

Learn to Sail at MIT

Please read this before the next class and practice your knots: the bowline and the stunsail tack bend.

Rigging

Check with the dock staff to see if there are any restrictions. Grab the appropriate sail, check the number and put your sailing card up on the board. Find a lifejacket and get a rudder – now you are ready to rig your boat.

- Place the rudder in the bottom of the boat
- Find a life jacket your size, don it and zip it up
- Attach the sail to the mast:
 - Head of sail in the mast slot, tie on the halyard (stunsail tack bend)
 - Foot of sail in boom slot, slug in track and attach the outhaul S-hook
- Check that all three plugs are in
- Wet the dock before sliding the boat
- Hold onto the bow line (painter)
- Lift the bow and push – slide the boat into the water
- Tie the boat to the dock (bowline knot)
- Get into the boat
- Take the bungee cord off and put the centerboard down
- Attach the rudder, with the tiller under the traveler line; tighten the traveler line
- Raise the sail up to proper height (all the way for large sails)
- Tighten the downhaul and adjust the outhaul, & boom vang

Unrigging

- Untie downhaul
- Drop the sail in the boat (leave the head and foot attached)
- Remove Rudder (pop cam cleat and loosen traveler)
- Raise centerboard, put bungee cord on handle
- Bailout the boat if it has taken on water
- Pull the boat out of the water
- Roll up sail
- Coil the mainsheet
- Put rudder & lifejacket away
- Remove sailing card from board

Getting Into and Out of the Boat

- Grab on to the shroud (the side steel wire) and pull the boat up against the dock.
- Step into the middle of the boat assertively, close to the centerboard, with one foot and follow up with the other foot.
- Avoid standing with one foot on the dock and one in the boat!
- Crawl out of the boat near the shrouds.

How to Shove Off from the Dock

With two people: the skipper should crouch down in the back and middle of the boat to balance the boat. The crew unties the boat, grabs the shroud, checks for traffic, steps in with one foot and pushes off with the other foot, aiming the boat forward and away from the dock.

With one person: Push off, just as the crew would do (see above). Once you are in the boat, move toward the stern and immediately grab the tiller. Sit on the opposite side as the sail, pick up the sheet and start trimming the sail while also steering the boat.

Position of Skipper & Crew

The person steering (the skipper) sits on the upwind side of the boat, opposite the sail, on the side edge of the boat (the gunwale), or on the seat (the thwart), with both of her feet on the floor behind the seat, facing the sail

and looking forward. The crew sits on the seat facing forward. The crew must move his body weight from one side of the boat to the other to keep the boat balanced. In strong winds, the crew will need to sit on the upwind side of the boat. In light winds, the crew will need to sit on the downwind side of the boat to counterbalance the weight of the skipper.

Landing

Check the wind direction. Always land into the wind. Be sure you have sufficient space at the dock – preferably two or more boat-lengths for beginners. As you approach the dock let the sail out completely. To slow down, head up into the wind. Nudge the side of the boat up against the dock and grab one of the ropes tied to the dock.

Steering

In the beginning you will have a lot of demands on your attention. Steering the boat and adjusting (trimming) the sail are best practiced separately at first.

The skipper will steer the boat with the tiller; the crew will trim the sail (pulling it in or letting it out) with the sheet. Trade tasks and positions in the boat frequently. Pick an objective, some point on the shore or a buoy on the water, and try to sail directly towards it. When you feel comfortable steering, try steering and trimming the sail at the same time.

Whenever your boat turns, the wind direction relative to your boat will change. While steering, keep track of the direction of the wind relative to your boat at all times and never let go of the tiller.

In the beginning the skipper may want to use the wood tiller only, with the white tiller extension folded back and tucked under the loop of bungee cord. As you become a more experienced sailor or sail in more wind, you'll want to try steering with the tiller extension. Hold the extension near the base (where it attaches to the tiller) for best control and keep it pointed up to avoid getting it stuck under the lip of the boat.

Tacking

A *tack* is a maneuver where the boat is turned upwind so far that the bow of the boat crosses the eye of the wind and the wind then blows over the opposite side of the boat. Start with some speed as your momentum will need to carry you through the maneuver. Before starting the tack, shout "Ready about!" to let your crew know you are about to tack. Turn the boat into the wind by pushing the tiller towards the sail as far as it will go. As the bow of the boat turns into the wind, your sail will luff and you will lose speed. As the boat continues to turn, the sail will move from one side to the other; remember to duck under the boom. While facing forward and continuing to steer the boat, stand up, face the front of the boat, switch the tiller from one hand to the other behind your back, then sit down on the opposite side. Straighten the tiller when you are on your desired course.

In strong winds, if you perform your tack too slowly, you will get stuck *in irons*, pointed into the wind, halfway through the maneuver. Start your tack with plenty of speed, push the tiller all the way over, continue to steer the boat and keep it turning until you have come around and the wind has filled the sail on the opposite side.

Jibing

A *jibe* is a maneuver where the sail flips from one side of the boat to the other while sailing downwind. Jibing is potentially more hazardous than tacking because the boom can move across the boat with more force, especially in strong winds. An unintentional jibe made through inattention or carelessness can result in loss of control of the boat or injury. Let your crew know you are about to jibe by shouting "Prepare to jibe!" To start a jibe, pull the tiller away from the sail to turn downwind. Move to the opposite side of the boat and switch hands with the tiller behind your back *before* the sail switches sides. The sail will not jibe across until after you have turned past directly downwind (when you are *by-the-lee*). As the sail begins to move across, shout "Jibe-Ho!" duck your head and straighten out the tiller. The crew should be ready to adjust their weight throughout the maneuver to keep the boat level and not let it heel too far one way or the other.

In a moderate to strong breeze, the wind can sweep the sail and boom across the boat with high speed and severe force. There will be a danger of getting hit in the head by the fast-moving boom or to capsize or death roll due to the wind's strong force on the sail. Watch the tell-tales to determine if and when you are sailing by-the-lee and to predict when the sail will jibe. Expect that the boat may tip drastically during a jibe and prepare to adjust your balance. At all times, stay in control and don't drop the tiller!

The Wind

The wind on the Charles River is shifty, changing often both in direction and in strength. This can cause difficulty for the beginner, as well as for the experienced sailor. Being aware of the wind's direction relative to your boat is of primary importance. Keep an eye on the tell-tales on your boat, as well as other indicators, such as flags on the shore, waves on the water, and the sail trim of nearby boats to give yourself an idea of what the wind is doing.

Balance

Try to keep the boat flat – heeling just slightly away from the direction of the wind. If the wind increases suddenly, let the sail out quickly to lessen the pressure on the sail and keep the boat from capsizing. Also allow the boat to turn towards the wind, pushing the tiller into the sail. With experience, you will also learn to shift your weight to assist in keeping the boat flat.

Sail Trim

Once you have your boat pointing in the desired direction, trim the sail. The sail should be out as far as possible, without any *luffing*. Look at the front edge of the sail where it feeds into the mast. If it is flapping or bubbling (luffing) even gently, pull it in until the luffing stops. If the sail is not luffing, let it out until it luffs a bit, then pull it back in a little. When the wind direction changes, or when you change the heading of the boat, you should re-adjust the sail to compensate. Proper sail trim is essential. Expert sailors alter and experiment with their sail's trim almost continuously.

The Course

The course that we are going to start with is the easiest possible: a *reaching* course. Take a look at the picture of the course in Figure 1. Two buoys will be set up perpendicularly to the wind. You will sail a figure-eight course, tacking around each buoy. Concentrate on steering a straight line between the buoys and get comfortable using the tiller. As you approach each buoy, think about which way you will turn around it. Look before you tack! Remember to continue steering the boat during the entire maneuver. Straighten out the tiller when you have come around and your boat is on course pointing at the next buoy. During the tack, the crew can trim the sail in slightly as the boat moves through the eye of the wind and loosen it once the boat is on its new tack.

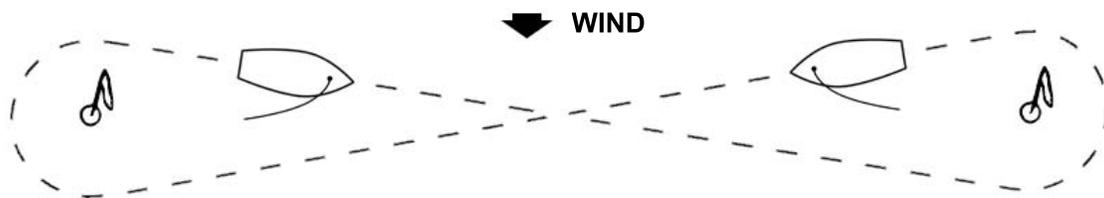


Figure 1. Reaching Course with Two Tacks

Other people will be sailing on this course so you must watch out for other boats. Look before you tack – make sure there will be no boats in your path when you make your turn. If you feel you might hit another boat, remember to point the tiller at the other boat to turn your boat away from it. However, it is better to avoid other boats by making small changes in your course when you are far away from them, rather than waiting until you are too close and in danger of having a collision.

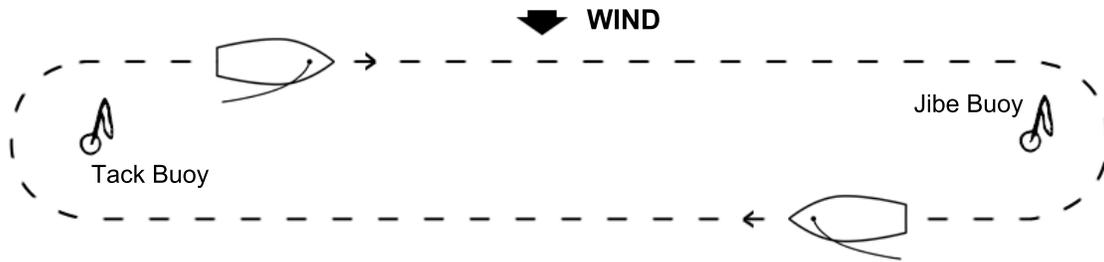


Figure 2. Reaching Course with Tack and Jibe

The second course you will sail will also have two buoys set perpendicularly to the wind. As shown in Figure 2, this course will require one tack and one jibe. You will sail around this course in an oval. As you approach the jibe buoy, think about which way you'll turn. As you start to turn downwind, stand up, switch hands behind your back, sit back down on the opposite side of the boat before you get directly downwind. Watch the wind direction on the tell-tales. After the stern of the boat crosses the eye of the wind (when you are *by-the-lee*), be prepared to duck as the sail jibes over. Then straighten out the tiller and steer towards the next buoy.

Be extra careful jibing around buoys, especially on windy days. Please don't jibe close to other boats as it is possible for one or both boats to lose control.

A third course may be used in the 3rd class. This course has three buoys and will require you to practice sailing *close-hauled*.

Sailing Close-Hauled

Sailing close-hauled means sailing as close to the direction of the wind as possible. For most sailboats, this is about 45 degrees into the wind. When sailing close-hauled, pull the sail in as far as it will go – it should be over the back corner of the boat. Keep the sail hauled in close (unless you need to let it out in a strong gust of wind to keep the boat from tipping). Steering while close hauled requires concentration. You will control the luffing of the sail by changing the direction of the boat. If your sail luffs, turn a bit more downwind. If your sail is not luffing, try turning a bit more upwind. The wind may shift, so you may need to continually make adjustments to your boat's direction.

When you tack, keep the sail hauled in all the way, and try to make a sharp 90-degree turn. You should turn just far enough to fill the sail on the other side.

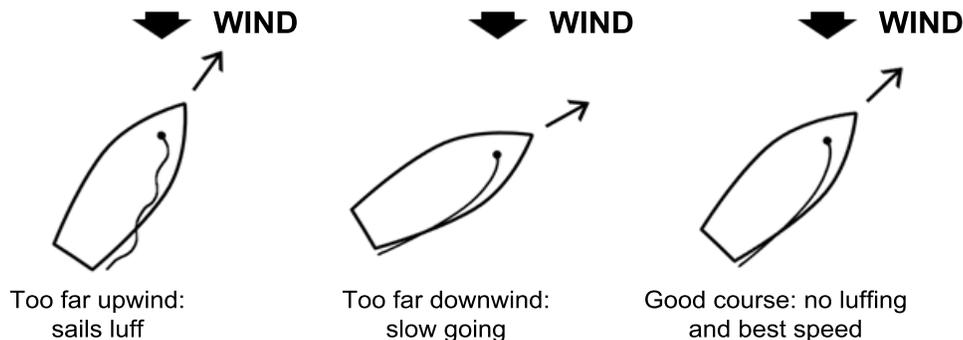


Figure 3. Sailing Close-Hauled

Useful Nautical Terms

- **port** – The left side of the boat (as you face forward)
- **starboard** – The right side of the boat (as you face forward)
- **windward** – The direction the wind is coming from; or, the side of the boat opposite the boom
- **leeward** – (pronounced “loo-word”) Opposite of windward
- **bow** – The front of the boat
- **stern** – The back of the boat
- **forward** – Toward the bow
- **aft** – Toward the stern
- **close-hauled** – Sailing upwind as close to the direction of the wind as possible
- **reach** – Sailing with the wind blowing over the side of the boat (but not close-hauled)
- **run** – Sailing with the wind blowing over the stern of the boat
- **by-the-lee** – Running with the wind blowing over the leeward side of the boat (boat is in danger of accidentally jibing)
- **head up** – To turn the boat toward the wind
- **bear off** – To turn the boat away from the wind (also called falling off)
- **tack** – A maneuver where the boat is turned upwind until the bow crosses the eye of the wind, which causes the sail to change sides
- **jibe** – A maneuver where the boat is turned to leeward until the sail changes sides
- **ready about** – Command issued before commencing a tack
- **prepare to jibe** – Command issued before commencing a jibe
- **jibe ho** -Warning issued as the sail jibes from one side to the other
- **in irons** – Stuck in the water (making no headway) with the bow pointed into the wind
- **trim** (of sails) – (n.) The adjustment of the position of a sail to improve its efficiency; (v.) To pull a sail in closer to the middle of the boat.
- **ease** – To let the sail out
- **sheet** – The rope used to trim in or ease out the sail
- **luffing** – Shaking and flapping of the sail due to the sail being eased too far out and/or the boat pointing too close to the direction of the wind
- **pinching** – Sailing too close to the wind, causing the sail to luff
- **trim** (of boats) – The adjustment of the heeling of the boat by moving weight from side to side
- **heeling** – Tipping of the boat to windward or leeward
- **hiking** – Leaning your body out to windward in order to hold the boat in proper trim
- **weather helm** – The tendency of a boat to turn to windward when heeled by the wind
- **lee helm** – Opposite of weather helm
- **tell-tale** – Yarn or other wind direction indicator tied to the sail or the rigging
- **skipper** – In a small boat, the person steering the boat
- **crew** – Everyone in the boat, except the skipper
- **dinghy** – A small boat

More sailing terms and information at <http://sailing.mit.edu/LearnToSail/SailingBooklet/>