

SQA Advanced Unit Specification

General information for centres

Unit title: Chartwork and Tides (SCQF level 7)

Unit code: HW6P 47

Superclass: ZS

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Unit purpose

This unit will introduce learners to using, caring for and the correction of charts and publications carried aboard ship. It is also about position fixing using charted objects, determining the compass course to steer and counteracting tidal stream and leeway to make passage plan way points by measurement from the chart. It also covers the general theory on the cause of tides, which includes calculations involving times and heights of tides worldwide. It is primarily aimed at learners who intend to seek sea-going employment as a Merchant Navy Deck Officer. However it could also be studied by someone with an interest in the subject area.

Outcomes

On successful completion of the unit the learner will be able to:

- 1 Identify recommended procedures to ensure that all charts and publications are maintained and corrected.
- 2 Use Mercator charts for visual position fixing methods.
- 3 Use chartwork techniques to amend and update the vessel's passage plan.
- 4 Use tidal terminology and calculate times and heights of tides worldwide.

Credit points and level

2 SQA Credits at SCQF level 7: (16 SCQF credit points at SCQF level 7)

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Recommended entry to the unit

Access to this unit is at the discretion of the centre. However learners would benefit most from this unit if they have successfully completed the *Marine Induction Course* associated with the SQA Advanced Certificate/Diploma in Nautical Science, or have the required seetime as laid down by the Maritime and Coastguard Agency for those learners not following an approved training scheme.

Core Skills

Achievement of this Unit gives automatic certification of the following Core Skills component:

Complete Core Skill	Numeracy at SCQF level 6
Core Skill component	Critical Thinking at SCQF level 6

There are also opportunities to develop aspects of Core Skills which are highlighted in the support notes of this unit specification.

Context for delivery

If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

SQA Advanced Unit Specification: Statement of standards

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Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Identify recommended procedures to ensure that all charts and publications are maintained and corrected.

Knowledge and/or skills

- ◆ Types of charts
- ◆ Carriage of nautical publications
- ◆ Storage and handling of charts
- ◆ Procedures for ordering charts and publications
- ◆ Correction logs for charts and publications
- ◆ Contents and use of chart catalogue
- ◆ Weekly and cumulative lists of admiralty notices to mariner
- ◆ Commercial systems for maintaining charts and publications

Outcome 2

Use Mercator charts for visual position fixing methods.

Knowledge and/or skills

- ◆ Navigational properties of a Mercator chart
- ◆ Plotting positions on a chart
- ◆ Chart symbols
- ◆ True, gyro and compass courses
- ◆ Chartwork techniques to determine position
- ◆ Dead reckoning and estimated positions using water and ground tracks
- ◆ Estimated Time of Arrival (ETA) to reach a given position

Outcome 3

Use chartwork techniques to amend and update the vessel's passage plan.

Knowledge and/or skills

- ◆ Principles of passage planning
- ◆ Appropriate regulations and guidelines in passage planning
- ◆ Adjustments to the vessel's course and speed to take account of passage plan requirements

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Outcome 4

Use tidal terminology and calculate times and heights of tides worldwide.

Knowledge and/or skills

- ◆ Theory of tides and their causes
- ◆ Tidal definitions and calculations
- ◆ Admiralty tide tables and tidal software

Evidence requirements for this unit

Learners will need to provide written and/or oral recorded evidence in supervised open-book conditions using centre provided, MCA approved data sheets, publications, navigation tables and formulae sheet to demonstrate their knowledge and/or skills across all outcomes.

Outcome 1 to 4 can be combined for assessment and will be assessed by open-book under supervised conditions not exceeding three hours. However, Outcomes 1 to 4 may be assessed separately.

The appropriate admiralty exercise charts will be used as necessary.

Admiralty tide table extracts from the SQA/MCA extracts folder will be used where appropriate.

Outcome 1

For Outcome 1 a minimum of two out of four knowledge and skills should be sampled. A different sample should be used on each assessment occasion.

Learners are required to provide written and/or oral recorded evidence to demonstrate their knowledge and/or skills by showing they can:

- 1 Identify types of charts that must be carried on board a vessel and describe the information contained in these charts.

On each assessment opportunity learners must describe the information on a Mercator chart and also a gnomonic chart or an admiralty routeing chart.

- 2 Describe the contents of publications that are required by law to be carried on board vessels.

Evidence can be produced by the learners demonstrating their knowledge from a sample of four of the publications which are required to be carried on board a vessel as stated in the Convention on Safety of Life at Sea (SOLAS) Chapter Five.

- 3 Describe the correct procedure for the handling, storage and ordering of charts.
- 4 Explain the procedure for ensuring that charts and publications are maintained and corrected up to date.

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Outcome 2

For Outcome 2 a minimum of two out of five knowledge and skills should be sampled. A different sample should be used on each assessment occasion.

Learners are required to provide written and/or oral recorded evidence to demonstrate their knowledge and/or skills by showing they can:

- 1 Determine the ship's position by use of horizontal sextant angle technique.
- 2 Determine the ship's position using the distance of a light(s) or prominent object(s) and/or using luminous range diagrams or distance tables.
- 3 Running fix calculation/construction.
- 4 Dead reckoning or estimated position calculation/construction.
- 5 ETA calculation/construction.

In one calculation the learner should be required to convert gyro courses and bearings to true bearings whilst in another question, compass courses and bearing should be converted to true bearing etc.

Outcome 3

For Outcome 3 a minimum of two out of three knowledge and skills should be sampled. A different sample should be used on each assessment occasion.

Learners are required to provide written and/or oral recorded evidence to demonstrate their knowledge and/or skills by showing they can:

- 1 Explain the four stages involved in the making of a passage plan, including any special requirements for specific navigational scenarios.
- 2 Identify and use the content(s) of the appropriate regulations and guidelines available in relation to 1.
- 3 Find the appropriate true, compass or gyro course(s) to steer and or speed or ETA to reach a given waypoint taking into account tide and leeway.

In the case of 3 above this can be achieved by sampling two of the following calculations/constructions:

- (a) Course to counteract the current and leeway.
- (b) ETA at given point with current and leeway.
- (c) Course and speed required to counteract a current and leeway.
- (d) Actual set and drift experienced.

Any of these two elements can for practical purposes be combined into a single calculation/construction.

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Outcome 4

For Outcome 4 a minimum of two out of four knowledge and skills should be sampled. A different sample should be used on each assessment occasion.

Learners are required to provide written and/or oral recorded evidence to demonstrate their knowledge and/or skills by showing they can:

- 1 Explain the causes of spring and neap tides.
- 2 Define tidal terms.
- 3 Perform calculations involving air draughts and under-keel clearances and required height of tide.
- 4 Use the admiralty tide tables and tide curves to calculate the height of tide at a given time and/or the time the tide will reach a given height in the European or Pacific areas.

On each assessment occasion learners will be required to perform one calculation to determine the required height of tide at a specified time and one calculation to determine the required time the tide will be at a specified height.

Elements 3 and 4 above can be combined within a single calculation.

Learners should also give a detailed explanation of the causes of either spring or neap tides.

SQA Advanced Unit support notes

Unit title: Chartwork and Tides (SCQF level 7)

Unit support notes are offered as guidance and are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 80 hours.

Guidance on the content and context for this unit

The content of this unit forms part of the underpinning knowledge for an MCA Officer of the Watch Certificate of Competency and accordingly reflects the content of the International Maritime Organisation's Standards for Training Certification and Watchkeeping (STCW).

The following notes give additional information on the knowledge and skills for each of the outcomes.

Outcome 1

Learners will understand the information contained in nautical charts and in nautical publications. They will be shown how to order, store and correct these charts and publications in order to keep them up to date as per the required maritime legislation.

Outcome 2

This outcome will develop the learner's knowledge of Mercator charts and how to use them in coastal navigation.

It will also give them the required knowledge and techniques to find a vessel's position using a variety of methods utilising the geographical and topographical features on the chart, and to fix a vessel's position using compass bearings, radar ranges and other coastal navigation techniques.

They will learn about the effect of tide and wind on the vessel and where to find and how to use this information to establish the vessel's present or future predicted positions.

Outcome 3

This outcome follows on from the previous two, in further expanding the learner's knowledge of the use of navigational charts and publications, with particular reference to the planning of a safe passage from one place to another.

The learner will also be shown how to counteract the effect of tide and wind to safely arrive at given points identified during the planning process.

Outcome 4

This outcome gives the learner the knowledge to understand the theory and causes of tides. They will also be able to calculate the times and heights of tide at primary and secondary ports throughout the world.

Learners will also be shown various computer programmes and software available to calculate tidal heights and times.

Guidance on approaches to delivery of this unit

This unit is primarily intended for learners who are new entrants to the Merchant Navy via one of the Merchant Navy Training Board (MNTB) approved deck cadet training schemes or for seafarers who are enrolled on an Officer of the Watch (OOW) course. Ideally learners would have accrued some shipboard experience prior to attempting this unit although this is not a prerequisite.

The knowledge and skills contained within this unit cover all the requirements as laid down by STCW 95 at the operational level.

Completion of this unit will also ensure that the learner complies with all requirements laid down by the UK Maritime and Coastguard Agency (MCA) for the issue of an Officer of the Watch Unlimited, Certificate of Competency as a Deck Officer. The required knowledge and skills for MCA certification can be found in a document detailing the requirements for the issue of an Education and Training Certificate (A&B), which is available from the MNTB.

Learners will benefit most if this unit is delivered in conjunction with the unit *Navigational Mathematics and Science*. They should also be able to draw on the knowledge gained from the *Marine Induction Course* as well as experience gained from service at sea.

Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Written and/or recorded oral evidence in supervised open-book conditions is required for Outcomes 1 to 4 which can be combined and should not exceed three hours. However, Outcomes 1 to 4 may be assessed separately.

Where sampling is used a different sample should be used on each assessment occasion.

Centre provided, MCA approved data sheets, publications, navigation tables and formulae sheet will be used and the appropriate admiralty exercise charts will be used as necessary.

Admiralty tide table extracts from the SQA/MCA extracts folder will be used where appropriate.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

Opportunities for developing Core and other essential skills

This Unit has the Core Skill of Numeracy embedded in it, so when learners achieve this Unit their Core Skills profile will be updated to show that they have achieved Numeracy at SCQF level 6.

This unit also has the Critical Thinking component of Problem Solving embedded in it. This means that when learners achieve the unit, their Core Skills profile will also be updated to show they have achieved Critical Thinking at SCQF level 6.

Information and Communication Technology (ICT) can be developed in the unit and SCQF level 5 *Communication* can be developed through the reading and analysis of information and report writing. Oral Communication can be assessed during oral assessment.

History of changes to unit

Version	Description of change	Date

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SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

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General information for learners

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This section will help you decide whether this is the unit for you by explaining what the unit is about, what you should know or be able to do before you start, what you will need to do during the unit and opportunities for further learning and employment.

This unit is designed to provide you with the knowledge and skills required to navigate a vessel through coastal waters to the standards laid down by STCW 95 and the MCA for Officer of the Watch.

The ability to do moderately complex arithmetical calculations and manipulate simple equations will be required, however this ability will have been more than covered in the mathematics content of the induction phase or distance learning mathematics pack.

Use of tabular and graphical information is central to much of the content of the outcomes as is the ability to understand certain concepts of the factors which affect a vessel's movement due to tide and wind.

You will be required to be able to understand the concepts required to plan a passage between two points, calculate the required courses between those points and adjust the course to take into account tide and wind. The time and height of tide at a given point will also be calculated.

Assessment may take the form of a written project or oral and practical demonstration for Outcome 1.

Written and/or recorded oral evidence in supervised open-book conditions is required for Outcomes 1 to 4 which can be combined and should not exceed 3 hours. However, Outcomes 1 to 4 may be assessed separately.

Centre provided, MCA approved data sheets, publications, navigation tables and formulae sheet will be used and the appropriate Admiralty exercise charts will be used as necessary.

Admiralty tide table extracts from the SQA/MCA extracts folder will be used where appropriate.

This unit has the Core Skill of Numeracy embedded in it, so when you achieve this Unit your Core Skills profile will be updated to show that you have achieved Numeracy at SCQF level 6.

This unit also has the Critical Thinking component of Problem Solving embedded in it. This means that when you achieve the unit, your Core Skills profile will also be updated to show you have achieved Critical Thinking at SCQF level 6.