New Zealand Schools Waterwise Incorporated

WATERWISE INSTRUCTOR MANUAL

MODULE 2 SAILING

Module 1 - General Operations (Compulsory)
Module 2 - Sailing
Module 3 - Kayak

Contents

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1. INTRODUCTION

A warm welcome to Waterwise. Your time and effort will be much appreciated and your reward will be the enjoyment of working with an excellent organised team of teachers, parents and students.

This manual is the official New Zealand Schools Waterwise Instructor Training Manual for Sailing which you should keep with you whilst you are learning and teaching at Waterwise. To qualify as a Sailing Instructor for NZSWW you must also pass Module 1, which covers; Safety, Weather and Tides, Knots & Lines, Rescue Boat, Power Boat Rules, Outboard Motor Use and Rescue situations.

From the modules you will see that land-based teaching ability and power craft handling are very important parts of the course and your qualification. The aim of the course is to train teachers, parents, caregivers, and other helpers to become proficient and qualified Waterwise Instructors within the Waterwise programme.

When attending a course, or a Waterwise session you will need to bring, in addition to your day clothes:

- Footwear suitable for the beach you are attending
- A raincoat
- Clothing which will dry quickly or stay warm when wet e.g. board shorts, poly prop vest
- A towel and bag for wet clothes
- Sunhat and sunscreen
- Some energy snack food and a drink
- Writing equipment (pen, pencil, paper) in a re-sealable plastic bag

Your Tutor may ask you to bring extra items to those listed above.

If you require any further information or assistance please contact your Waterwise Centre training officer, your tutor, your examiner, the Central Registry Office, or one of the National Association's officers.

The Syllabus Modules are available by email from your instructor. If your hard-copy manual, or any pages within it, becomes damaged or illegible or lost, just print off more from that document.

Good luck with the course, your sailing, and remember to have fun!

2. WATERWISE INSTRUCTOR SYLLABUS

The Waterwise Syllabus is currently divided into three modules.

NZSWW Instructor Sailing is Module 2. Module 1 is mandatory for all Waterwise Instructors to pass. It includes content that is important to all Waterwise Instructors; prior, during and after instruction.

Waterwise Instructors need to demonstrate proficiency in the "Module 1" and at least one other Waterwise discipline to be fully qualified as a Waterwise Instructor in the specific discipline. e.g. General Operations Module and Sailing Module – now qualified to instruct Waterwise Sailing.

3. STUDENT / INSTRUCTOR RATIO

Strict adherence to the minimum Waterwise Instructor / Pupil ratio must be maintained at all times.

One Waterwise Instructor for every four children on and in the water.

The Waterwise Instructor is to be in the rescue craft with one other able person 15 or more years of age approved by the training officer - *except that when there are two Waterwise Instructors in the rescue craft, then the Waterwise Instructor to pupil ratio may be 2:6 to allow boats to sail with "two up" subject to the overall limitations* ***OF NO MORE THAN 4 SAILING BOATS FOR EACH RESCUE CRAFT.***

4. PREPARING AN OPTIMIST

Assembling the Sail

1. Lash the throat to the top of the mast. The throat must be hard up to the mast - no gap is permitted.

   It must also be lashed down at an angle to prevent movement caused by sprit and/or kicker tension.

2. Lash the tack to the forward end of the boom and around the mast. When the boom is placed on the mast, the front edge of the sail must be hard up behind the mast.

3. Tie down the clew. This should be a separate lashing to the Outhaul.

   It is important that this is tight otherwise the strain is taken on subsequent lashings and creases occur.

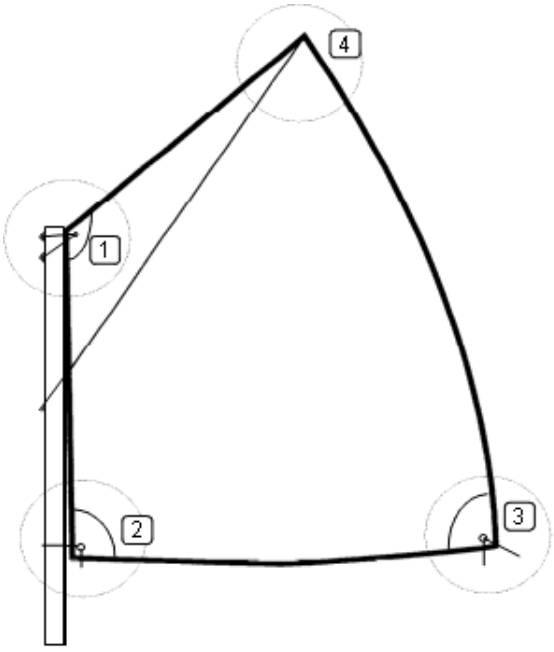
4. Do up the lashings or lacings down the mast, tying off with reef knots.

5. Do up the lashings or lacings along the boom, but do not over tighten these.

6. Temporarily fix the Clew Outhaul to the approximate tension required (adjust tension later).

7. Lash or fit the top of the sprit to the peak of the sail on the Starboard side.

   Reeve the sprit halyard through its blocks (pulleys) and cleat temporarily (do not tighten sprit at this stage).



Rigging the Boat

1. Check the sail is rigged correctly before starting (see 'Assembling the Sail').
2. Face the bow into the wind.
3. Lift mast, sprit and sail carefully up so that the lower end of the mast fits through the mast thwart and into the mast step. You may need to turn the mast 180 degrees so that the mast lock pin fits into the mast step. Turn the mast back 180 degrees so that the boom will sit above the hull.

   Alternatively you may need to fix a lashing or hook to stop the mast from coming out.
4. Tie the mainsheet to the boom with a round turn and two half hitches or fisherman's hitch.

   Reeve the mainsheet through the pulley blocks and check that the mainsheet can run free.

   Tie a stopper knot in the free end so that it will not un-reeve itself and slip through the blocks. This should be positioned so that the sail will swing to nearly 90 degrees angle to the boat but no more.
5. Push the lower end of the sprit up and haul down on the sprit halyard to put sufficient tension onto the sprit to create a wrinkle from peak to tack.

   Cleat the halyard to the mast.
6. Using the mainsheet, pull the boom down to about the right tension for the wind of the day. (Tight for strong winds, loose for light winds.)

   The crease should drop out. If it is still there, ease off the sprit halyard. If a crease appears from throat to clew tighten the sprit halyard.

Do not proceed further until you have this correct.

7. Make final adjustments to the clew outhaul.

   Tight - to flatten the sail for strong winds.

   Loose - to produce fullness for light winds.
8. Pull down the mainsheet tight and tension the kicker. It is important for downwind speed and boat handling that this is working well. If this has produced a crease running vertical behind the mast, try easing either the sprit or the kicker, but check again for sprit creases as in point 4.
9. Check lashing/lacing on the foot - only tight enough to keep the sail close to the boom.

   Check for creases caused by over tight lashings.
10. If the wind is light, tip the boat over slightly to check the shape of the sail as if it had wind in it.

    Be careful how you let your students do this as it can damage the boat if dropped.
11. Place the centreboard and rudder in the boat ready for launching.

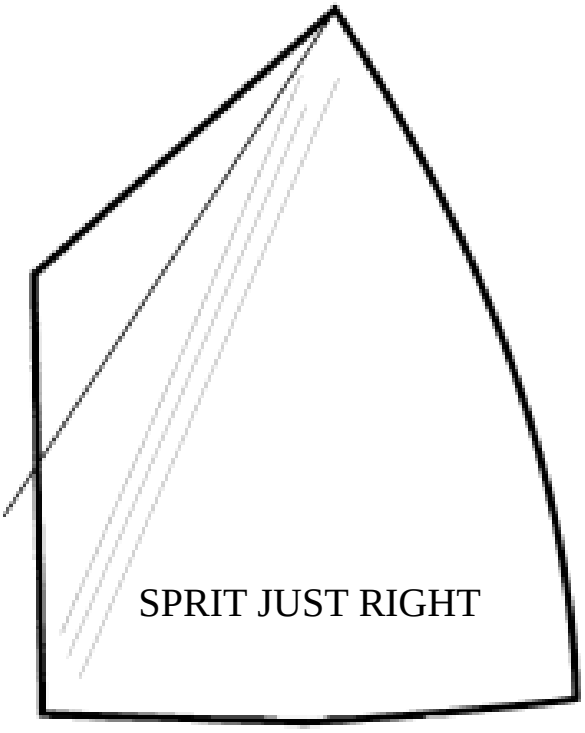
    If you have a kick up rudder then fit it before launching and remember to lower it immediately after launching.
12. Check that your Optimist is equipped with all the safety features.

Do not hesitate to make adjustments.

Remember it is hard to adjust the Sprit with the kicker tight – especially when you are sailing.

Common Rigging Faults

1. The sprit is not pulled tightly enough, causing an incorrect crease in the sail from throat to clew.
2. The sail is wrapped around the top of the mast. *This will damage the sail.*
3. The sail becomes twisted around the sprit at the peak. *This will damage the sail.*
4. The throat lashing is left loose. *This will damage the sail.*
5. The mainsheet is installed incorrectly through the mainsheet blocks.
6. The mainsheet is incorrectly tied onto the boom or not pulled tight and in the wrong place.
7. The foot of the sail is not pulled tightly enough towards the clew.
8. The figure of eight, or stopper, knot is not tied at the correct point in the mainsheet.
9. Incorrect or loose knots.
10. The kicker is not tight enough.
11. Pupils have a desire to install the rudder before doing any other rigging. It should go on last because it gets in the way.



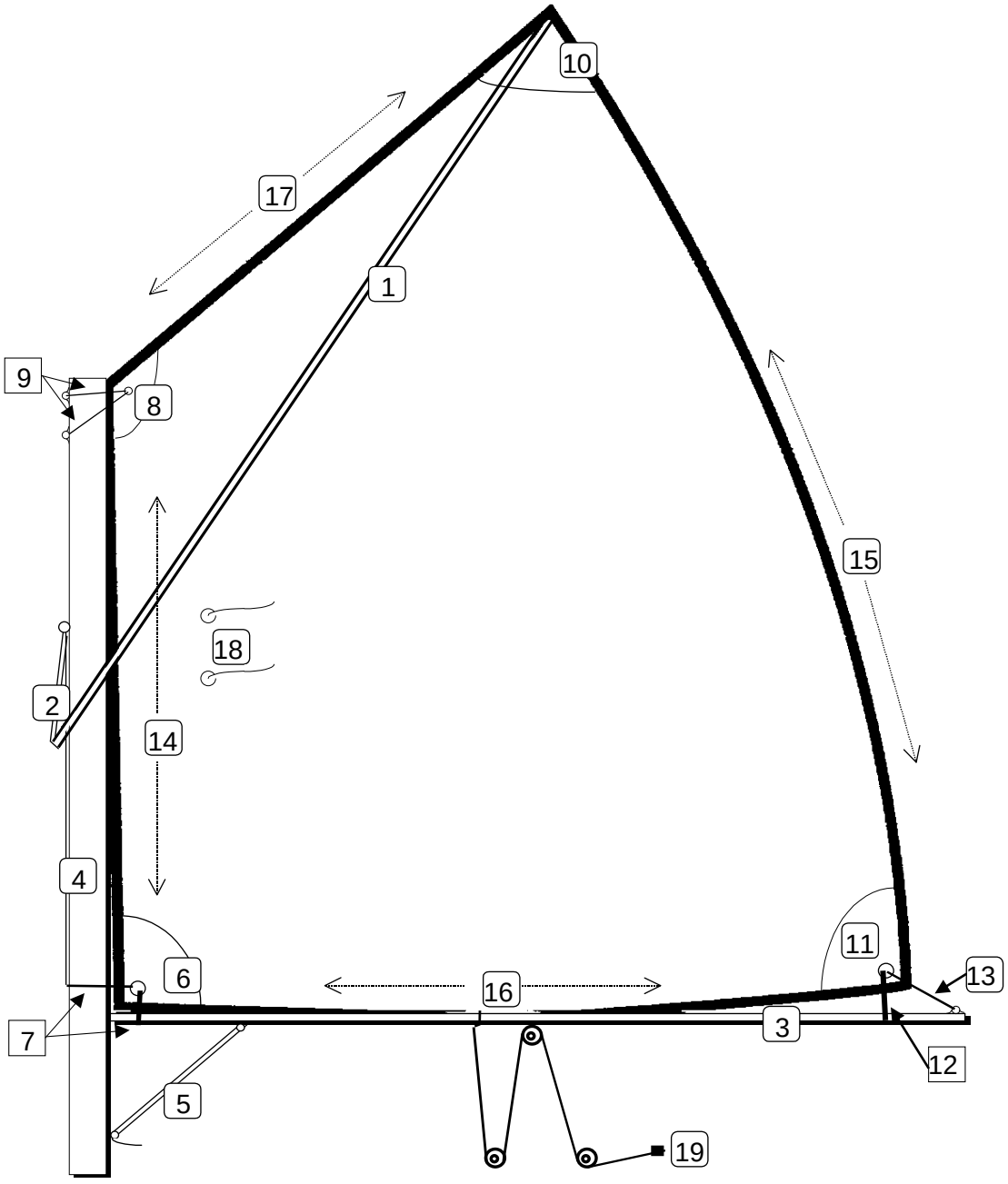
5. BOAT SAFETY FEATURES AND CHECKING

Ensure that the following safety features are in place

1. Painter - Make sure the painter is coiled and attached to the yacht
2. Mast Restraint – is securely fastened and is effective
3. Centreboard Restraint - is securely fastened and effective
4. Rudder Restraint - is effective
5. Bailer – attached to the yacht, in good condition, adequate size
6. Buoyancy - yacht buoyancy tanks are attached, bungs securely in
7. Main Sheet Restraint – Figure of 8 Knot

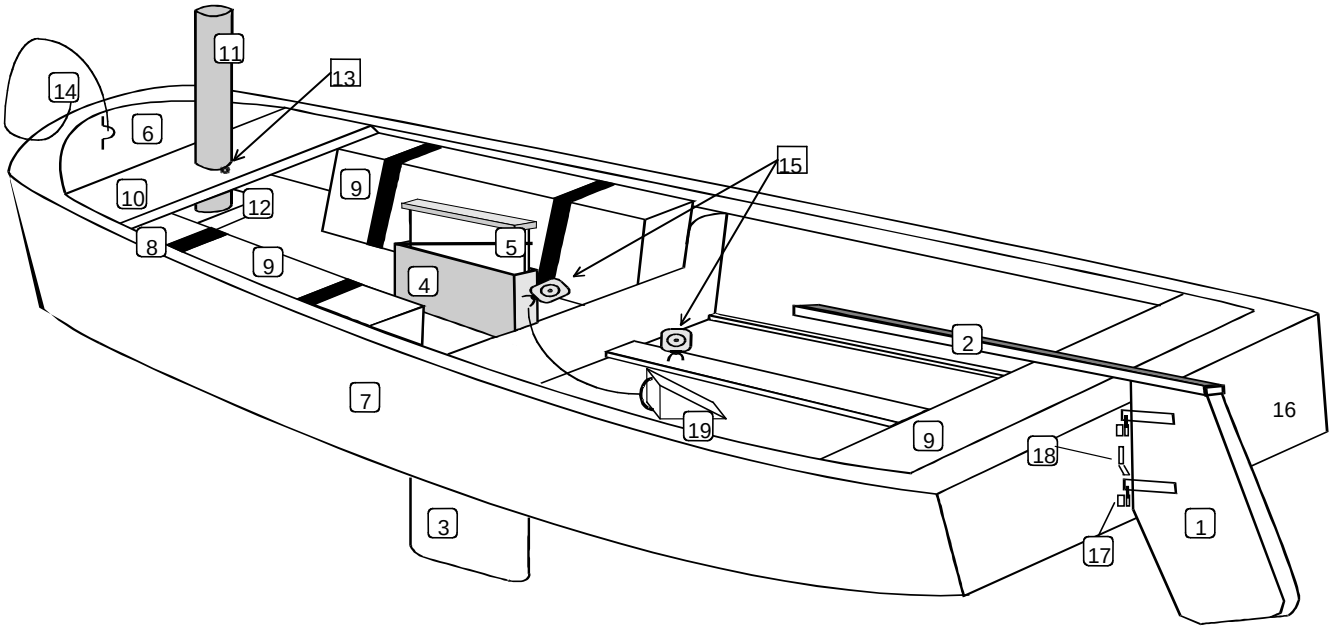
6. PARTS OF THE SAIL

1. Sprit	6. Tack	11. Clew	16. Foot
2. Sprit Halyard	7. Tack Lashings	12. Clew Lashing	17. Head
3. Boom	8. Throat	13. Outhaul	18. Telltales
4. Mast	9. Throat Lashings	14. Luff	19. Mainsheet
5. Kicker (or Boom Vang)	10. Peak	15. Leech	



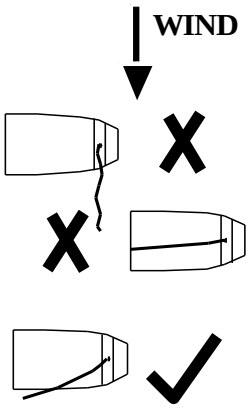
7. PARTS OF THE HULL EQUIPMENT

1. Rudder	2. Tiller	3. Centreboard	4. Centreboard Case
5. Centreboard Restraint	6. Bow	7. Side (Port)	8. Gunwhale
9. Buoyancy Bags / Tanks / Blocks	10. Thwart	11. Mast	12. Mast Step
13. Mast Restraint	14. Painter	15. Mainsheet Block	16. Stern
17. Gudgeons & Pintles	18. Rudder Restraint	19. Bailer	



8. HOW TO SAIL

Direction and Intensity

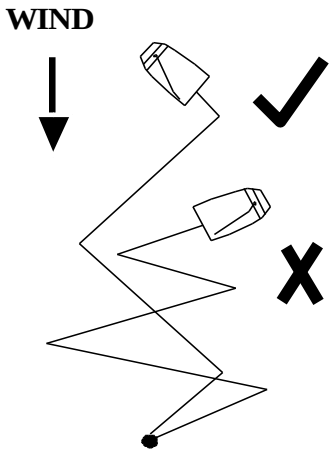


You must be aware of two points about the wind.

1. Although the wind may be blowing from a general direction, it is always fluctuating, mostly only a few degrees, but at times up to 180 degrees as weather changes occur.
2. Wind speed constantly varies (lulls and gusts), and wind strength can alter very quickly as weather fronts pass.

Watching the texture of the ripples on the water surface and other boats can show wind change. Darker patches will often mean an increase in intensity and possible wind shift. Land masses (peninsulas, hills), trees, high buildings and the like, may also affect wind flow close to shore.

Harnessing the Wind



The main skill in sailing is to know how to correctly trim the sails to the angle of the wind and therefore provide maximum power to the yacht.

The first thing to establish is the wind direction (where the wind is coming from).

This can be done by looking at a masthead or deck mounted wind indicator, ribbon or flag, wind on face, ears, neck and hair, smoke, trees bending, water texture, or simply letting the sail flap loosely for a short time.

Once the objective has been decided (where you want to go), the yacht is steered by the rudder and the sail adjusted accordingly, remembering that the yacht cannot sail forward within 45 degrees of where the wind is coming from.

To sail to an objective directly to windward (Sailing to Windward), a series of tacks creating a zig zag course of 45 degrees either side of the wind must be sailed, with the sail in the close hauled position.

Remember:

A close-hauled course is seldom sailed in a straight line.

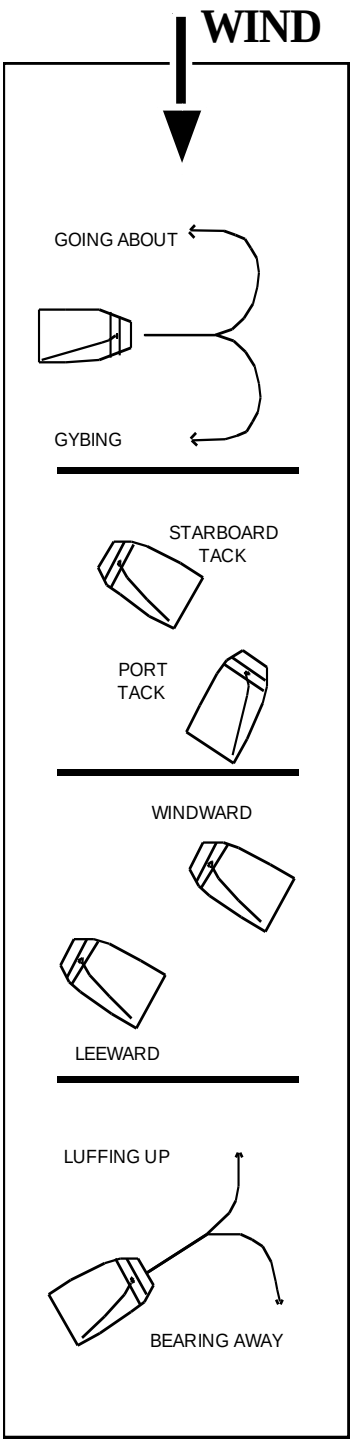
The sail is always sheeted in.

9. TERMINOLOGY

When teaching sailing it is important for everybody to use a standardised language.

DEFINITIONS

GOING ABOUT	Changing tack from port to starboard (or vice versa) with the *BOW* of the yacht going through the eye of the wind.
GYBING	Changing tack from port to starboard (or vice versa) with the *STERN* of the yacht going through the eye of the wind.
PORT	The left side of the boat when facing forward.
STARBOARD	The right side of the boat when facing forward.
PORT TACK	Sailing with the wind hitting the port side of the sail.
STARBOARD TACK	Sailing with the wind hitting the starboard side of the sail.
BEARING AWAY	Turning the bow of the boat away from the wind without changing tack.
WINDWARD	Nearest to the wind.
LEEWARD	Furthest from the wind.
LUFFING UP	Turning the bow of the boat towards the wind.
LUFFING THE SAIL	Flapping the luff of the sail.
AFT	The back of or behind the boat.
FORWARD	The front of or in front of the boat ("fo" as in foreign and "red" as in the colour).
ABEAM	At right angles to the boats heading.



COMMANDS

"BEAR AWAY"	The command for "Turn the bow of the boat away from the wind."
"LUFF UP"	The command for "Turn the bow of the boat towards the wind without changing tack." (not going into irons)
EASE SHEETS	Let out the mainsheet.
SHEET IN	Pull in the mainsheet.
PUSH TILLER	Push the tiller away from you (normally towards the sail).
PULL TILLER	Pull the tiller towards you (normally away from the sail).
HEAD DOWN	Duck your head down below the height of the boom.
MOVE FORWARD	Sit further forward in the boat
MOVE AFT	Sit further aft in the boat.
STOP!	Let the sail out and steer a close reach course.

10. POINTS OF SAILING

There are special terms to describe the various angles to the wind when sailing.

1. CLOSE-HAULED

Sailing as close to the angle of the wind as possible (45 degrees approximately). Mainsheet pulled in so that the boom is over the stern quarter (where the stern and the side of the yacht meet).

2. REACHING

Sailing further off the wind than close hauled and with the sheets eased

a. **CLOSE REACH**

Sailing less than 90 degrees to the wind direction, but not close hauled. Sail eased out slightly away from the side of the yacht.

b. **BEAM REACH**

Sailing at 90 degrees to the wind direction. Sail eased out further away (45 degrees approximately) from the centre line of the yacht.

c. **BROAD REACH**

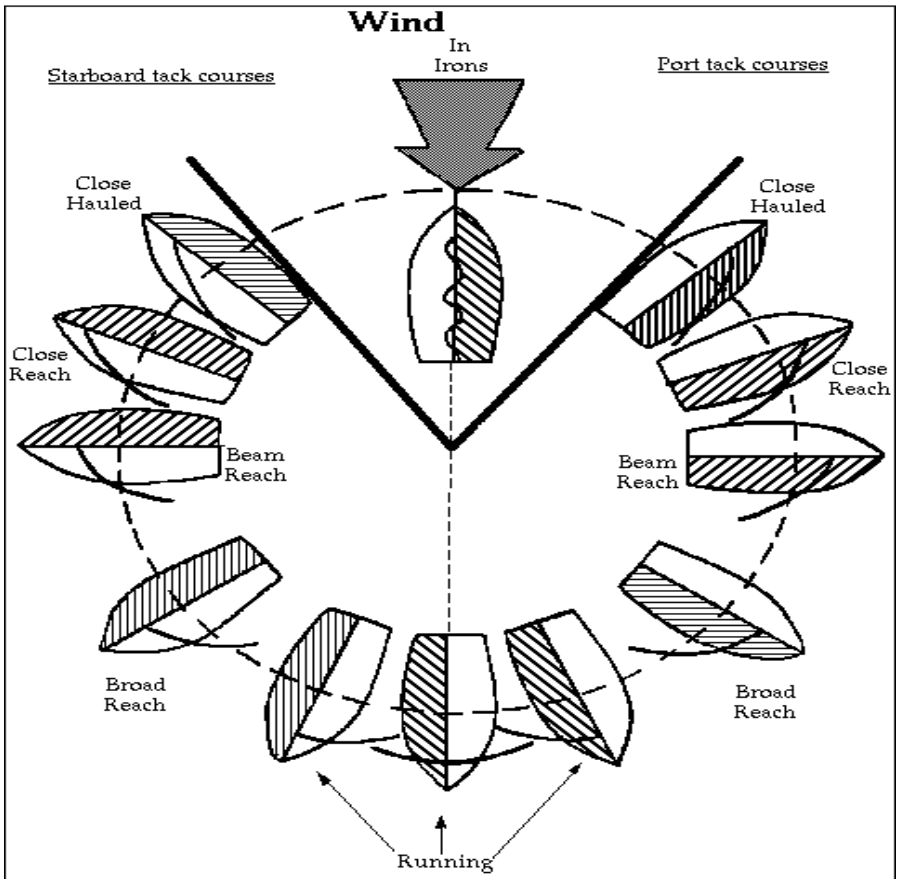
Sailing with the wind aft of 90 degrees to about 165 degrees. Sail let out further from the centre line of the yacht.

3. RUNNING

Sailing with the wind in the 30 degree arc about 15 degrees either side of directly astern of the yacht. Sail eased out to near 90 degrees to centre line of the yacht.

4. IN IRONS

Pointing directly into the wind, sail flapping, probably also going backwards.



11. RIGHTING AN OPTIMIST

How to Capsize

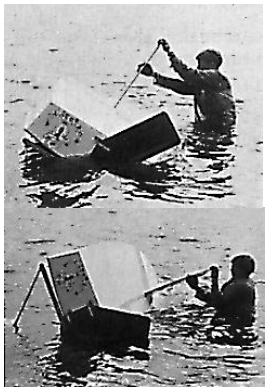
It is important that you are able to capsize (tip your yacht over) in a controlled manner so as to practice righting it again. Your capsize should simulate, as near as possible, that which will happen when things go wrong. Try going about without changing sides in the yacht. Keep the sail sheeted in and the wind in the sail. It is important that you consider safety first, as always, and that your head is not between the sail, boom and the water.

Righting an Optimist

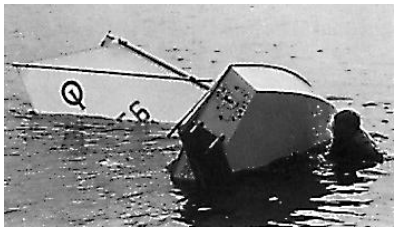
1. If you have capsized in your Optimist, swim to your upturned yacht and hold onto the gunwale. Try to move around to the windward side while still holding on.

2. If you need to be rescued, climb on top of the hull if you can and with both arms straight, raise them slowly up and down to your side, otherwise stay in the water and raise one arm straight above your head. You can remain in the water for sometime in a comfortable tucked sitting position with your buoyancy aid supporting you while you gather your thoughts. Remain calm.

3. To right your yacht, reach up and hold onto the end of the centerboard. Climb up onto the bottom of the boat so that your weight is still on the windward side. Grasp the end of the centerboard with both hands, place feet on the side of the hull and pull the centerboard towards you and down until the yacht is halfway righted. It takes a while for the sail to drag through the water as the mast comes slowly up, so keep the weight on the centerboard until it is half righted.



4. When the yacht is half way up and the mast is now off the water, remove your body weight off the hull and move into the water while still holding onto the centerboard. *Pause before fully righting*. This allows the yacht to use its buoyancy and lift up more out of the water. Less water is likely to remain in the yacht making it quicker to get the yacht sailing again. (An energy saver).



5. Turn the yacht sideways to the wind and unlike other marine situations slide over the side (gunwale) front first and belly flop into the boat. Balance the yacht with your weight immediately, to prevent more water coming in. *You may have to bail some of the water out before climbing in.*

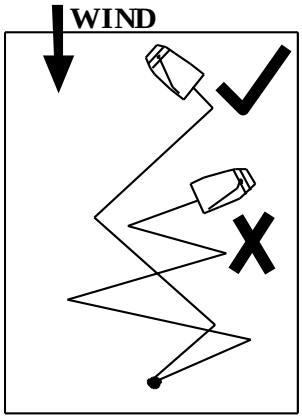
6. Kneeling astride the yacht (unlike the photo) bail all the water out with your bailer. You may, after you have bailed much of the water out, be able to "sail and bail."

7. Take control of your tiller and mainsheet, and continue sailing.

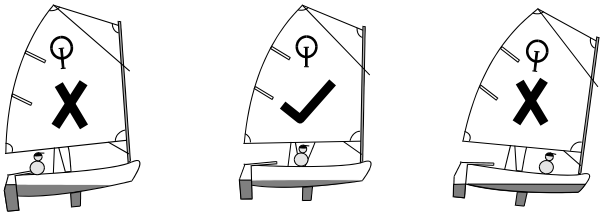
Remember - Whatever happens - "Stay with the yacht"

12. THE FIVE ESSENTIALS OF SAILING

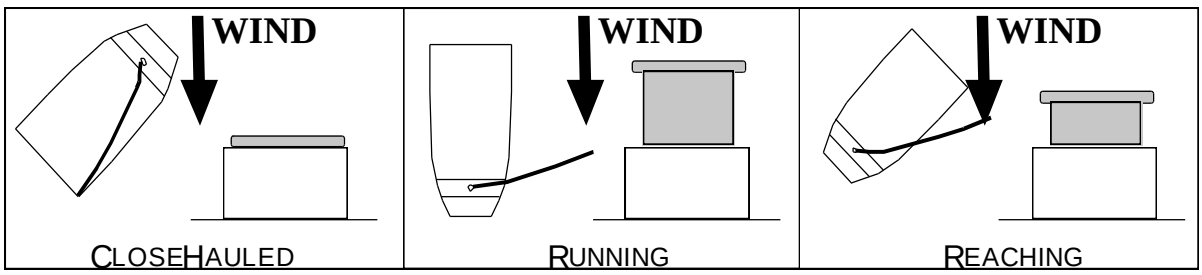
There are five essentials to get right at all times to sail efficiently.



1. **COURSE SAILED** - Normally the quickest way to get somewhere is a straight line but there are an infinite number of courses that take you to windward. One course may be better than another because of tide, wind shadows or hazards. Make your own decisions based on personal observations.
2. **SAIL SETTING** - The angle between the sails and the wind should stay the same (35-45 degrees) on all points of sailing except when running where the sail should be approximately 90 degrees to the wind (refer to Points of Sailing Diagram). Sails should always be "just not flapping." Let out the sails when turning away from the wind and pull them in when turning towards the wind (which will also aid going about). One of the most common faults at this early stage is the failure to sheet out when bearing away (and vice versa).
3. **TRIM** - Sit forward, as near to the forward buoyancy as possible. Only when the wind comes aft and the yacht tends to nose dive do you need to move aft.



4. **BALANCE** - The yacht should always be sailed upright as leaning over can change the sailing characteristics of the boat. There are, however, two exceptions to this golden rule. They are:
   a) In light winds, lean the yacht to leeward (away from the wind). This makes the sail "fall" into shape and also reduces the amount of hull (drag) in the water.
   b) When running, lean the yacht to windward (towards the wind). This raises the boom higher off the water and catches more wind. It also moves the centre of the sail over the yacht to reduce the turning effects of having the sail out to one side.
5. **CENTERBOARD** - The centerboard should be inserted blunt edge forward (like an aero plane wing). It should be down for Close-Hauled, up for Running and half way for Beam & Broad Reaching.

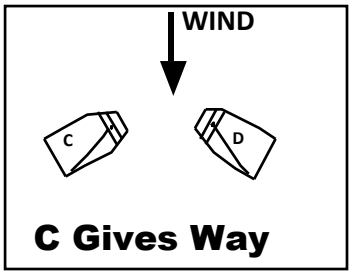


13. SAILING RULES

(not Racing Rules)

THE GOLDEN RULE

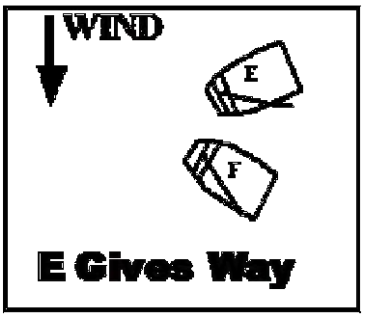
Keep a constant lookout and avoid a collision at all costs.



1. **OPPOSITE TACKS (only)**

   When yachts on different tacks meet, the yacht on port tack must keep clear of and give way to the yacht on starboard tack.

   "Port gives way to starboard.



2. **SAME TACKS (only)**

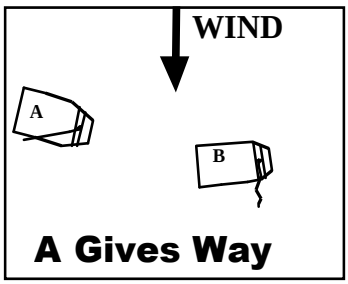
   When yachts on the same tack meet, the windward yacht must keep clear of and give way to a leeward yacht.

   "Windward gives way to leeward."

3. **OVERTAKING**

   When overtaking, whatever it is or whichever tack they are on, the overtaking boat always keeps clear until it is clear ahead. (Racing rules which only apply to yachts in an official race are different).

   "Overtaking boat keeps clear."



NOTE.

Rules (1) to (3) are general collision avoidance rules governed by the International Regulations for the Prevention of Collisions at Sea. Racing rules, which only apply to yachts racing in official races, are considerably different (refer Yachting New Zealand Rulebook).

4. **OTHER safety REQUIREMENTS**

i) **ROUNDING MARKS** - When yachts are about to round a mark, an outside yacht must give inside overlapping yachts room to round the mark safely. Note: give ample room when rounding to avoid fouling the anchor rope.

"Inside yacht gets buoy room!"

ii) **TACKING AND GYBING** - When tacking or gybing, keep clear of other yachts. If you are likely to interfere with another yacht before you have completed your manoeuvre and regained full control, then do not change direction.

"No tacking or gybing too close!"

14. WATERWISE LESSON RECORDS

WATERWISE - LESSON RECORD

Rigging

School _____ Class _____ Date _____

Instructor _____ Helpers _____

NAME									Comments

Rigging Sequence

1. **Check sail before stepping Mast** *(all lashings tight, sprit on correct side, no damage to spars).*
2. **Boat Hull turned into wind**
3. **Step Mast** *(Check Mast restraint).*
4. ***Attach Mainsheet*** (round Turn & 2 Half Hitches on Boom, Reeve through blocks & Fig 8)
5. **Adjust Sail** *(Sprit & Foot (Outhaul) tension)*
6. **Tension Kicker**
7. **Check Safety Gear** *(Painter, Bailer and the Board, Rudder & Mast Restraints)*
8. **Buoyancy Aid** *(Correct size and properly fitted)*

WATERWISE - LESSON RECORD

WATERWISE - LESSON RECORD

Safety Features

School _____ Class _____ Date _____

Instructor _____ Helpers _____

NAME											Comments

Boat Safety

1. Painter
2. Mast Restraint
3. Bailer
4. Centreboard Restraint
5. Craft Buoyancy
6. Stopper knot in Mainsheet
7. Rudder Restraint

Personal Safety

A. Buoyancy Aid *(properly fitted)*

B. Suitable Clothing *(light shoes, hat, clothing appropriate to weather & sun block)*

WATERWISE - LESSON RECORD

Simulator Instruction

School _____ Class _____ Date _____

Instructor _____ Helpers _____

NAME	Sitting Position.	Move Forward/Aft.	Luff up/ Bear Away.	Sheet in/ Ease Sheet.	Changing Sides.	Tiller Towards/ Away.	Going About.	***Comments***

Note - Students should satisfactorily complete the above before proceeding to on water instruction

WATERWISE - LESSON RECORD

Capsize, Under Boat and Swim

School _____ Class_____Date_____

Instructor _____ Helpers _____

NAME									Comments

Capsize & righting Sequence

1. **25 metre swim unaided** *(swimming pool).*
2. **50 metre swim in buoyancy aid** *(on location).*
3. **Capsize leaning against sail** *(to Leeward).*
4. **Swim under upturned hull** *(knock on bottom of hull, recite poem, etc.)*
5. **Right boat from windward side**
6. **Bail from water before entering** *(optional).*
7. **Enter from the side opposite sail**
8. **Boat Trim & Balance while bailing**.

15. EXAMINATION NOTES

You will be expected to know and demonstrate the following

1. NAME THE PARTS OF THE OPTIMIST SAIL AND HULL

2. DEFINE AND USE THE BASIC SAILING TERMINOLOGY

3. RIG AN OPTIMIST

a) Know the correct sequence when rigging;
b) Check for correct set of sail;
c) Boat Safety Features.

4. DEMONSTRATE THE POINTS OF SAILING

a) Close hauled;
b) Close reaching;
c) Beam reaching;
d) Broad reaching;
e) Running.

5. DEMONSTRATE SAILING SKILLS

a) Go about on a figure of eight course.
b) Gybe on a figure of eight course.
c) Beat upwind to a mark.
d) Demonstrate a working knowledge of the Right of Way Rules.
e) Teach the going about and gybing land drills.
f) Demonstrate the use of the Five Essentials (refer to page 21).
g) Demonstrate getting out of irons.

6. CAPSIZE AND RECOVER AN OPTIMIST

a) Capsize in a controlled manner;
b) Swim under an Optimist and show confidence in the water by singing a song while waving a hand outside;
c) Right an Optimist;
d) Bail water out and climb back in (not necessarily in that order).

7. LAY AND RETRIEVE MARKS FOR SAILING

a) For a windward triangular course.
b) For a beam reach figure of 8 course.

8. DEMONSTRATE THE BASIC RIGHT OF WAY RULES