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## BADGE COURSE MANUAL

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### HELMSMAN INTEREST BADGE

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<i>Name</i>	
<i>Troop</i>	
<i>Course Date</i>	

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## Take Note:

**The Sailing Badge Course Manual is to be consulted in addition to this manual, to refresh the former embedded information.**

## Helmsman – Badge Requirements

1. Have passed the Sailing Scoutcraft Badge and be prepared to demonstrate any of those requirements. OR Complete all the requirements for the Sailing Scoutcraft Badge.
2. Have passed the Swimming Scoutcraft Badge and be prepared to demonstrate any of those requirements. OR Complete all the requirements for the Swimming Scoutcraft Badge.
3. Explain the major points of the Racing Rules of Sailing, including start procedure, “Port and Starboard”, “windward leeward” and water round a mark
4. Explain how to use the Beaufort Wind Scale for determining safe boating.
5. Identify and discuss the different types of sails as used on sailing craft e.g. mainsail, spinnaker, genoa, and jib
6. Name the parts of the standing and running rigging.
7. Explain how you would get underway after running aground
8. Demonstrate the following splices: Eye Splice, Back Splice.
9. Demonstrate the following:
  - a) Sailing single handed, rescue a conscious crew from the water.
  - b) With your crew, rescue an unconscious person from the water.
10. Take the helm and carry out the following:
  - a) Come alongside, moor and get underway from a buoy and from a jetty.
  - b) Make and shorten sail.
  - c) Steer a compass course of around at least 6 marks requiring all points of sail.
  - d) Whilst afloat, rig a jury sea anchor from items in the boat and demonstrate its use
  - e) Sail a figure of eight course between two markers without the use of a rudder.
  - f) Sail without centreboard/dagger board.
  - g) Sail on Jib alone.
11. In addition to the requirements of the Scoutcraft Badge, log at least 10 hours of sailing in various conditions over a period of 3 months as helmsman. This log is to be certified by your Troop Scouter

### **OR**

Compete as helmsman in three series of races under SAS rules. The log for these races to be signed by the Bridge Crew.

## **REGATTAS & WATER-BASED COMPETITIONS**

### **GENERAL**










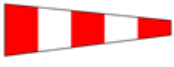


1. Racing is governed by the current prescriptions of the international Racing Rules of Sailing (RRS). The Race Officer may amend these rules as appropriate, to be notified as part of the Sailing Instructions.
2. Juniors are defined as invested Scouts who have not yet reached 14½ years of age.
3. Seniors are invested Scouts 14½ or older, but not yet turned 18. Junior Assistant Troop Scouters are classified as senior Scouts.
4. Team Managers must be Scouters or Adult Lay Members. Scouts may not act as Team Managers.
5. Team Managers must have proof of registration and any minimum requirements for all Scouts taking part in the event. The organisers reserve the right to disqualify any participant who is unable to produce this proof.
6. Teams/Groups may not change dinghies or sails during a regatta, without the prior permission of the Race Officer.
7. The Race Officer may use discretion in varying the application of some of these rules, and any variations will be notified in the Sailing and/or Pulling Instructions.

### **PULLING**

8. Races will generally be decided over a straight course.
9. In 'out-and-back' races, all boats shall round the turning mark to starboard, unless otherwise instructed. A boat shall not turn before her STERN has crossed the turning line.
10. Any boat converging on and / or fouling another boat shall be disqualified.
11. It is the duty of an overtaking boat to keep clear.
12. Protests during a race shall be indicated by the coxswain holding up flag 'Bravo' (a red burgee). This requirement may be waived at the discretion of the Race Officer.
13. Protests are to be lodged by the Team Manager within 30 minutes of the completion of the race.
14. Protests must be lodged on protest forms and must contain the following information: date, race, team protesting, against whom, reasons. A deposit of R10.00 is required to discourage frivolous protests.
15. Races shall normally be started by the lowering of the Class Flag accompanied by a sound signal. Flag 'Papa' (preparatory signal) will be lowered, with a sound signal, 1 minute before the start, to indicate the race is about to start. The Race Officer may vary this procedure and will brief crews accordingly.
16. A sound signal will be made when a boat has crossed the finish line.
17. A boat shall have started or finished a race when her bows cross the start/finish line in the direction of the course.

## SAILING

18. Rules 12, 13 and 14 above apply to protests, except that in the case of rule 12, flag 'Bravo' is to be hoisted and kept flying. This requirement may be waived at the discretion of the Race Officer.
19. Sail numbers are to be clearly visible on both sides of the sail.
20. The start/finish line shall normally be between the mast on the Bridge and a mark (usually a buoy) in the water, positioned according to the prevailing wind direction. A boat is considered to have started or finished when any part of her hull or equipment in normal position has crossed this line in the direction of the course. A limiting mark near the shore (if used) does not form part of the starting line.
21. Boats crossing the finish line to finish the race shall be acknowledged by a short sound signal.
22. No boat may display advertising on its hull, sails or equipment unless sanctioned by the Base Committee
23. The helmsman shall not be changed during a race, unless by permission of the Race Officer.
24. The Race Officer may apply a time limit for finishing, so that races are not unduly prolonged. This time limit will be confirmed in the Sailing Instructions, according to the prevailing conditions.
25. When sailing, all crew members shall wear lifejackets.
26. Competitors will be notified of the approximate time of the 5-minute warning signal for each race. All competing boats must be off their moorings and under way before the 4-minute preparatory signal, failing which they may be disqualified.
27. Flag 'Lima' will be flown in the event that 'back-to-back' races will be held. Competing boats must then remain in the vicinity of the starting line and may not go ashore.
28. Crew: For all inter-troop regattas, each boat shall normally have a helmsman plus a crew of 4. A non-sailing instructor may accompany junior crews. These requirements will be specified in the Notice of Race and may be varied at the sole discretion of the Race Officer.
29. Penalties: A boat hitting a mark of the course while racing, or committing any sailing infringement, such as colliding or interfering with a right-of-way boat, may exonerate herself by completing a 360° penalty turn. In the case of serious incidents, this will not necessarily avoid protest, disqualification or further disciplinary action.
30. Starting Procedure: The starting procedure is based on the standard starting procedure as contained in the current Racing Rules of Sailing (RRS). This is summarized overleaf, along with a brief explanation. Sailors are advised to familiarize themselves with the most commonly-used rules in RRS.

	Minutes before start	Sound signal	Visual signal (flag)	<b>Racing – standard starting procedure (Rule 26)</b> (Times are taken from the visual signals – the absence or malfunction of a sound signal is disregarded)	
<b>Warning signal</b>	<b>5</b>	1 sound	Class flag up 	Set your watch as the class flag goes up (stopwatch or countdown). Do a test start to check headings and to time your final run. You can cross the line at this stage, but must be behind it at the starting signal (or one minute before starting if Rule 30 applies). Check that you have identified all the marks of the course and “mentally sail the course” so you know where you’re going and which side to round the marks. Ensure your crew knows the course too, in case you have a memory lapse while racing.	
<b>Preparatory signal</b>	<b>4</b>	1 sound	Preparatory flag up  (P)	You must be off your moorings and under way before this signal. Check your watch as (P) flag goes up. Check your positioning and decide where you will start your final run to the line. Keep an eye on the rest of the fleet. If it’s a big fleet, the Bridge may enforce control by replacing (P) flag with (I), (Z), (U) or (Black) flags, which carry penalties for being <u>over the line in the last minute before the start</u> (Rule 30).  I (Rule 30.1)  Z (Rule 30.2)  U (Rule 30.3)  Black (Rule 30.4)	
<b>1 minute signal</b>	<b>1</b>	1 long sound	Prep. flag down	With 30 - 60 seconds to go, you should be starting your final run, sheeting in and picking up speed. If you see you will arrive at the line too early, spill wind and ‘zig-zag’ to slow down. Get a crew member to count down the last 20 seconds aloud, using their stopwatch. If (I), (Z), (U) or Black flags are flown, you <b>must</b> keep behind the line for the whole of the last minute before the start (Rule 30).	
<b>Starting signal</b>	<b>0</b>	1 sound	Class flag down	Try to start on Starboard to keep your right of way, unless the starting line has a very obvious “port” bias (i.e. if you really have to “pinch upwind” to get across the line on Starboard). Cross the starting line and work up to the first mark, normally to windward. Don’t “pinch” to windward, rather head a bit lower and gain extra speed. You will get to the first mark quicker that way.	
<b>Individual recall</b>	<b>0</b>	1 sound	 (X)	If you are over the line early, the onus is on you to know that and come back, realizing that the “X” flag and sound signal are meant for <u>you</u> . You will be scored OCS (On Course Side) if you don’t return behind the line and re-start. No right of way while returning.	
<b>General recall</b>	<b>0</b>	2 sounds	 (1 <sup>st</sup> Sub)	If unidentified boats are over the line early, or if an error in the starting procedure, the whole fleet must return and re-start. When most or all yachts have returned, this flag is lowered with a sound signal, and the new 5-minute Warning Signal will be raised exactly 1 minute later.	
<b>Shorten course</b>	During the race	2 sounds	 (S)	The (S) flag will be flown near the mark where the course is to be shortened. You will finish through a line between that mark and the (S) flag, sailing from the direction of the previous mark. If the course might be shortened in a different way, it will be defined in the Sailing Instructions.	
<b>Postponement</b>	Before Start	2 sounds	 (AP)	Flown in the event of unsuitable sailing conditions, error in starting procedure, missing or drifting marks, etc. When ready to start again, the (AP) will be lowered with a sound signal, and the new 5-minute Warning Signal will be raised exactly 1 minute later.	
<b>Abandon</b>	Any time	3 sounds	 (N)	Race abandoned. New 5-minute warning signal is given 1 minute after N is lowered.	 (L) Back to back races. Stay near the starting line. ‘L’ also means look at the noticeboard. 1 sound when raised.

## INTERNATIONAL RULES OF THE ROAD AND RACING RULES OF SAILING (RRS)

Below is a summary of the most common rules that apply when boats meet.

The International 'Rules of the Road' state that: "Power gives way to sail." A powered craft is defined as a craft that is engine-driven, such as a power boat or jet ski, or powered by oars or paddles, such as a rowing boat, canoe, surf-ski, paddle ski, etc. These must all give way to a boat under sail.

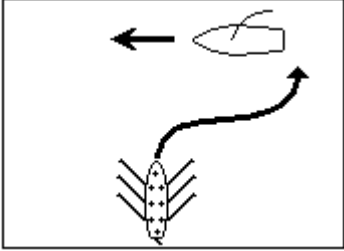
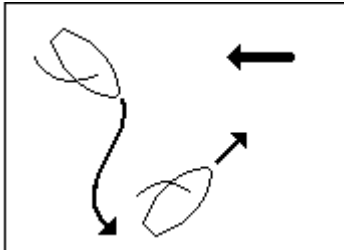
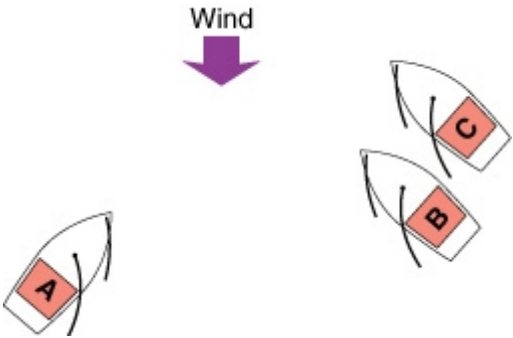
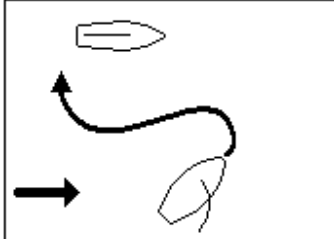
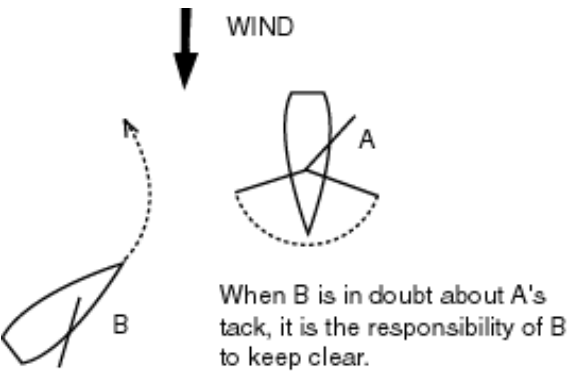
However, common sense and courtesy must apply. A small sailing dinghy that meets a big ship is much more maneuverable and should not expect the large vessel to give way. When sailing on inland waters, there are likely to be many recreational paddlers on canoes, etc, and not all of these people will be competent or knowledgeable enough to keep clear on every occasion. Sailors must ensure that they do not enforce their right of way at the risk of collisions or injury.

Kite surfers and wind surfers are classified as sailing craft, so the sailing right-of-way rules will apply if you meet one while sailing. However, don't assume that they know the rules – they often do not!

In the rules that follow, which apply when two boats meet, 'keeping clear' means maneuvering so that the right-of-way boat does not have to do anything to avoid you. Read Part 2 of RRS for more detail.

1. **CAUTION.** Avoid a collision at all costs, even if you have right of way.
2. **PORT-STARBOARD.** Port-tack boats must keep clear of starboard-tack boats. This also applies when reaching or running, so the general rule is: **Port gives way to Starboard.** This is the over-riding rule that must be applied first. Only if both boats are on the same tack, should you then look at the other rules.
3. **WINDWARD-LEEWARD.** When boats are overlapped on the same tack, the windward boat must keep clear.
4. **CLEAR ASTERN.** When boats are on the same tack and not overlapped, the boat clear astern must keep clear. Note: One boat is "clear astern" if she's entirely behind a line through the other boat's aft-most point. The other boat is "clear ahead". Two boats are "overlapped" if neither is clear ahead of the other.
5. **OVERTAKING BOAT KEEPS CLEAR.** While overtaking another boat, on either the windward or the leeward side, you must keep clear of her.
6. **KEEPING CLEAR WHILE TACKING.** Before you tack, make sure your tack will keep you clear of other boats.
7. **CHANGING COURSE.** If you change course, or do something to become the right-of-way boat, you must give the other boat a chance to keep clear.
8. **PASSING MARKS AND OBSTRUCTIONS.** Special rules apply at a mark or obstruction. However, the over-riding Port-Starboard rule still applies. Except at a starting mark, there's a three-boat-length 'zone' around marks of the racing course, and a boat's rights with respect to another boat are "fixed" when the first of them enters that zone. If you are clear astern of another boat when she enters the zone, you have no rights. If you have an inside overlap, she must allow you sufficient room to pass the mark.
9. **TACKING NEAR A MARK.** Don't tack within the three-boat-length zone at a windward mark if you will cause a boat that is coming up to the mark to sail above close-hauled (i.e. go into irons) to avoid you, or if you will prevent her from passing the mark.
10. **ROOM TO TACK AT AN OBSTRUCTION.** When boats are on the same tack on a beat and come to an obstruction, the leeward boat can call for room to tack, and the other boat must give room to tack.

## EXAMPLES OF RULES OF THE ROAD

	<p><b><u>Power gives way to sail.</u></b></p> <p>A boat propelled by oars or paddles is considered to be 'powered'. This includes a sailing boat using its motor (if it has one).</p>
	<p><b><u>Port gives way to starboard.</u></b></p> <p>The lower boat is on starboard tack because the wind reaches her starboards side first, and her sail is on the port side. The upper boat is on port tack. Port and starboard tack have nothing to do with which side of the boat you are sitting on!</p>
	<p>Port (A) must give way to both starboard boats (B) and (C).</p>
	<p>Port tack boat must keep clear if she can't determine the other boat's tack.</p> <p>In any situation where the tack or heading of any craft is not clear, other craft must take precautions and keep clear if necessary, even those on starboard.</p>
 <p>When B is in doubt about A's tack, it is the responsibility of B to keep clear.</p>	<p>'B' is on port tack, and cannot clearly see which side 'A's boom is. In such cases, 'B' must keep clear.</p> <p>If 'B' can see that 'A' is on a starboard run, she would still have to keep clear, but if 'A' were on a port run, (i.e. both boats on port), then 'A' is the windward boat and would have to keep clear of 'B'.</p> <p>To avoid confusion, 'A' should call in good time "Starboard" for right of way if she is on starboard.</p>



## Calling for Right-of-Way

There are some generally-used calls to alert other boats to your intentions, but it is your responsibility to use words to ensure that the other boat understands what you are doing. (Bear in mind the 10<sup>th</sup> Scout Law!).

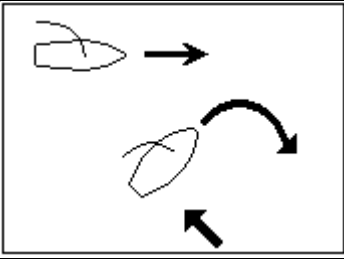
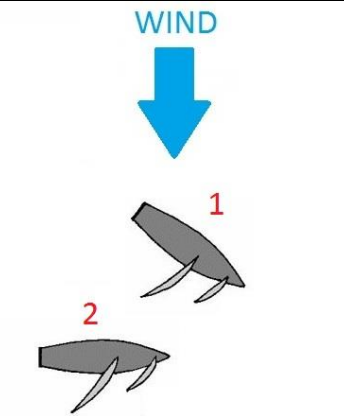
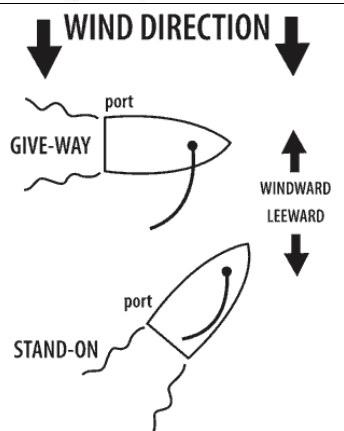
Give them fair warning – don't call at the last possible moment. If in doubt, call again! If they don't respond, take action to avoid a collision. You can always protest them later.


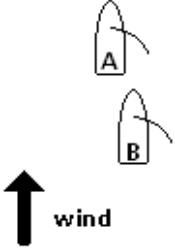
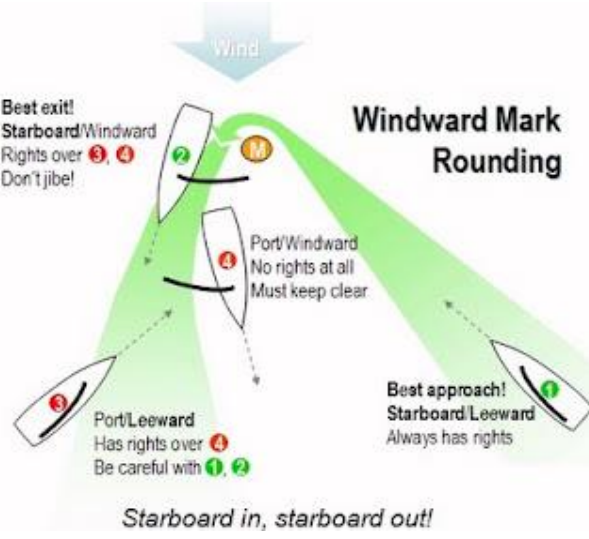
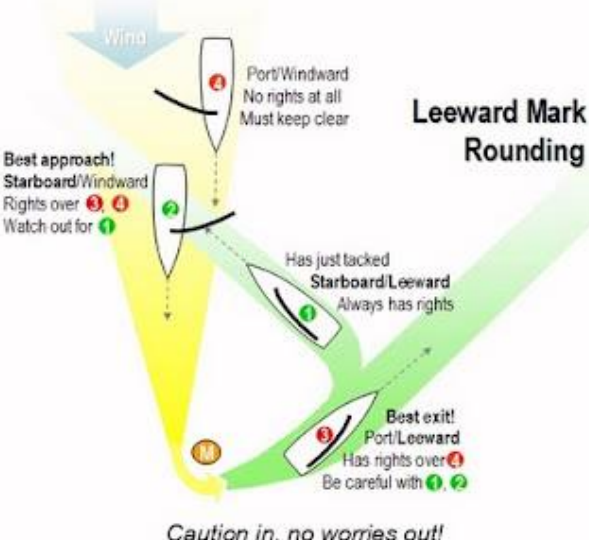
**Starboard rule:** if you're the starboard boat, shout **"starboard!!!"** loudly and often enough until you know they have heard you and are responding. If they don't respond, avoid a collision.

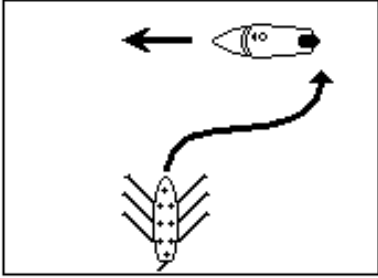
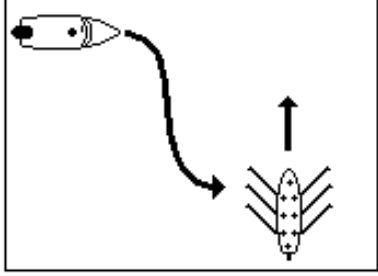
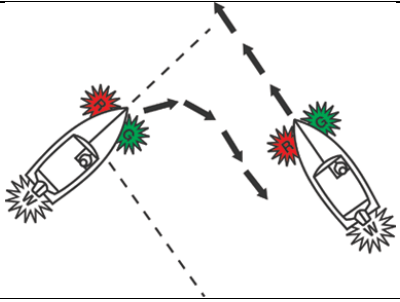
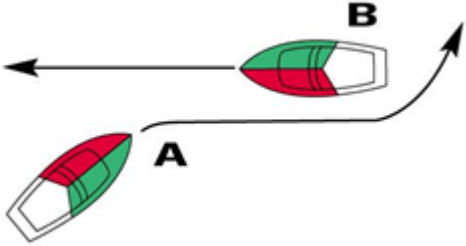

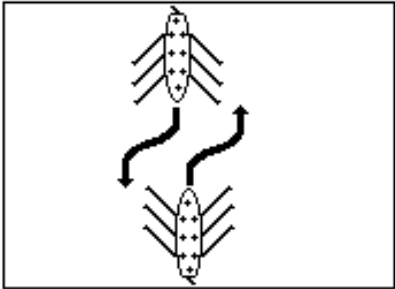
**Windward rule:** The leeward boat shouts **"windward boat keep clear!!!"** at the windward boat. If they don't keep clear, shout **"windward boat keep clear!!!"**

**Rounding a mark:** If you have rights due to an overlap in the zone, call **"mark room!!!"** or **"water!!!"** If the other boat thinks you have no rights, they must call **"no room!!!"** or **"no water!!!"**

**At obstructions:** The leeward boat can call for room to tack and the windward boat must give them room. Call **"room to tack!!!"**

	<p>Windward boat keeps clear</p>
	<p>Windward boat (1) must keep clear</p> <p>Keeping clear means that the 'right-of-way' boat (2) should not have to take any avoiding action.</p>
	<p>The windward boat must keep clear. The other boat is called the leeward boat.</p> <p>The wind gets to the windward boat (and the windward side of a boat or sail) first.</p> <p>The wind gets to the leeward boat (and the leeward side of a boat or sail) last.</p>

	<p>What's wrong with this?</p> <p><u>Answer:</u> the windward boat (<b>W</b>) is not keeping clear. If they carry on like this, 'L' will have to alter course to avoid a collision. In this diagram, if the left side of the box is the shore or a harbour wall, then L can call for room to tack and <b>W</b> must allow this.</p>
	<p>Is this the windward rule?</p> <p><u>Answer:</u> No! Windward rule doesn't apply here – the boats are <u>not</u> overlapped. However, 'B' is 'clear astern' of 'A' and must therefore keep clear. If 'B' wants to pass 'A' on either side, then the rule is: overtaking boat keeps clear.</p>
 <p><b>Windward Mark Rounding</b></p> <p>Best exit! Starboard/Windward Rights over 3, 4 Don't jibe!</p> <p>Port/Windward No rights at all Must keep clear</p> <p>Best approach! Starboard/Leeward Always has rights</p> <p>Port/Leeward Has rights over 4 Be careful with 1, 2</p> <p><i>Starboard in, starboard out!</i></p>	<p>Going round marks while racing is often where collisions happen. Try to approach a mark and leave it on starboard, as you will usually have rights over others. In practice, all sorts of trouble is caused at crowded marks by aggression or by inexperience.</p> <p>It often pays off to sail a bit wider around the mark, avoiding the chaos inside. The trouble saved will be more than worth the slight additional distance you had to sail. If boat '1' finds that she is not going to make the mark, and needs to tack, she may not tack right in front of boat '3' and cause her to change course to avoid a collision.</p>
 <p><b>Leeward Mark Rounding</b></p> <p>Port/Windward No rights at all Must keep clear</p> <p>Best approach! Starboard/Windward Rights over 3, 4 Watch out for 1</p> <p>Has just tacked Starboard/Leeward Always has rights</p> <p>Best exit! Port/Leeward Has rights over 4 Be careful with 1, 2</p> <p><i>Caution in, no worries out!</i></p>	<p>Approaching the downwind (or leeward) mark is often done at a much higher speed than at the upwind (or windward) mark, so you have to be extra careful.</p> <p>Because you might be gybing and then swinging round into the next beat, you can use your speed to 'slingshot' outside the crowd on the mark and get ahead of them, rather than risk a collision on the inside.</p> <p>If you are the leading boat, clear ahead of the next, then it's OK to approach on port, harden up round the mark and then take off. Although boat '1' has rights, she is sailing into the crowd and lots of 'dirty' wind, so boat '3' is likely to get away faster and can tack if necessary when she is in clearer air.</p>

	<p>Both craft are considered powered. The pulling boat has the motor boat on her starboard side, so must give way and keep clear.</p> <p>If both of these were pulling boats, the same right-of-way rule would apply: the boat which has the other on her starboard side, must keep clear.</p>
	<p>Both craft are considered powered, but the pulling boat has right of way because the motor boat is on the pulling boat's port side.</p> <p>The motor boat has the pulling boat on its starboard side, so must give way. The same scenario would apply if both were pulling boats</p>
	<p>Two motorboats meet. The one which has the other on its starboard side must give way.</p> <p>Two pulling boats meeting in the same situation would behave in the same way.</p>
	<p>Port gives way to starboard.</p> <p>'A' has 'B' on its starboard side, so must give way.</p>
	<p>What's wrong with this?</p> <p><u>Answer:</u> 'A' is correct in giving way to 'B' who is on her starboard side. 'B' has right of way and should <b>not</b> alter course, unless she thinks 'A' is not going to give way, in which case she should stop, reverse or turn away to her starboard.</p>
	<p>Both craft must alter course to their starboard, thus passing each other 'port to port.'</p>

## **DEFINITION OF SAILING TERMS**

<b>SAILS</b>	
Storm Sail	Special sails for stormy weather conditions and strong winds. These are smaller and made from heavier material than normal sails.
Head Sails	Any sails set before (in front of) the foremast or main mast, if there is no foremast.
Foresail	Is the sail immediately before (in front of) the foremast or main mast.
Jib	Any head sail set before the foresail.
Staysail	Any triangular sail whose luff is supported by a stay. The Saldanha Dinghy has one head sail, which is also a staysail, and is called interchangeably the jib or foresail.

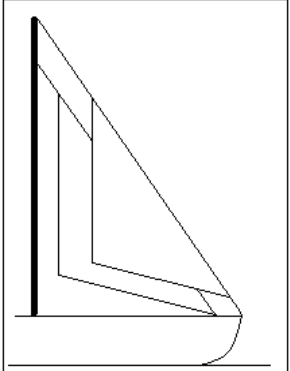
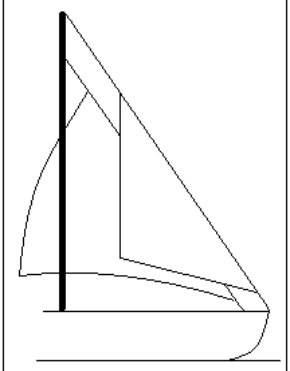
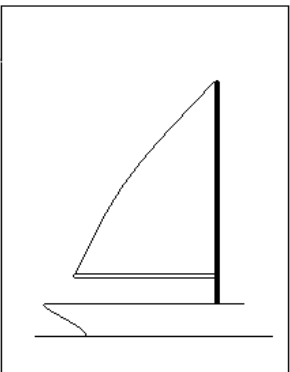
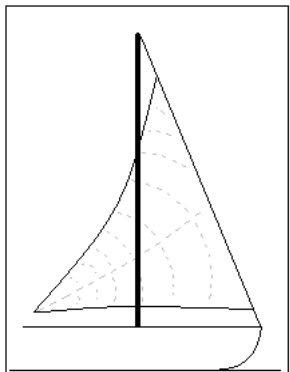
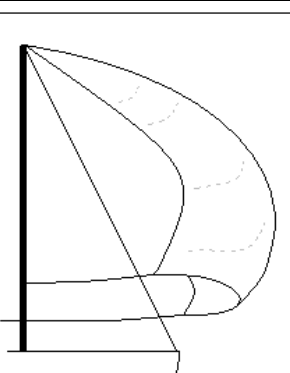
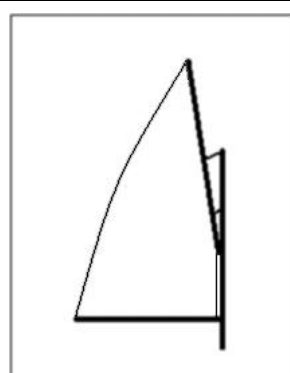
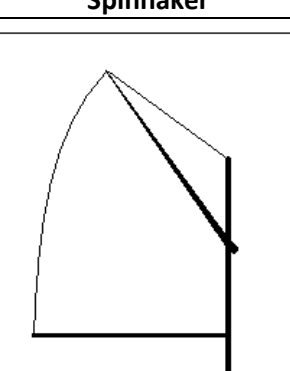
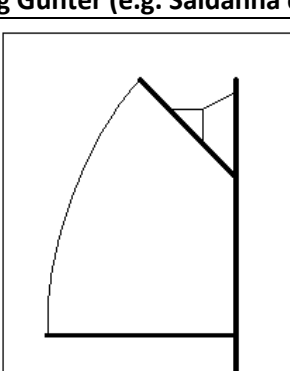
<b>STANDING RIGGING: <i>fixed wire or rope that supports the mast</i></b>	
Shrouds	Shrouds support the mast on either side. They are commonly called sidestays.
Stays	Stays support the mast fore and aft.
Forestay	The forestay supports the mast forward, preventing it from falling backwards.
Backstay	The backstay supports the mast aft, especially on large yachts where there is great pressure forward due to the large sail area, especially if a spinnaker is used.
Chain Plates	Plates attached to the hull, forming the lower attachment point for the shrouds and stays. The wires are attached with chains, metal turnbuckles or rope lanyards.
Turnbuckle	Used to adjust the tension of the shrouds and stays. A bottle screw is a variant of this.
Lanyards	A short length of rope used to adjust the tension of the shrouds and stays on a dinghy, if chains or turnbuckles are not used.

<b>RUNNING RIGGING: <i>All running gear, that is, all ropes and wires that run through pulleys and sheaves</i></b>	
Pulley	Grooved wheel fixed in a block, providing a mechanical advantage. Sometimes called a block.
Sheave	Grooved wheel mounted in the mast, boom or on the deck, functioning similarly to a pulley.
Halyards	Ropes or wires running through pulleys or sheaves fixed to the top of the mast, used to haul the sail to the top of the mast. On the Saldanha Dinghy, the following halyards are used: <b>Peak</b> (hauls the peak up, via the jackstay on the gaff); <b>Throat</b> (hauls the foot of the gaff vertically up the mast, attached to the gaff at or near the throat); <b>Jib</b> (hauls up the head of the jib)
Cleats	Fixing points used to secure halyards and other running rigging under tension.
Mainsheets	The rope used to control the mainsail while sailing.
Jibsheets	The ropes used to control the jib while sailing. Attached to the clew of the jib, one will run to starboard and the other will run to port.
Downhaul	A lightweight block and tackle used to tighten the luff of the mainsail, attached either to the boom or to the tack of the mainsail
Outhaul	A lightweight block system to tighten the foot of the mainsail by hauling the clew out towards the aft end of the boom.
Kicking strap	Used to hold down the boom, preventing it from lifting, especially when running and gybing.
Topping lift	A cord used to lift the aft end of the boom.
Centreboard uphaul	A block and/or sheave system to assist in raising and lowering the centreboard.

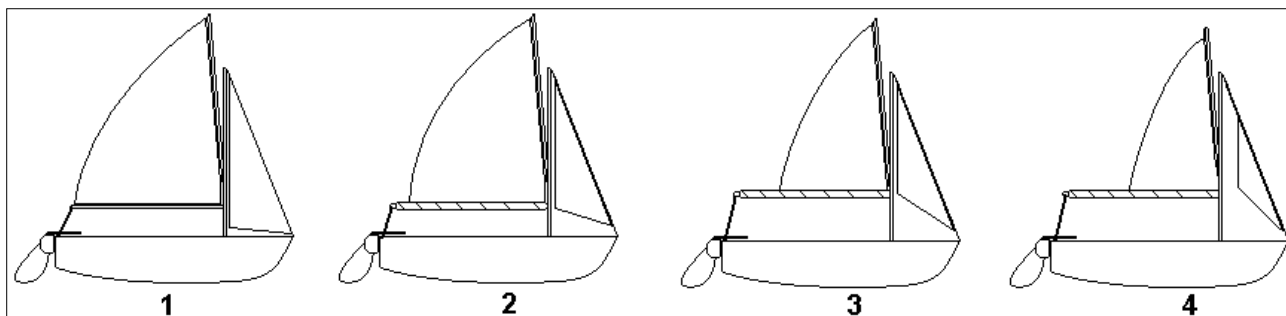
OTHER COMPONENTS	
Horse	A metal bar or track along the top of the transom, along which the traveller can slide. Some boats use a rope traveller instead.
Traveller	A sliding device fitted to the horse, to which the mainsheet block is attached. In the case of a rope traveller, the mainsheet block usually slides along the rope.
Boom	The spar to which the foot of the mainsail is attached.
Gooseneck	A universal joint attaching the forward end of the boom to the mast.
Gaff	The spar to which the head and peak of the mainsail are attached
Hounds	The upper attachment point for the shrouds and stays, at or near the masthead
Piston hanks or twist hanks	Fittings used to attach the foresail (jib) to the forestay. Some dinghies have a luff wire sewn into the luff of the jib, and this is tensioned via the halyard so that attachment to the forestay is not necessary.

SAILING TERMS	
Weather helm	With the helm amidships, the boat tends to pull up into the wind. Most boats are designed with a small amount of weather helm, which is a safety factor if the helmsman drops the tiller by accident.
Lee helm	With the helm amidships, the boat tends to bear off away from the wind.
Close hauled	Sailing upwind, as close to the wind as possible, with sails sheeted fully in.
Sailing free	Not close-hauled, with the sails sheeted out but still filled with wind.
Reaching	Sailing free with the wind abeam, or just in front of the beam.
Close reach	When not quite close-hauled, wind forward of the beam.
Broad reach	Sailing free with the wind full abeam.
Running	Sailing free, heading downwind, with the wind aft of the beam, or from full astern. On a port run, the mainsail is set on the starboard side, and a starboard run has the mainsail set on the port side.
Port tack	Sailing with the wind coming from the port side and the sails set on the opposite (starboard) side; but not during tacking or gybing.
Starboard tack	Sailing with the wind coming from the starboard side and the sails set on the opposite (port) side; but not during tacking or gybing
Tacking	The act of changing course by going about; starting from when she is head-to-wind, until her mainsail is filled and she starts to sail on her new course.
Beating	Sailing close-hauled to windward, in a series of alternate tacks. (Zig-zags).
Gybing	Changing course while running before the wind. The gybe starts when the mainsail/boom swings across the centre line and is completed when the mainsail fills on the opposite side.
Bearing away	Altering course away from the wind. Also called bearing off. The opposite of heading up into the wind.
Running by the lee	Running with the mainsail set on the windward side, as opposed to the more usual leeward side. This situation over-rides the standard definition of 'port' and 'starboard' run. Even if the wind is from the port side, with the sail on the same side (running by the lee), the boat is defined as being on a <b>starboard</b> run. The position of the sail over-rides the fact that the wind is coming from the port side.
Luffing	Heading up to windward, until the boat lies head to wind.
Windward side	The side of the boat that the wind reaches first, 'closer' to where the wind is coming from.
Leeward side	The side of the boat that the wind reaches last, 'further' from the wind.

## TYPES OF SAIL

	
<p><b>Working jib over working staysail</b></p>	<p><b>Yankee over genoa staysail</b></p>
	
<p><b>Bermuda Main Sail (e.g. Dabchick, Extra, Laser)</b></p>	<p><b>Genoa</b></p>
	
<p><b>Spinnaker</b></p>	<p><b>Sliding Gunter (e.g. Saldanha dinghy)</b></p>
	
<p><b>Spritsail (e.g. Optimist dinghy)</b></p>	<p><b>Gaff Sail</b></p>

## **REEFING**



### **Heavy Weather**

A good sailor will make an assessment, using all available sources of information, to avoid being caught out in really bad weather conditions, but there are bound to be times when a boat is pressed too hard by the wind.

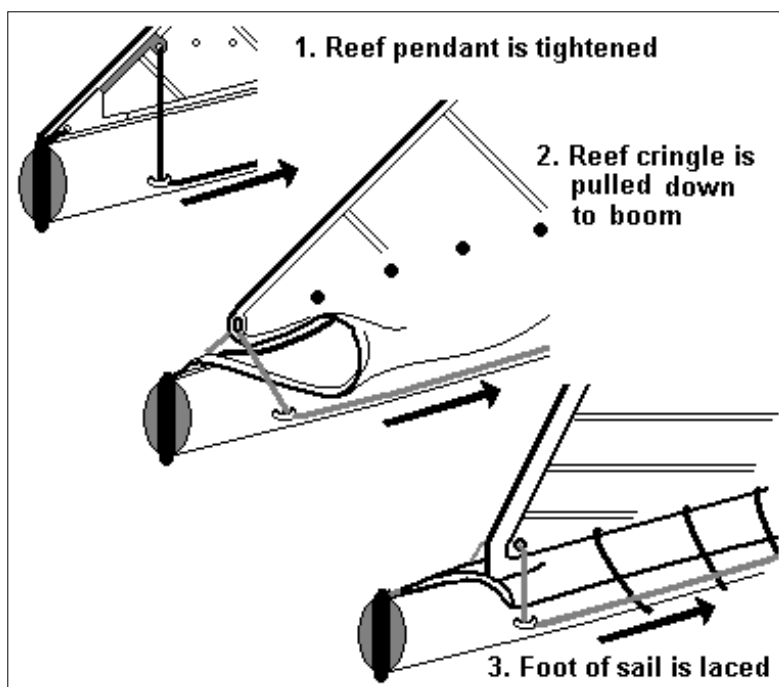
If your course is downwind, or on a reach, you can turn into the wind, get the mainsail down, and carry on under jib alone. If your course is to windward, you may need to keep both sails up to preserve the balance of the sail plan, but also need to reduce the total sail area in some way. If you can't replace the sails with smaller storm-sails, you have to REEF.

### **Reefing**

The basic operation when reefing is to reduce the area of the mainsail. In many modern boats, this is done by rolling the foot of the sail round the boom (roller-reefing).

The traditional way is to use *reefing points*, which are horizontal rows of short lengths of line hanging from the sail on either side of it. There are usually two or three rows between the foot and a third way up it, and at the leech end of each row there is a cringle (eyelet) called a *reefing cringle or eyelet*.

To reef, means that you must lower the sail half a metre or so, to one of the rows of reefing points, then secure the sail along the boom, tying the reefing lines with reef knots.



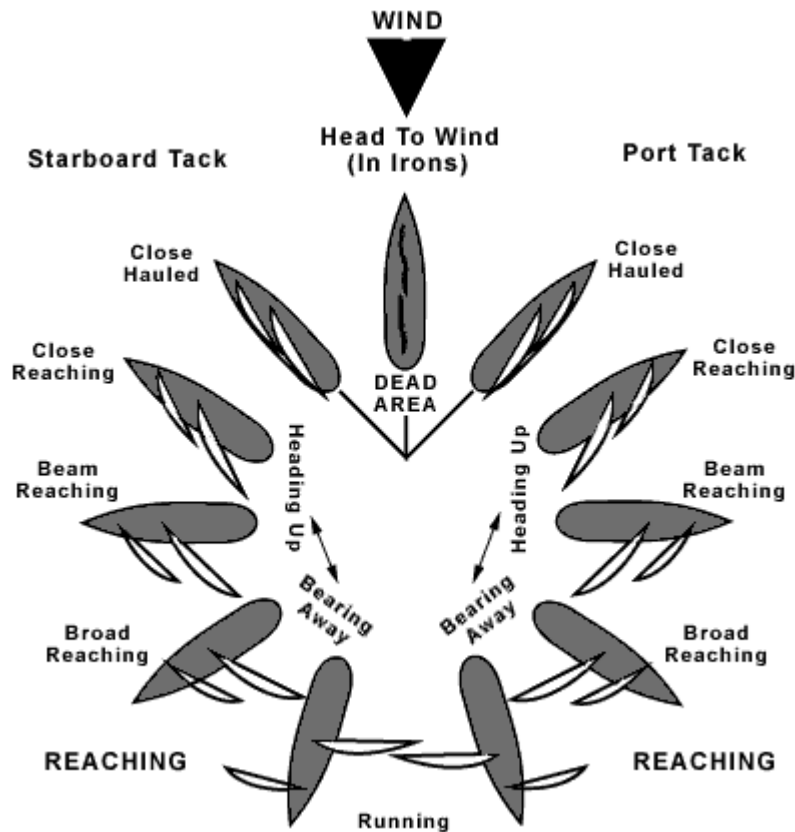
# THEORY OF SAILING

## POINTS OF SAIL

As far as the wind is concerned, there are just three ways to sail:

- with the wind (**running**),
- against the wind (**tacking or beating**) and,
- across the wind (**reaching**).

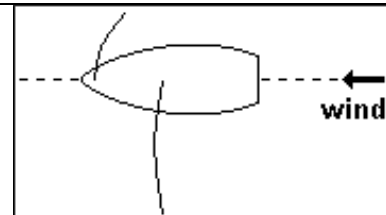
These are known as the points of sailing, and each has a special word to identify it. Sailing with the wind (the wind behind you) is called **RUNNING**. Sailing across the wind is called **REACHING**. Sailing towards the wind is called **BEATING**.



### Running

Running can be tricky, even dangerous. Running before a strong wind can capsize a boat, or your craft may broach, which means it will swing broadside to the wind, lose headway and leave you at the wind's mercy, if any. Your best bet is to let the main boom swing as far forward as it will go, without causing the mainsail to luff (flap loosely). Also, keep a firm, steady hand on the tiller.

These diagrams show a 'goose-wing' run, with the jib on the opposite side to the mainsail. You can also run with both sails on the same side.



**Starboard run**



**Port run**

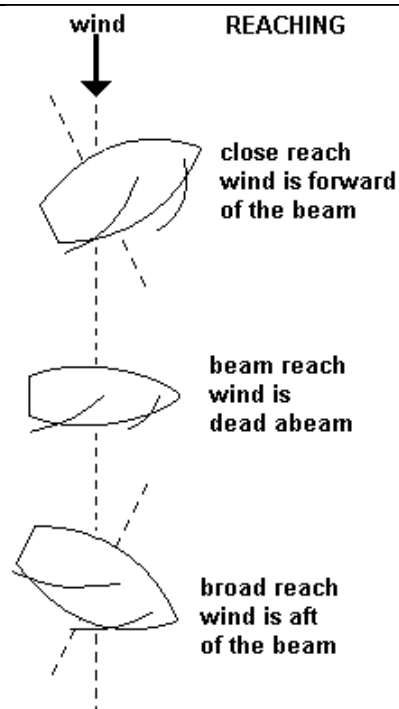


### Reaching

Reaching, or sailing across the wind, is probably the easiest of the three.

You have the power of the wind at your side – neither dangerously pushing you from behind, nor stubbornly resisting you from the front. Set your course, and then set your sails at the angle that will keep you on course.

Usually more sail area is exposed to the wind in reaching, which makes it the **fastest point of sailing**.



### Beating

If your course is north and the wind is also coming at you from the north, you have a problem. You can solve the problem by beating – a series of ‘zig-zags’ right and left of an imaginary line between start and finish known as your course or base line. You beat to windward on the starboard tack for a distance, as close to the wind as you can, then switch to the port tack and beat to windward again, equally close to the wind. Keep alternating this way and each beat will bring you closer to your finishing point.

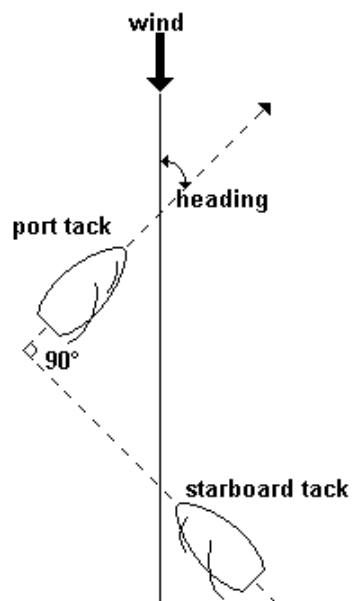
Does beating take you out of your way – force you to cover more distance than a direct route would? Of course it does. But it gets you there. Beating works best when the mainsail and jib are set to work together properly. Neither must be trimmed too flat or eased too much. If the jib or mainsail luffs (goes loose or flaps), the helmsman may be sailing too close to the wind. Ease off. Read your tell-tales.

**A word to the helmsman:** Whether you’re running, reaching or beating, you are in charge of the tiller. Give it plenty of room to move, but don’t let it take over. If you lose control of the tiller, you lose control of the boat.

### Tacking

The manoeuvre when you turn the bow of the boat through the eye of the wind, is known as tacking. As you bring the bow up toward the wind, the boom moves across the boat and as the turn continues through the wind, the sails begin to fill on the opposite side of the boat.

You normally tack from one close-hauled course to another, but beginners generally find it easier to tack from a reach to a reach, which allows the boat to move through a greater angle, giving both the helmsman and crew more time to complete the manoeuvre. Many people find tacking rather confusing at first and lose their sense of direction. The helmsman in particular, tends to get in a muddle with the controls and it often helps to practise the hand and foot movements first on dry land.



### Tacking Commands

Helmsman:                *"Ready about!"* or *"Ready to tack!"* (this warns the crew to get ready)  
Crew:                    Crew prepares the sheets, gets ready and shouts *"Ready!"*  
Helmsman:                *"Lee-oh!"* or *"Tacking!"* or *"Coming about!"* (and puts the tiller over to leeward)

### Gybing

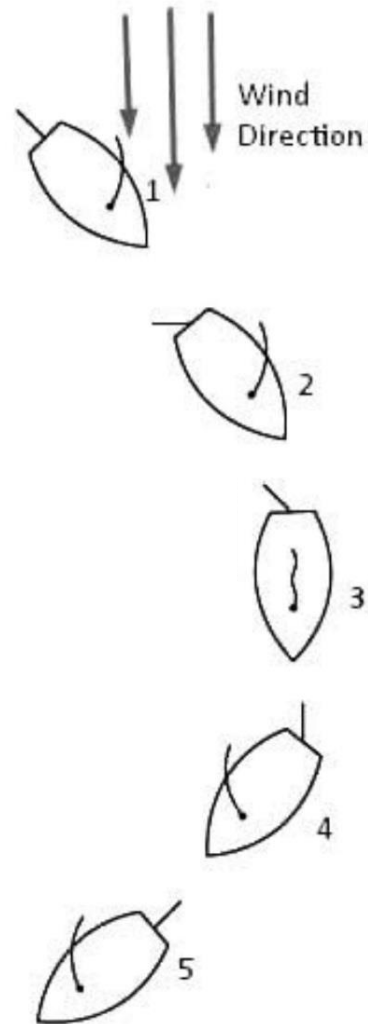
Gybing is the manoeuvre used, when running downwind, to change direction to the opposite run, and get the sails to fill on the opposite side. A gybe is defined as the action of the sail crossing the midline of the boat while sailing downwind. The sails are full throughout the gybe, with the consequence that the mainsail swings rapidly across the boat, unless the wind is light. The helmsman must know exactly where the wind is coming from, so that he can anticipate the point at which the boom will cross the boat, and therefore, co-ordinate his and the crew's actions.

Many sailors dread gybing the boat, but although it is quicker and can be more risky than tacking, it is an important sailing manoeuvre and should be practised regularly.

However, in strong winds and rough seas, the risk of capsizing during a gybe may be unacceptable, especially when not racing. The alternative is to luff up, tack round and bear away onto the required course (called a "wheelbarrow" turn). Although this is marginally safer than gybing, care must be taken to keep the boat upright and moving fast throughout the tack.

Depending on the wind strength, it is important not to sheet in the mainsail too tightly before the gybe, as this may over-power the sail and cause a broach and capsize. Rather keep the sail filled so the boat moves as fast as possible. As you put the tiller over, grab the mainsheet and pull it across to the other side in a quick movement, letting it run free immediately so that the sail can fill as you set your new course.

If you are at sea, try to execute the gybe while surfing down a wave, as your increased boat-speed will reduce the power in the sails as you gybe.

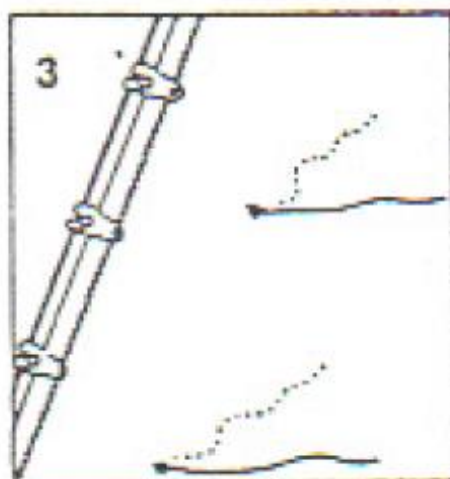
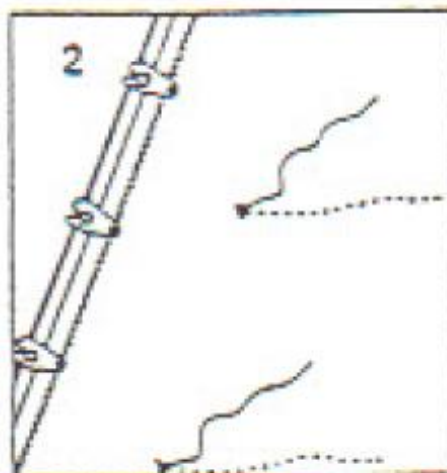
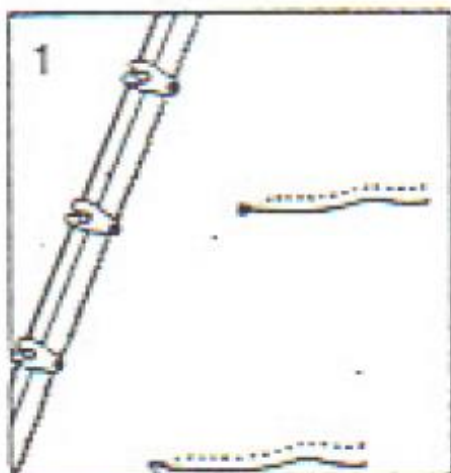


### Gybing Commands

Helmsman:                *"Ready to gybe!"*  
Crew:                    Crew prepares the sheets and gets ready to shift their weight; shouts *"Ready!"*  
Helmsman:                *"Gybe-oh!"* (and puts the tiller over to windward)

## READING TELL-TALES

### Checking set of sails



**1** Tell-tales parallel:  
sail set correctly.

**2** Tell-tales on  
windward side  
breaking away – pull  
in sheet.

**3** Tell-tales on  
leeward side  
breaking away – let  
out sheet.

## PRE-SAILING CHECKLIST

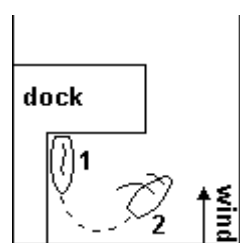
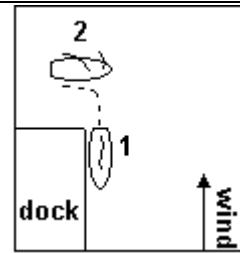
1. Always check stays and shrouds. Ensure that the lanyards, if fitted, are properly secured and that stays and shrouds have been tightened sufficiently.
2. Ensure that all shackles are secure and that pins are not worn out.
3. Halyards must run freely and must not chafe or jam in their sheaves.
4. On Saldanha dinghies, when hoisting the mainsail, make sure that the sliding gunter (gaff) is hoisted upright **first**. Only then hoist the throat to the correct height. This will prevent unnecessary strain on the mast, which occurs if you hoist the throat first and then raise the gaff upright. It also prevents tearing of the mainsail through excess tension on the luff.
5. When lowering the mainsail, first lower the throat to approximately the level of the boom, to reduce the tension on the luff. Then lower the gaff to its horizontal position.
6. Ensure that the luff of the main and jib is tight.
7. Make sure that you have enough clearance under the boom.
8. Always insist on, and use the correct commands when sailing.
9. Boat discipline must be maintained at **all times**. The helmsman is the one in charge. Ensure that you understand the need to keep the boat balanced at all times and under control.
10. When your boat is alongside a jetty for any length of time, make sure that all sails are dropped and stowed away correctly. This prevents unnecessary wear and damage to the sails.

## GETTING UNDERWAY

### Leaving a weather jetty

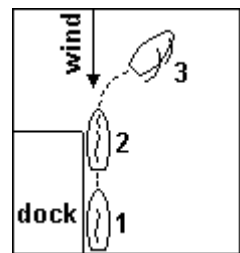
As the boat is always rigged head-to-wind, it will be facing the shore. The methods you use for leaving will depend on whether there is clear water astern of the boat or not. An obstruction may take the form of part of the jetty or possibly other boats. . In both methods the boat is rigged in the same way, with first the mainsail hoisted and then the jib and the centreboard is lowered if the water is deep enough. If the wind is at a slight angle to the pontoon, rig the boat on the leeward side. It is the crew's job in both cases to push the bow of the boat off from the pontoon.

If you do not have clear water, you will have to use this method, which gives you slightly less room to manoeuvre.



### Leaving a lee jetty

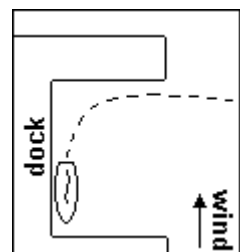
The boat is launched and turned head-to-wind (1) and led to the end of the jetty – to the leeward side if the wind is at a slight angle to the shore. The helmsman then hoists the mainsail and the jib and lowers the centreboard (2). Since there is only one course the boat can take to depart, the helmsman and crew must be sure that it is free of obstructions before setting off. The crew then pushes the bow of the boat away from the jetty and jumps aboard. The sails are set and the boat is sailed away close-hauled.(3)



## COMING ALONGSIDE

### Returning to a weather jetty

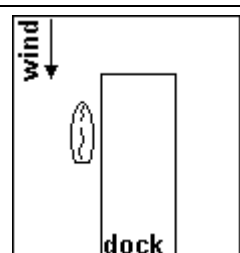
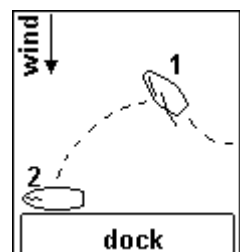
You will find it much easier to come alongside the part of the jetty that lies at right angles to the weather shore, rather than the part lying parallel to it. The same method is used in both cases, but the latter requires precision timing on the part of the helmsman. If you are a novice and have no alternative, but to come alongside a jetty parallel to shore, then it would be advisable to lower the sails some distance off and paddle or row in. The other alternative is to let your sails fly before you get to the jetty. If the wind is at slight angle to the shore, you will find it better to approach the leeward side of the jetty, so that the sails can fly clear of the jetty



### Returning to a lee jetty

As with the weather shore, your approach will be determined to a great extent by the position of the jetty. You should use one method if you are planning to approach the part of the jetty lying at right angles to the shore, and another if you are trying to come alongside the part lying parallel to the shore. Your choice may be limited by the extent of clear water around the jetty. If in doubt, lower the sails some distance off and paddle or row in.

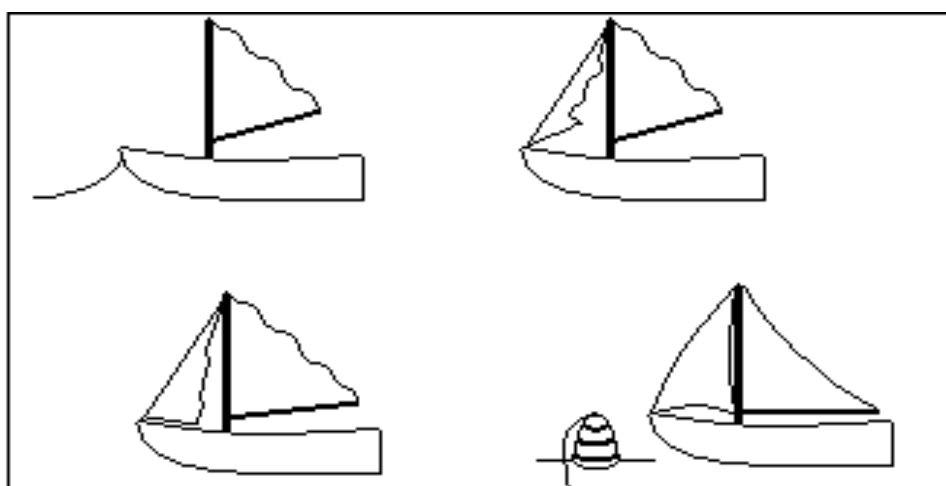
The other alternative is to let your sails fly before you get to the jetty. If the jetty juts out quite a long way into the water and you have enough clear water, you can use the method shown bottom, right. It requires careful judgement, since you have to sail the boat quite close to the shore before luffing to a stop. If you have to make you approach to the part of the jetty lying parallel to the shore, you must let your sails fly before you get to the jetty and come in under headsail alone



## **MOORING**

### **Leaving a mooring**

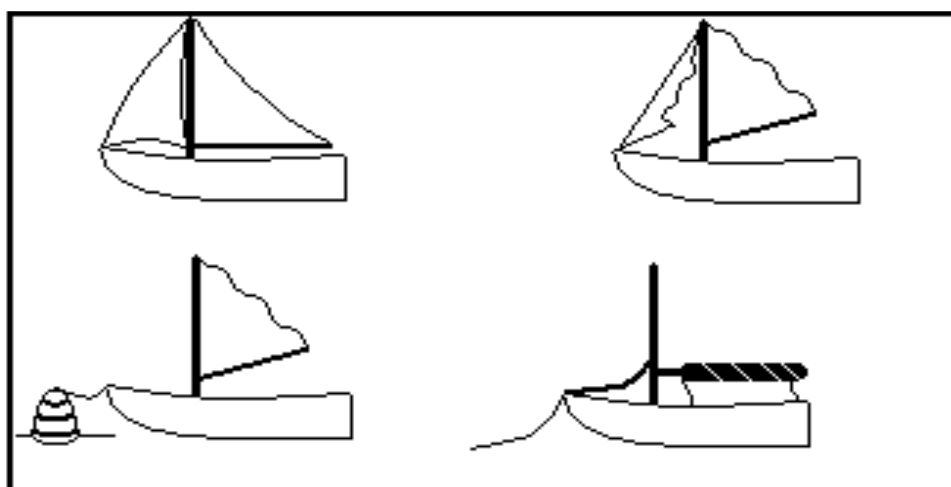
1. Get ready all gear, raise mainsail, lower centreboard. Bend jib, but do not raise. Let mainsheet run, do not belay it (i.e. do not cleat it).
2. Raise jib, but do not belay (i.e. don't cleat) the sheets. Draw boat to mooring or prepare to cast off mooring warp.
3. Hold weather jib sheet on tack desired to sail on, i.e. back the jib. As head pays off, cast off mooring.
4. Sheet in main and jib. Trim both. (See Figure 1)



**Figure 1**

### **Picking up a mooring**

1. Sail to mooring from leeward.
2. Luff and shoot into the eye of the wind, at mooring.
3. Let all sheets run. Pick up mooring and drop jib.
4. Drift back on mooring warp, douse main and snug down. (See Figure 2)



**Figure 2**

## ROPE WORK – SPLICES

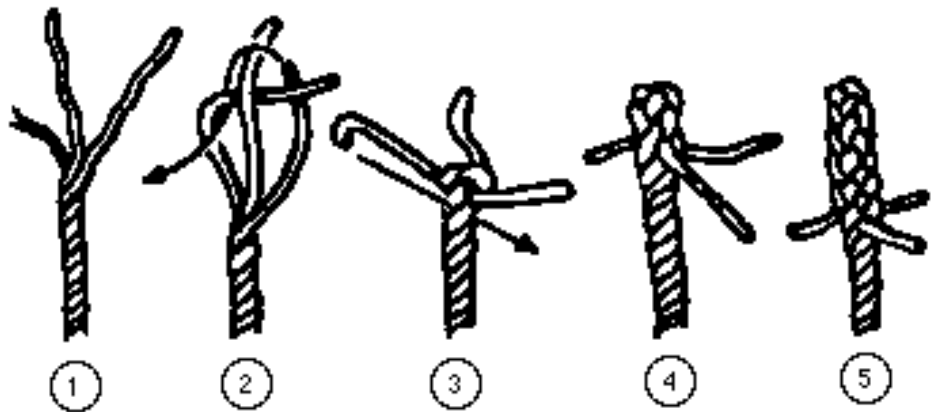
SplICES are used to join any two parts of rope together permanently. A good splice has up to 95 per cent of the rope's strength, while a knot's efficiency varies from only 45 to 60 per cent of the rope's strength.

Before beginning to splice, you need a couple of tools - a sharp knife and a marlinspike. The marlinspike is the tool included in some pen-knives that most Scouts think is used for taking stones out of horses' hooves. The marlinspike is used to help you in opening the lay of the rope at the point where the strand is to be introduced. If you haven't a marlinspike handy, a 15cm nail will do the job.

The most important step in splicing is the start. Marry the strands correctly and the remaining steps follow easily. To properly prepare a rope for splicing, unlay the end adequately and whip each strand with a temporary whipping. Four tucks will hold any splice providing that they are full strands (i.e. not tapered off). Tapering off is done after the fourth tuck and is performed by reducing each of the strands by one-third with a knife; tuck again with the thinner strands and then reduce the strands by another third; and finally by tucking and trimming off close.

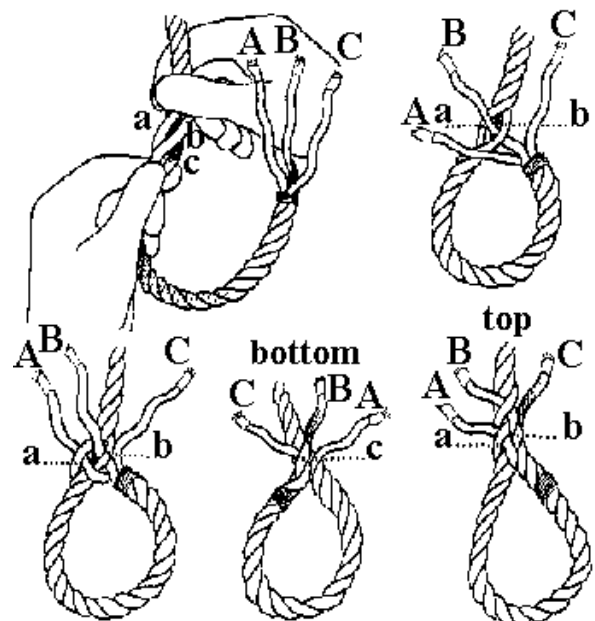
### Backsplice

The backsplice at the end of a three-stranded rope makes a neat and permanent finish. But it also thickens the end, thus creating a problem with block and tackle, which may be to an advantage acting as a stopper. Commence the splice by making a crown knot, then continuing over and under for at least three tucks with each strand.



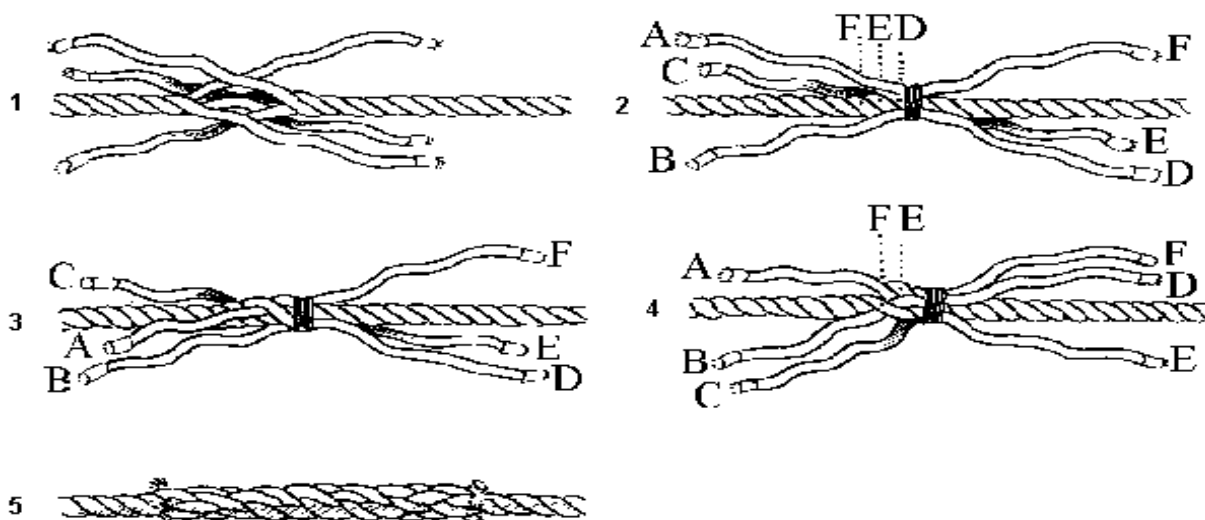
### Eyesplice

The eye splice is used to make a permanent loop or eye in the end of a three-stranded rope. Often a metal thimble is worked into the eye and then bound with twine. Carefully follow the illustrations, pulling each tuck up tight.



## Shortsplice

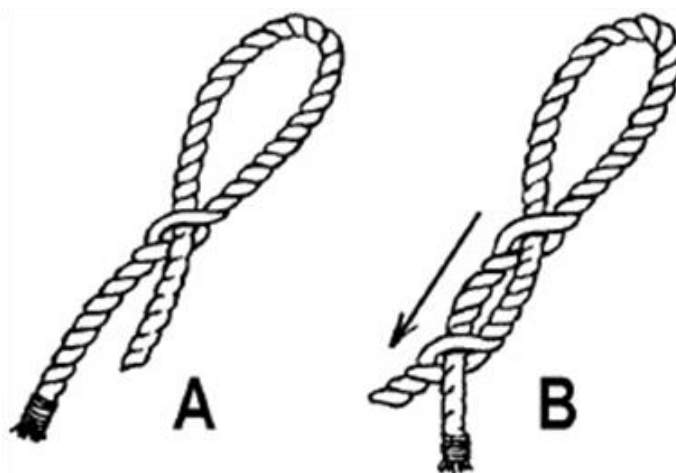
This splice is used to join two ropes of three strands each. Like the backsplice, it thickens the rope and will prevent it from passing through a block and tackle. When making this splice, ensure that each stage of the splice is pulled up tight before proceeding with the next



## Docker's Splice

The Docker's Splice is sometimes called the Marline Eye Splice or the Tucked Eye Splice. It is the easiest of all to form. It is a quick method of making a temporary eye in a rope at any point and is often used on ridge tents to hold the dolly of the main guylines. In most splices the lay of the rope is opened and the tucks are made with the rope strands. In the Docker's Splice the whole rope is used.

Open the lay at the chosen point in the rope and tuck the whole of the running end through the raised strand to make an eye of the required size (A). Now open the lay of the standing part of the rope immediately below the first tuck and pull the running end through until both tucks lock together (B).

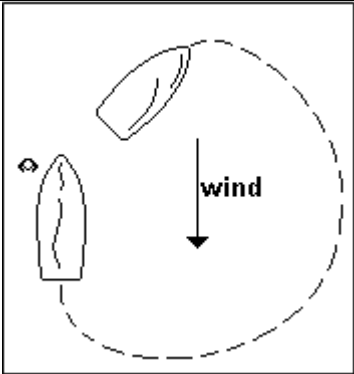
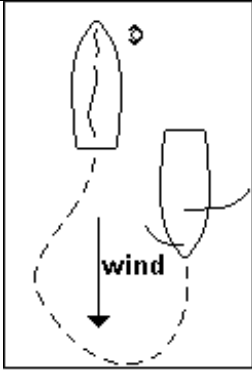


As in all splices, remember to work against (or across) the lay. After the second tuck make sure that the running end is of reasonable length so that there is no danger of it pulling out.



## **MAN OVERBOARD RECOVERY PROCEDURE**

If a crew member falls overboard, immediately one of the crew should be detailed to keep a bearing on him and if a marker is available, this should be thrown out.

	
<p>If beating or reaching – tack or gybe immediately, depending on the conditions. Sail past him and then head up and approach him close hauled, luffing up alongside.</p>	<p>If running before the wind, continue for a short distance, bear up, then tack to come up just leeward of the person before luffing up and coming alongside.</p>
<p>When alongside the person, pull the tiller sharply towards you and then let it go. Grab hold of the person and help him/her aboard.</p>	

## **RESCUE A CONSCIOUS PERSON FROM THE WATER**

When using sailing boat to rescue a conscious person, the correct procedure is as follows:

1. Take the boat near the victim and then stop. Always approach from the leeward side, with the person to windward of you. If you come up on the windward side of the person, you risk drifting right over them. A person on the windward side is also more visible to the helmsman
2. The person can grasp the stern or be grasped by the crew, they would help him aboard over the transom, being careful not to swamp the boat.
3. Remember that the crew should balance the boat while the person is being hauled aboard.

## **RESCUING AN UNCONSCIOUS PERSON IN THE WATER**

With an unconscious person in the water, this above procedure is not possible. Watch the victim at all times as you approach him. The further he is from the shore, the more difficult it will be to find his exact location if he submerges before you can get to him.

If you can, mark the victim's location as you approach, in relation to two objects on the shore. If the victim submerges, watch the spot where he went down. If you lose sight of him, you know he must be somewhere near the line defined by the two objects you chose. A rough cross-bearing is even better.

If the victim is floating, approach him with the boat, as you would in the case of a conscious person. Then the crew can carefully haul the victim over the transom, being careful not to swamp the boat.

If the victim does submerge, then a rescuer must enter the water where the victim was last seen and bring him back to the boat using techniques used in swimming rescues.

If a swimmer must enter the water, remember the following:

1. It is difficult for anyone to make a swimming rescue while dressed, so don't try. Remove any heavy or bulky clothes you may be wearing.
2. When entering the water to perform the rescue, jump – don't dive. You can thus keep the victim in sight if he is floating.
3. Any object that floats well enough to support the rescuer's weight and is light enough for him to move through the water should be used. Lifejackets, inflated tubes, etc can be used. Unless you are a very strong swimmer trained in rescue techniques, a GO swimming rescue is very tiring and some floating device should be used.
4. If at all possible, the rescuer should have a line attached from the boat to him, around one shoulder and under the opposite arm. It is the responsibility of one of the crew on the boat to prevent the line from fouling, as the swimmer swims toward the victim.

## **CAPSIZE DRILL**

A boat is considered capsized when her masthead is in the water. **There are now three things you must NOT do:**

- Panic
- Swim for shore
- Argue over whose fault it was

**Here, on the other hand, are things you should do:**

- Stay with the boat, however unattractive it may look at the moment. Most modern sailboats have built-in buoyancy and will not sink. If you hang on, neither will you.
- Put on your lifejacket if you are not already wearing one – but you should already be wearing one.
- Now, count heads. Is everyone safe and ready for action? Does anyone need help? If each crew member is given a number, they should all call out their number, or name, to check that no-one is missing.
- Detail a crew member to swim to the masthead and hold it up, to prevent the boat from turning turtle.
- If you have capsized close to shore, you may be able to get a line on the boat and work it into shallow water, then right it in relative comfort and safety.
- If a rescue vessel is approaching, stand by to co-operate with the crew when they arrive.

## **Righting the Boat**

1. If your boat is in deep water or a long way from shore or if there is no help on the way, and if everyone is in good shape, you need to right the boat yourself.
2. Firstly, uncleat and free up all sheets.
3. If not already done, send a crew member to hold up the masthead, to prevent the boat from turning turtle, or the mast from sticking in the mud.
4. Round up all loose equipment floating around that someone forgot to secure, and secure it.
5. Next, work the boat around until the bows are into the wind.
6. Detail a crew member to stay by the bows and to hang on there when the boat comes upright. This will ensure that the boat stays facing into the wind, and does not bear off and capsize again.
7. Stand on the tip of the centreboard and heave back on the gunwale.
8. The boat should slowly come upright, sails and all.
9. Bail vigorously with a bailing scoop, can, bucket or bilge pump, assuming any of these survived the capsize – always make sure these are tied on before leaving the shore. If not, bail by hand.
10. When the boat is stable and water level has dropped, the crew can climb on board, one by one over the stern, and carry on bailing until the boat is ready to get under way again.

## **What if you can't right the boat?**

1. First check that the masthead is not stuck in the mud or jammed under an underwater obstruction.
2. If the boat won't come upright with the sails on, no matter what you do, you'll have to get them off.
3. Let the mainsail outhaul go, free the tack and clew from the boom, cast off the halyards and then work the gaff down the mast. Secure the gaff along the boom, with the sail gathered in.
4. Stand on the centreboard and heave the boat upright. When it's up, bail out the water and get back on board.
5. Try to sail back under jib alone, otherwise you will have to raise the main again.
6. Congratulate yourself and the crew on doing it the hard way.

## **Special Caution**

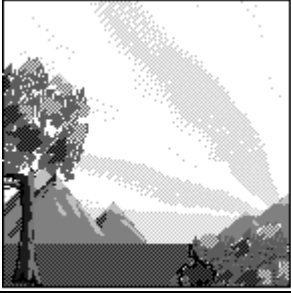



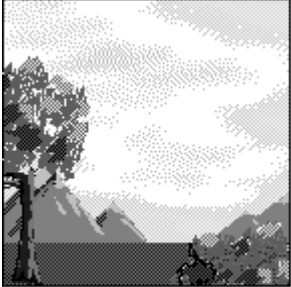
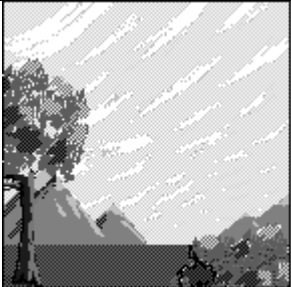
Don't try and swim ashore for help unless the shore is very close. Even if you're a good swimmer, you may not make it – especially if the water is cold or rough. As a rule of thumb, the shore will actually be twice as far away as it looks.

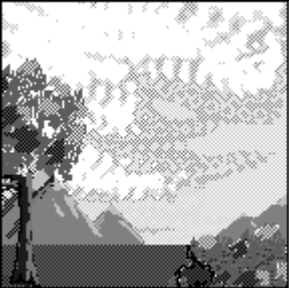

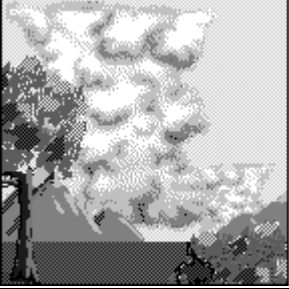
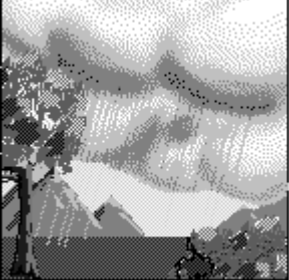
It is much easier for rescuers to find a boat, than to spot the head of a person swimming in rough seas, so STAY WITH THE BOAT.

## **Exceptions**

If the boat is on fire, or if it is drifting towards a dam spillway or dangerous surf, you won't have a choice. Get to shore.

## CLOUD IDENTIFICATION

	<p><b><u>Cirro-stratus.</u></b> If these clouds thicken, there will be rain in 6 – 24 hours.</p>
	<p><b><u>Alto-stratus.</u></b> Indicates a warm front or storm.</p>
	<p><b><u>Strato-cumulus.</u></b> When these clouds become dense, expect rain. If they form after rain, the weather will clear.</p>
	<p><b><u>Cumulus.</u></b> If these clouds mass to windward, they foretell a storm. Rapid growth on a summer day precedes a thunder-storm. In small, widely spread patches, they mean fair weather.</p>
	<p><b><u>Stratus.</u></b> Indicates light, steady rain.</p>
	<p><b><u>Cirrus.</u></b> If they do not increase, but drift along or dissolve as the sun climbs, fair weather. Otherwise, rain or bad weather to follow.</p>

	<p><b><u>Cirro-cumulus.</u></b> Indicates the approach of a weak disturbance, or if increasing in density, rain in 24 hours.</p>
	<p><b><u>Alto-cumulus.</u></b> In small isolated patches, or if dissipating, they mean fair weather. If piled up into domes, beware of thunderstorms.</p>
	<p><b><u>Cumulo-nimbus.</u></b> Cumulo-nimbus are thunderstorm clouds, and produce rain, snow and sometimes hail.</p>
	<p><b><u>Nimbo-stratus.</u></b> These are rain or snow clouds when thickening and building.</p>

## THE BEAUFORT WIND SCALE

Beaufort Number (Force)	Description	Wind speed		Observations
		KPH	Knots	
0	Calm	0	0	Tree leaves don't move; smoke rises vertically; sea is calm
1	Light Air	1 – 5	1 – 3	Tree leaves don't move; smoke drifts slowly; weathervane inactive; sea is slightly rippled
2	Slight Breeze	6 – 11	4 – 6	Tree leaves rustle; flags wave slightly; can feel wind on your face; small wavelets or scale waves
3	Gentle Breeze	12 – 19	7 – 10	Leaves and twigs move around; small flags extend; long unbreaking waves
4	Moderate Breeze	20 – 29	11 – 16	Small branches move; flags flap; raises dust and paper; waves with some whitecaps
5	Fresh Breeze	30 – 38	17 – 21	Small trees sway; flags flap and ripple; moderate waves with many whitecaps. <b>Be cautious and consider your crew and boat capability before going out</b>
6	Strong Breeze	39 – 50	22 – 27	Large branches sway; flags beat and pop; open wires (such as telegraph wires) begin to "whistle"; umbrellas are difficult to keep under control; larger waves with regular whitecaps. <b>Don't go out unless reefed and your boat and crew can handle the conditions</b>
7	Moderate Gale	51 – 61	28 – 33	Whole trees sway; noticeably difficult to walk; large waves ("heaping sea"). <b>Stay ashore in this and any stronger winds</b>
8	Fresh Gale	62 – 74	34 – 40	Twigs break off trees; moderately high sea with blowing foam
9	Strong Gale	75 – 86	41 – 47	Branches break off trees; shingles blow from roofs; high crested waves
10	Whole Gale	87 – 101	48 – 55	Some trees blow down; damage to buildings; high churning white sea
11	Storm	102 – 120	56 – 63	Widespread damage to trees and buildings; these winds typically occur only at sea and rarely inland; mountainous waves
12	Hurricane	120 +	63 +	Extreme destruction; severe and extensive damage

**EXAMPLE OF A SAILING LOG**

This log should be kept as a complete record of all your sailing experience.

NAME		GROUP	
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Course	Hours Required	Course	Hours Required
Oarsman Scoutcraft	3	Sailing Scoutcraft	3
Boatman Interest	10	Helmsman Interest	10

**SAILING LOG**

DATE	BOAT TYPE	REMARKS (Location, sailing conditions, crew, other details)	Time Logged	Confirmed by (sign)

*Hours to be confirmed by Water Activity Licence (WAL) holder*