

# MARINERS SKILLS STUDENTS MANUAL 1995

Suitable for syllabus in

Marine Studies and Marine Education (Queensland)  
Marine Studies (New South Wales)  
Maritime Studies (South Australia)  
Senior Science Marine Studies and Nautical Studies (Western Australia)

and  
companion to the textbook

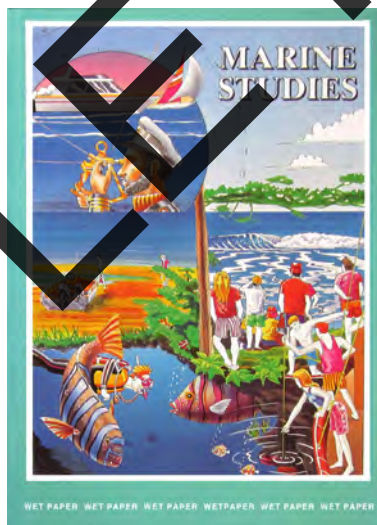
## **MARINE STUDIES**

*A course for senior students*

by

Bob Moffatt

B Sc, Dip Ed, Grad Dip.Ed Admin, MACE



Wet Paper

## TO TEACHERS

To ensure the best quality possible use of this book, Wet Paper offers the following services.

1. For schools who purchase single copies, a free telephone support service is available in office hours by simply telephoning Wet Paper on (075) 972 806 or by faxing your request or leaving a message on our answering machine on (075) 39 4187 any time.
2. For schools who use class sets of the book, an in-service program is available for staff wishing to implement any of the activities. A program can be arranged by contacting the manager.
3. Schools or teachers can write for our complimentary newsletter which outlines conference dates and other seminars where free workshop sessions are held explaining any activities in this book.
4. Equipment used in this book is available for training purposes at our Wet Paper Laboratory and Classroom during office hours. Our address is 14 Milbong Terrace, Queensland, Ashmore, 4214.
5. If we cannot answer your questions, Wet Paper has a team of highly qualified consultants who are willing to assist.
6. As this is the first edition, we welcome comments on any of the activities.

In time, workbooks will be written to indicate the time each activity takes, its sequence and core questions relevant to national syllabus.

As many exercises could take more than two hours, some selection of questions may be necessary before setting students homework.

What's new in this book is the use of photographs for questions and cut and paste exercises; class discussions on safety issues; tables that can be photocopied and used in conjunction with handed in written work; speech bubbles in the radio section and safety information boxes. We welcome feedback on how effective these are in the classroom.

## QUALITY ASSURANCE

Wet Paper is committed to total quality management and the implementation of a quality system throughout each project undertaken, to ensure the highest standards of professionalism, ethical practice and client and customer satisfaction.

Quality assurance is the responsibility of the manager who has the authority to manage all functions to quality, and is the nominated Quality Assurance Manager as defined in AS 3901/ISO 9001.

# CONTENTS

## Section 1 Boating

EXERCISE 1 BOAT PARTS	11
EXERCISE 2 SAILING TERMS	14
EXERCISE 3 EPIRBs	16
EXERCISE 4 SAFETY OF BOAT AND CREW	18
EXERCISE 5 PFDs	20
EXERCISE 6 FLARES	21
EXERCISE 7 RULES AND REGULATIONS	22
EXERCISE 8 THE SKIPPER	23
EXERCISE 9 FIRES AND FIRE EXTINGUISHERS	24
EXERCISE 10 WATER SKI SIGNALS	25
EXERCISE 11 ROPE	26
EXERCISE 12 BOWLINES	28
EXERCISE 13 ROUND TURN AND TWO HALF HITCHES	30
EXERCISE 14 OTHER KNOTS	31
EXERCISE 15 COILING AND THROWING ROPE	34
EXERCISE 16 AVOIDING COLLISIONS	36
EXERCISE 17 WHERE TO TIE KNOTS	38
EXERCISE 18 PARTS OF A LARGER YACHT	39
EXERCISE 19 GLOSSARY OF SAILING TERMS	40
EXERCISE 20 MATERIALS USED IN BOATS	43
EXERCISE 21 HULL DETAILS	44
EXERCISE 22 AT THE DOCK	46
EXERCISE 23 MARINE INSURANCE AND REGISTRATION	48
EXERCISE 24 BEAT THE BUZZER	49
EXERCISE 25 TRAILERS	50
EXERCISE 26 TRAILER MAINTENANCE	52
EXERCISE 27 BUYING A BOAT	53
EXERCISE 28 BOAT SHOW ASSIGNMENT AND HULL PROJECT	54
EXERCISE 29 BOAT BUILDING ASSIGNMENT	55
EXERCISE 30 NAVIGATION LIGHTS ON A BOAT	56
EXERCISE 31 MARINE BATTERIES	58
EXERCISE 32 LARGER VESSEL DECKWORK	59
EXERCISE 33 REVISION TEST	60

## Section 2 Outboards

EXERCISE 34 MAJOR COMPONENTS	67
EXERCISE 35 TOOLS AND THEIR USE	69
EXERCISE 36 STARTING THE MOTOR	70
EXERCISE 37 READING THE MANUAL	73
EXERCISE 38 DIAGNOSIS AND REPAIR	74
EXERCISE 39 THE COOLING SYSTEM	76
EXERCISE 40 LUBRICATION AND MAINTENANCE	78
EXERCISE 41 FUEL SYSTEMS	80
EXERCISE 42 POWER UNITS	81
EXERCISE 43 REVISION TEST	82

## Section 3 Small craft

EXERCISE 44 WHAT TO WEAR	83
EXERCISE 45 WORKING TOGETHER	86
EXERCISE 46 GETTING INTO AND OUT OF A SMALL BOAT	88
EXERCISE 47 SAFETY EQUIPMENT	90
EXERCISE 48 ROWING A BOAT	92
EXERCISE 49 SAFETY INSTRUCTIONS	94
EXERCISE 50 GOING OUT	96
EXERCISE 51 UNDERWAY	98
EXERCISE 52 COMING BACK TO SHORE	100
EXERCISE 53 MOORING AT A JETTY	102
EXERCISE 54 MOORING TO OTHER PLACES	104
EXERCISE 55 LEAVING A JETTY	106
EXERCISE 56 PREVENTING COLLISIONS AT CLOSE QUARTERS	108
EXERCISE 57 PLANING YOUR BOAT	110
EXERCISE 58 CROSSING A WASH AND FIGURE OF EIGHT	112
EXERCISE 59 RECOVERY OF OBJECT FROM WATER	114
EXERCISE 60 PERSON OVERBOARD DRILL	116
EXERCISE 61 ANCHORING	118
EXERCISE 62 THE SAILBOARD	120
EXERCISE 63 THE CORSAIR	122
EXERCISE 64 TACKING AND GYBING	124
EXERCISE 65 THE POINTS OF SAIL	126
EXERCISE 66 CAPSIZE DRILL	128
EXERCISE 67 LAUNCHING A SAILING BOAT	130
EXERCISE 68 REEFING THE SAILS AND MOTORING	132
EXERCISE 69 TOWING	134
EXERCISE 70 FACTORS AFFECTING HANDLING	136
EXERCISE 71 SAFE BOATING	138
EXERCISE 72 REVISION TEST	140

## Section 4 Tides and weather

EXERCISE 73 TIDE TYPES	143
EXERCISE 74 TIDES	145
EXERCISE 75 TIDE CYCLES	148
EXERCISE 76 MODEL FOR DAILY TIDES	150
EXERCISE 77 RULE OF TWELFTHS	152
EXERCISE 78 BAY OF FUNDY	153
EXERCISE 79 TIDAL HEIGHTS AT SECONDARY PLACES	154
EXERCISE 80 CLOUD TYPES	156
EXERCISE 81 SYNOPTIC CHART INTERPRETATIONS	157
EXERCISE 82 WEATHER RECORD	158
EXERCISE 83 YOUR WEATHER MAP	160
EXERCISE 84 WEATHER MAP	162
EXERCISE 85 RECORDS AND EXTREMES	164
EXERCISE 86 WIND SPEED AND DIRECTION	166
EXERCISE 87 RAINFALL	168
EXERCISE 88 REVISION TEST	170

## Section 5 Navigation

EXERCISE 89 MAKING A COMPASS ROSE	173
EXERCISE 90 HYPOTHETICAL BAY	174
EXERCISE 91 LATITUDE, LONGITUDE AND NAUTICAL MILES	176
EXERCISE 92 DISTANCE, SPEED AND TIME	178
EXERCISE 93 PARALLEL RULES, SET SQUARES AND THE COMPASS ROSE	180
EXERCISE 94 TAKING COMPASS BEARINGS	182
EXERCISE 95 DOING COMPASS CONVERSIONS	184
EXERCISE 96 POSITION FIXING	188
EXERCISE 97 LAYING OFF AND PLOTTING	190
EXERCISE 98 BUOYAGE SYSTEMS	192
EXERCISE 99 YOUR LOCAL CHART	194
EXERCISE 100 CHART YOUR SCHOOL OVAL	195
EXERCISE 101 YOUR OWN CHART	196
EXERCISE 102 A3 CHARTWORK	197
EXERCISE 103 CHART 5169 B	200
EXERCISE 104 PLANNING A TRIP	202
EXERCISE 105 REVISION TEST	204

## Section 6 Chartwork

EXERCISE 106 LATITUDE, LONGITUDE AND BEARINGS	207
EXERCISE 107 COMPASS ERROR	209
EXERCISE 108 POSITION	212
EXERCISE 109 COASTAL NAVIGATION	213
EXERCISE 110 SET AND DRIFT	214
EXERCISE 111 RUNNING FIX INCLUDING SET AND DRIFT	215
EXERCISE 112 COMBINED EXERCISE	216

## Section 7 Radio

EXERCISE 113 MAKE A REFERENCE CARD	219
EXERCISE 114 PARTS OF A RADIO	220
EXERCISE 115 TUNING A MARINE TRANSCIVER	222
EXERCISE 116 CONNECTING A 27 MHz MARINE TRANSCIVER TO A BATTERY	224
EXERCISE 117 PRINCIPLES OF TRANSMISSION	226
EXERCISE 118 SENDING A MESSAGE	228
EXERCISE 119 SECURITE	232
EXERCISE 120 PAN PAN	234
EXERCISE 121 MAYDAY	236
EXERCISE 122 MAYDAY VIDEO	238
EXERCISE 123 STUDENT RADIO LOG	239
EXERCISE 124 SIMULATION MAYDAY	240
EXERCISE 125 CHECKING AND CLEANING RADIO COMPONENTS	242
EXERCISE 126 PHONETIC ALPHABET	244
EXERCISE 127 REVISION SHEET	245
EXERCISE 128 REVISION TEST	250

## Section 8 Skindiving

EXERCISE 129 RISK ASSESSMENT	253
EXERCISE 130 SAFETY	254
EXERCISE 131 SNORKELLING VIDEO	257
EXERCISE 132 EQUIPMENT	258
EXERCISE 133 GETTING INTO AND OUT OF THE WATER	260
EXERCISE 134 POOL ENTRIES	262
EXERCISE 135 CLEARING YOUR SNORKEL	264
EXERCISE 136 DUCK DIVING AND HYPERVENTILATING	266
EXERCISE 137 CLEARING YOUR MASK	268
EXERCISE 138 EQUALISING OR CLEARING YOUR EARS	270
EXERCISE 139 FINNING AND PLANNING	272
EXERCISE 140 RESCUE AND FIRST AID	274
EXERCISE 141 THE DIVING BELL	275
EXERCISE 142 BUOYANCY	276
EXERCISE 143 LIGHT AND SOUND	278
EXERCISE 144 SNAIL RESEARCH	280
EXERCISE 145 REEF PROJECTS	281
EXERCISE 146 MAPPING A BOMMIE	282
EXERCISE 147 SCHOOL PROJECT CLUBS	284
EXERCISE 148 UNDERWATER HOCKEY/FISHING	286
EXERCISE 149 REVISION TEST	287

## Section 9 Body surfing

EXERCISE 150 THE BASICS*	289
EXERCISE 151 BEACHES	290
EXERCISE 152 GETTING OUT	292
EXERCISE 153 CATCHING WAVES	294

## Section 10 Managing accidents

EXERCISE 154 HANDLING MARINE CREATURES	297
EXERCISE 155 BOATING	298
EXERCISE 156 WEATHER AND COASTLINES	300
EXERCISE 157 SURFING	302
EXERCISE 158 SUN SENSE	304
EXERCISE 159 MANAGING SKINDIVING ACCIDENTS	308
EXERCISE 160 PHYSIOLOGY FOR MARINE STUDIES STUDENTS	310
EXERCISE 161 CUTS	312
EXERCISE 162 PUNCTURE WOUNDS	314
EXERCISE 163 STINGS	318
EXERCISE 164 BITES	322
EXERCISE 165 HYPOTHERMIA	324
EXERCISE 166 DANGEROUS MARINE ORGANISMS	327
EXERCISE 167 COLD WATER SAFETY	328
EXERCISE 168 REVISION TEST	330

## Consultants

**Dave Claridge**

Marine Education Consultant, Maryborough

**Graham Anderton**

South Fremantle Senior High School

**Gwen Connolly**

St. Augustine's College, Cairns

**Bob Critchley**

Bowen State High School

**Dave Dawson**

Spectrum Management Agency

**Peter Hamlyn**

North Mackay State High School

**Lindsay Holthouse**

Senior Secondary Assessment Board SA

**Tony Isaacson**

Hallett Cove High School SA

**Geoff Jensen**

Innisfail State High School

**Phil King**

Coffs Harbour High School

**Ken Maclean**

Babinda State High School

**John Maloney**

St. Augustine's College, Cairns

**Mick O'Connor**

Ballina State High School

**David Olreichs**

Queensland Transport

**Don Reid**

Gympie State High School

**Mark Rickard**

Benowa State High School

**Graham Rogers**

Clontarf Beach State High School

**Pamela Rutledge**

St. Hildas School Perth

**Kathy Steggles**

Whitsunday Anglican School Mackay

**John Smith**

Environmental Education Consultant SA

**Tim Ryan**

Maryborough State High School

**John Wiley**

Maroochydore State High School

**Alan Wolfe**

South Fremantle Senior High School

# Acknowledgements

## Cover

Merv Smith Studio Designs

## Licences to print existing materials

Peter Chapman, Dan Cross, Bob Critchley

## Permissions

Thanks to the following for giving permission to Wet Paper to reproduce their works  
Minister for Transport (Queensland Transport), Mariner Outboards, Mercury Marine (Brunswick Corporation), Australian Marine Safety Authority, Beach Protection Authority, The Hydrographer for the Navy, Steve Hall, Telecom Australia, Gold Coast Bulletin, Redland Bay Times, Queensland Department of Education, Australian Maritime College, Queensland Health Promotions Unit, Australian Underwater Federation, NAUI (Australia)

## Photographs

Martin Tullemans, Geoff Jensen, Alan Wolfe, Peter Garwood, Paul Boddington, Paul Willison, Phil King. All photographs not acknowledged are by the author

## Illustrations

Sea World, Queensland Transport, Rose Bedford, Sue Oats, Steven Byers, Brady Moffatt, Peter Chapman, Great Barrier Reef Marine Park Authority and Mark Moffatt

## Review

Geoff Waterhouse, Graeme Rolston, Cherie Duney, Capt. Neil Morrison, John Maloney, Gwen Connolly, Peter Langley, Kathy Steggle, Len Couzens, Denise Wright, Peter Slaughter, Greg Lynch, John Wiley, Dave Olreichs, Mark Rickard, Alan Perry, Alan Wolfe, Lindsay Holthouse, James Organ, Peter Allen, Tim Ryan, David Claridge, Geoff Jensen, Gwen Connolly, Peter Hamlyn, David Kopelke, Ann Kenny, Phil King, Alan Wolfe, Don Reid, Mick O'Connor and Ken Maclean

## Additional advice and assistance

Jan Thornton, Greg Lynch, Don Reid, Ted Brambleby, Neville Coleman, Queensland Ambulance Service, David Kopelke, John Smith, James Organ, Hans Telford, Karl Kuhl, Ms Colleen Loughton (Australian Underwater Federation), Mark Snart, Jenny Hewson, Howard Gray (Geraldton Senior High School), Peter Jordan, Darelle Abbey, Col Colston, Con Kontos, Ron Jensen, Ross Macdonald, Greg McGarvie, Don Reid, Kelvin Rodgers, Roger Townsend, Greg Wirth, Joe Zmay, Robert Walker, Andrew Gohl, Keith Davey, Colin Denney, Terry Morrison (NAUI), David Cummins and David Gray (AMSA), Rod Waldon, Tony Failles, Mark Warne, Carol Clavery, Kelvin Rodgers, Dennis Bridger, Australian Government Publishing Service, Don Fee and Thelma Moffatt

## Schools equipment and students

Grateful acknowledgement is made of the following schools who assisted with photographic shoots, equipment and advice

Benowa State High, Coffs Harbour High, South Fremantle High, Gympie State High, Clontarf Beach State High, Innisfail State High, Expedition Boat Shed, Fremantle and to all schools who responded to our survey faxbacks for indicating that this publication was viable.



# SECTION 1

# BOATING

## EXERCISE 1

## BOAT PARTS

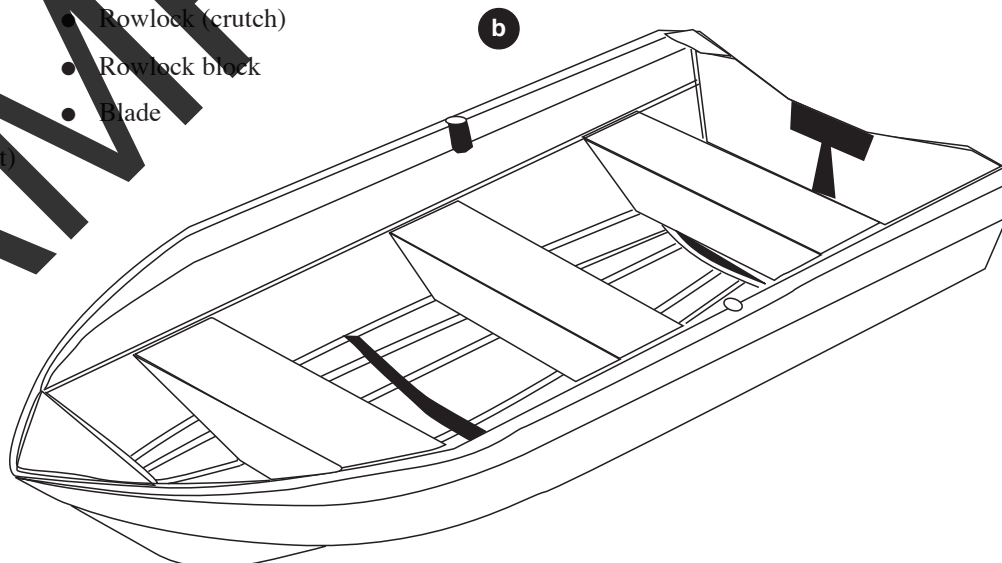
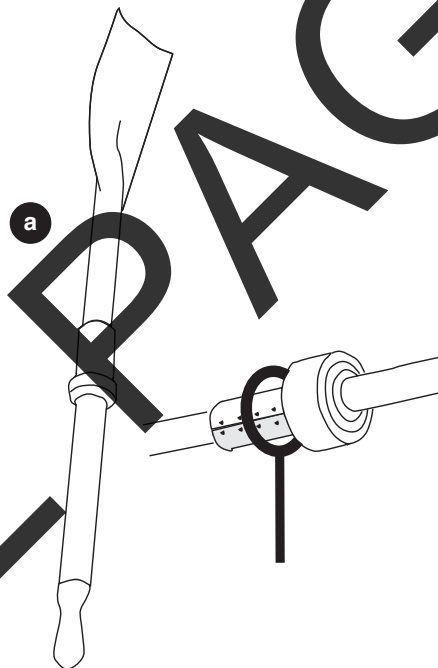
For some of you, using a small boat will involve learning a new vocabulary. This exercise introduces you to some new words and terms.

### QUESTIONS

Use your textbook index to find the word *port*. Now turn to the page which discusses it in your textbook and answer the following questions.

1. Use your textbook to identify the following terms and mark their location on the drawings in Figure 1.1.a and Figure 1.1.b.

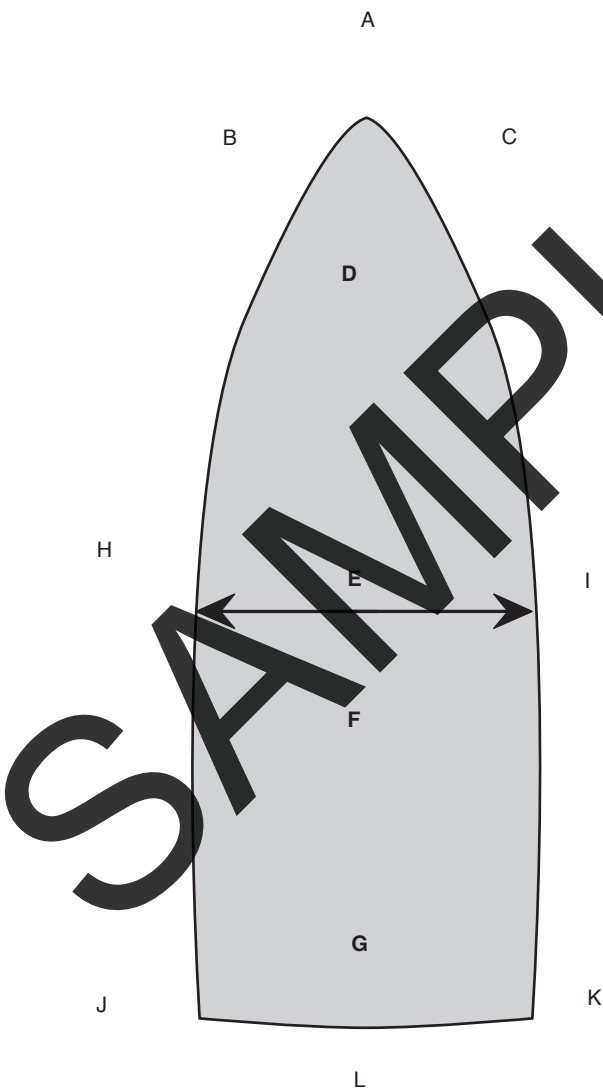
- Stern
- Bow
- Transom
- Keel
- Ribs
- Gunwale
- Seat (Thwart)
- Keelson
- Grip
- Shaft
- Oar stop
- Rowlock (crutch)
- Rowlock block
- Blade



**Figure 1.1** Students may make one copy of this page so that they can attach their answers before handing in for marking.

Bob Moffatt

2. Redraw the boat outlines in Figure 1.2 and use the list below to mark in the following places.
- Ahead
  - Astern
  - Port bow
  - Starboard bow
  - Forward
  - Aft
  - Beam
  - Port quarter
  - Starboard quarter
  - Deck area
  - On the port bow
  - On the starboard bow
  - Athwartships
3. Read the information box in Figure 1.3 and complete definitions for the words listed in Figure 1.4



**Figure 1.2** Places on a boat/ship/dinghy  
Bob Moffatt

### Writing definitions

In writing definitions, the following format could be used.

Item ... class ... distinguishing feature ... example.

#### Example

1. The definition of the word, 'Runabout', could be written as follows:

A runabout is an open vessel which has been fitted with either an outboard or inboard engine.

Item ... A runabout

Class ... is an open vessel

Distinguishing feature ... which has been fitted with either an outboard or inboard engine

2. Note that not all definitions require an example.

#### Task

Identify the parts of the following definition.

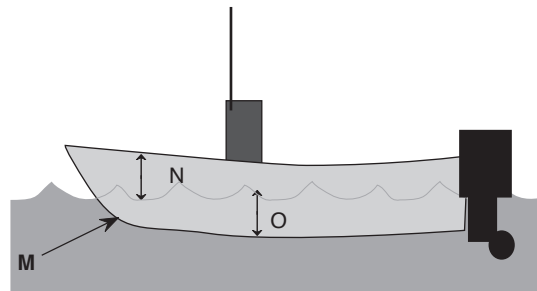
Motor cruisers are open vessels, ranging from 7 m to 18 m or more in length, and are designed for cruising, living and sleeping on board in comfort.

Item:

Class:

Distinguishing feature:

**Figure 1.3** How to write definitions (based on an original activity by Gwen Connolly, St, Augustines College, Cairns).



Term	Definition
e.g. deck	The deck is the part on a boat which occupies the entire floor space such as the area inside a dinghy under the seats. <small>Item      Class      Distinguishing feature      Example</small>
Stem	
Stern	
Bow	
Transom	
Keel	
Ribs	
Gunwale	
Oarlock socket	
Seats	
Keelson	
Rowlock	
Shaft	
Oar stop	
Grip	
Blade	
Ahead	
Astern	
Port bow	
Starboard bow	
Forward	
Aft	
Beam	
Port quarter	
Starboard quarter	
Deck area	
On the port bow	
On the starboard bow	
Athwartships	

SAMPLE PAGE



Figure 1.4 Students may make one copy of this page so that they can attach their answers before handing in for marking.

# EXERCISE 2

## SAILING TERMS

---

### QUESTIONS

1. Select a new page in your notebook and redraw the illustration on this page.

Draw in pencil first and then ink in the drawing.

2. Use the textbook to mark in the following parts.

- Weather vane
- Headboard
- Mast
- Batten
- Leech
- Luff
- Shroud
- Mainsail
- Clew
- Foot
- Boom
- Block
- Mainsheet
- Jib sheet
- Figure of eight knot
- Tiller
- Rudder
- Centreboard
- Cleat
- Jib
- Gooseneck
- Stays

3. Complete Figure 2.1 with the aid of your textbook.

