.

Shrouds

Wires running side to side from the top of the mast for support Hold onto the shroud when you board the boat.

Spreaders

Struts on the mast upon which the shrouds are attached

Boom

A pivoting, horizontal spar attached to the mast upon which a sail is set

Running Rigging

Lines on a boat’s rigging which can be adjusted. The running rigging includes lines, halyards, sheets, cunningham, outhaul, boom vang, and reefing lines.

Lines

Nautical term for ropes

Halyards

Lines used to raise and lower sails

Main Sheet

Line used to control the angle of the mainsail to the wind

Jib Sheets

Lines used to control the angle of the jib (sail) to the wind

Cunningham

Running rigging attached (by a hook on J/24s) to a cringle on the luff of the mainsail used to tension the luff of the mainsail

Outhaul

Line used to stretch the foot of the mainsail to flatten it in strong winds

Boom Vang

A block-and-tackle system which runs between the base of the mast and the boom. The boom vang holds the boom down when sailing off the wind.

Reef Line

Line used to shorten the mainsail in strong winds

IV. Sails

Sail

Aerodynamic triangles of cloth which generate power, moving a sailboat

Mainsail

Large sail attached to the boom and mast at all three corners

Jib

Smaller sail attached to a stay, forward of the mast

Tack (n.)

Forward lower corner of a sail

Clew

Back (aft) lower corner of a sail

Head

Top corner of a sail

Luff

Forward edge of a sail

Foot

Lower edge of a sail

Leech

Back (aft) edge of a sail

Battens

Small boards inserted into the leach of a sail to stiffen the leech

Bolt Rope

The rope sewn into the luff of the sail which, when slid into a groove, holds the mainsail against the mast. (The bolt rope is just about the only “rope” on the boat—the others are referred to as “lines”).

Scallops

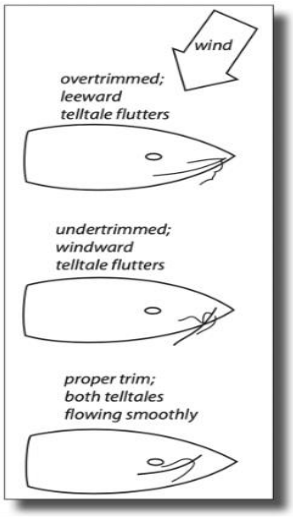
Curves in the luff of a sail. Scallops in a sail means that the halyard is too loosely tensioned.

Telltales

Telltales are pieces of yarn stitched into the luff of the sail which can visually show us air flow over the sail. If telltales on both sides of the sail are streaming back, the sail is trimmed well

If the windward (inside) telltale isn’t streaming back, the sail is a little under-trimmed and about to luff. You need to sheet the jib in or (if possible) bear away.

If the leeward (outside) telltale isn’t streaming back the sail is over-trimmed and stalling slightly. You need to ease the jib out until the telltales are streaming again or, if possible, head up.



V. Boat Hardware

Block

Nautical term for a pulley used to redirect lines.

Cleat

Fixture used to secure a line. Common cleats are horn, cam, jam, and clam cleats.

Shackle

Fitting primarily used to attach halyards to sails; also used for other types of fastenings. Common shackles include Hook, Key, and Snap shackles.

Hank

An attachment used to secure the luff of the jib to the forestay.

VI. Maneuvers

Tack (v.)

Changing course by bringing the bow of the boat through the eye of the wind.

Gybe

Changing course by bringing the stern of the boat through the eye of the wind.

Heading Up

Changing course by bringing the bow of the boat closer to the eye of the wind.

Bearing Away

Changing course by taking the bow of the boat further from the eye of the wind. Bearing away is also sometimes referred to as Heading Down, or Falling Off.

Sculling

An alternative way of propelling a boat by pushing and pulling the rudder side-to-side.

VII. Points of Sail

Tack (n.)

A course on which the wind comes over one side of the boat; i.e., starboard tack or port tack.

Note: a boat's tack is defined as the part of the boat opposite which the mainsail is carried.

Example 1: if a boat is sailing, and the boom is on the port side of the boat, the boat is on a starboard tack. Example 2: If a boat is sailing dead downwind (wind coming directly over the stern), and the boom is on the starboard side, the boat is on a port tack. Conversely, if the boom is on the port side, the boat is on a starboard tack.

Close Hauled

The point of sail closest to the wind. Close hauled is also sometimes referred to as Beating.

Close Reach

Sailing in a direction with the wind forward of the beam.

Beam Reach

Sailing in a direction 90 degrees to the wind.

Broad Reach

Sailing in a direction with the wind abaft (behind) the beam.

Deep Broad Reach

The downwind point of sail just before the dead down wind.

Dead Down Wind

Sailing in a direction straight down wind. Also referred to as a Run.

By the Lee

Sailing downwind with the wind coming over the same side of the boat as the boom is on.

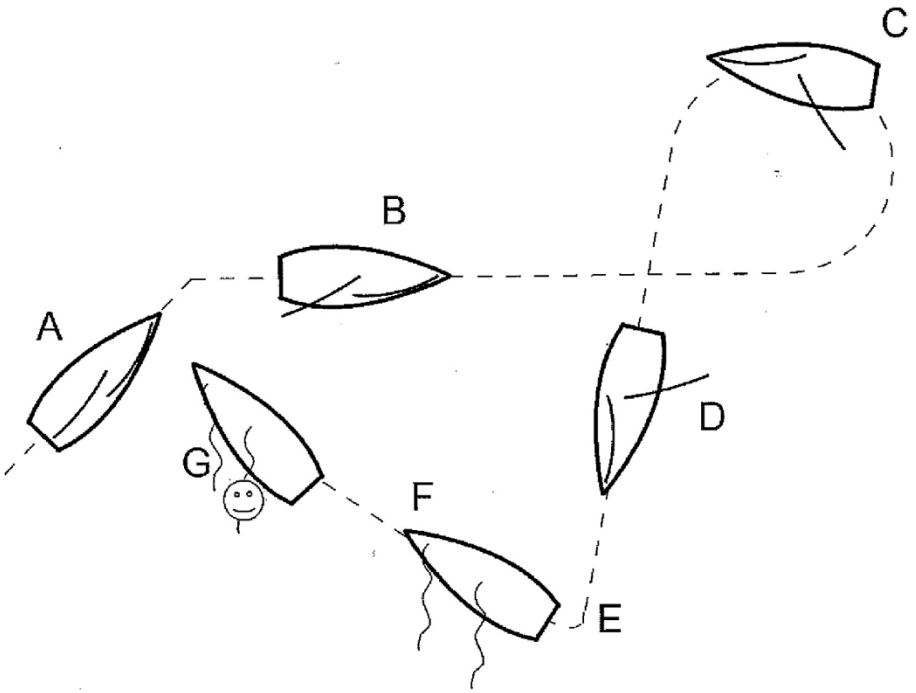
In Irons

A boat is “in irons” when it is pointed head to wind, i.e., the bow is directly into the wind. This is not an actual point of sail—if you put the boat head to wind, it will stop moving forward.

Normally, you will avoid putting the boat in irons because you want to keep sailing forward. Sometimes, however—such as when you want to pick up a mooring—you may put the boat in irons intentionally in order to stop the boat (in this example, next to the mooring).

APPENDIX D: CREW OVERBOARD RECOVERY (FIGURE 8)

Here is a quick diagram and highlights. Detailed discussion follows.



A) Initial steps…
   1. "Crew Overboard!"
   2. Turn to a beam reach. Ease mainsail, leave jib alone.
   3. Throw floatation.
   4. Appoint spotter.

B) Sail 3-4 boat lengths on a beam reach.

C) Big Tack. Leave the jib alone.

D) Sail downwind on a deep broad reach and release jib.

E) Turn the boat to point directly at COB (Crew Over Board)

F) Evaluate test. Then, sail on close reach, with sails luffing, reducing speed at a point just upwind of COB.

G) Stop the boat by pushing tiller to leeward, and then recover the victim on the leeward side of the boat.

CREW OVERBOARD RECOVERY (DISCUSSION)

The purpose of the Figure 8 Crew Overboard Recovery maneuver is to put the boat in a position so it can be sailed on a close reach back to the victim and slowed to a stop next to the victim. The maneuver is designed so that with a little practice it can be done quickly and reliably in a variety of conditions.

A) When a crew member falls overboard, a series of actions need to be initiated immediately:

1) The hail of "Crew Overboard!" is important to be sure everyone left on board knows the nature of the emergency.
2) The boat should be turned to a beam reach, 90 degrees to the true wind. The trim of the jib can be ignored, however the mainsail should be trimmed properly for the beam reach to keep the boat powered up and to allow the boat to tack. This course is critical for setting up the geometry of the remaining steps.
3) Anything that will float and is available should be thrown overboard. While floating objects may give the victim something to hang on to, the primary reason for having floating things in the water is to help mark the victim's location in the water.
4) A specific person on the boat should be appointed by name as the "spotter." This person is responsible for keeping their eyes on the victim, and continuously pointing at him/her.

B) Next, sail the boat accurately on the beam reach for three to four boat lengths. You need a bit of room to maneuver but going too far makes the final approach much more difficult.

C) Once the appropriate distance has been reached, it is time for the "big tack." Turn the boat through the wind, leaving the jib sheeted. ("Big tack, don't touch the jib, heads down, tacking!").

As the boat comes through the eye of the wind, the back-winded jib will help complete the turn. As the wind crosses the bow, let the mainsail out as if trimming for a run. Do not let the boom rest against the shrouds, but it should be close to them.

Tip: Manage the mainsheet during the "big tack" by remembering the phrase, "Lift, Drop, Pop." As the bow comes through the wind, the 4 mainsheet lines will become slack. Casually **lift** them over the traveler/block so they don't get snagged, then **drop** them, and then **pop** (release) the mainsheet cleat and let the sheet run out as you complete the tack and steer the boat downwind.

D) Continue to turn downwind until you are on a deep broad reach and the jib "winks." Stop the turn at this point, and steer the boat on a straight line on the deep broad reach. Release the jib. Do not release the jib if it has winged out on the opposite side of the mainsail or it will wrap around the headstay. If necessary, adjust your course upwind slightly to put the jib back behind the mainsail, and then release.

E) When you reach a position where your course to the victim will be a close reach, turn the boat toward the victim. Do not over turn! Stop the turn when the bow is pointed directly at the victim.

F) With the bow of the boat pointed directly at the victim, immediately evaluate the status of the mainsheet. If it is slack, and mainsail is fully luffing, then the course is a good one. If the mainsheet has any tension in it, the boat is not yet on an appropriate close reach. It needs to be turned, quickly, downwind, and then turned back upwind quickly. More than one of these adjustments may be necessary until the mainsheet is slack when the bow is pointing directly at the victim. This ensures that the mainsail is fully depowered and the boat can stop as it approaches the victim. Once on a satisfactory close reach, use the mainsail trim to maintain bare steerage-way on the approach to the victim.

G) As the boat comes closer to the victim, aim the bow upwind enough to ensure that the boat stays to windward of the victim. The victim is always picked up on the leeward side of the boat.
With the victim close alongside, the tiller is put down to leeward to turn the boat up into the wind and to bring it to a full stop. The tiller Is held to leeward during the recovery with the sails luffing.

CREW OVERBOARD RECOVERY (SUMMARY)

If someone falls overboard, several things need to be done quickly:	
Steer to a beam reach	Crew leaves jib as is
Call “Man Overboard!” loudly	
Throw flotation (horseshoe bouy)	Bright color helps mark the victim’s location in the water
Appoint a spotter by name	Spotter keeps eye on victim and points to location
Sail 3-4 boat lengths	To get room to maneuver
“Big tack, don’t touch the jib, heads down!”	240-degree turn in one smooth, continuous move
- Lift, drop, and pop the mainsheet	So it doesn’t snag on the block and so the main goes all the way out
- Use the “winking” jib to find the deep broad reach	Focus is on completing the big tack, not pointing the boat at victim
- Once on a deep broad reach, helmsperson changes sides	Only then does helmsperson start looking at victim
Find the zone of approach	
Continue on a deep broad reach	
Assess wind direction, boat position, and victim position	Avoid temptation to steer toward victim
When boat is slightly to leeward of victim:	
- “Blow the jib!”	Crew releases the jib sheet
- Test by rapidly and aggressively turning the boat and aiming at victim	Better to test early rather than sail too far downwind
- Observe the mainsheet: Is it slack and drooping on the lifeline? If YES, then hold course. If NO, then bear away briefly and test again.	The test and re-test should be sharp, aggressive turns. Do not sheet in the mainsheet yet… You need the mainsail out in order for the test to be accurate.
Return to the victim and safely stop alongside	
Aim the boat at a point 5 feet upwind of the victim	Victim always picked up on leeward side, and we don’t want to hit the victim with the bow of boat!
Sheet in the mainsail as needed to “slow sail” to the victim: sheet in to accelerate, sheet out to slow down; stand, lean against backstay, tuck tiller under arm, and sheet in/out with both hands.	Hold course as you slow sail, keeping the boat just upwind of the victim; to make it easier to sheet in/out, don’t cleat the mainsheet
Keep victim in sight on the leeward side of boat	Remember “pick up under boom”
On the final approach, victim will pass by the bow (leeward side) and slide along to the shrouds.	
Gently put the tiller to leeward, which will steer the boat into the wind and slow the boat down	Doing this also “swings” the stern around a bit to make pickup easier; puts the boat in a “heave-to” position, essentially
Helmsperson lies down on stomach, ducks under lifeline, and retrieves victim	

CREW OVERBOARD RECOVERY STANDARD (BK LEVEL):

In moderate conditions (15 knots or less), the student must remember the procedures to be followed immediately after someone falls overboard and be able to accurately and repeatedly sail the Quick Turn (Figure 8) pattern through the water. The boat must come within arm's reach of the victim (with the victim on the lee side) and be moving no faster than 1 knot. In more than 15 knots, some excessive speed is allowed.

From all of us at Modern Sailing:

GOOD LUCK
and
HAVE FUN!