

Tides

Sample Programme and Session
Plans

BCAB Tides Module

Sample Programme and Session Plans

This document provides an example programme of the British Canoeing Awarding Body (BCAB) Tides module and the accompanying plans for the 6 activities.

Tutors are required to obtain, understand and consider the participants' current understanding, knowledge and the craft and environment that they paddle. This can be done prior to activity 1 through introductions or part of a more formal process.

Notes:

1. Tutor to participant ratio is maximum 1:8.
2. A [module specific eLearning](#) is also available to learners, which could be considered as an appropriate method of a learner accessing the information or used to compliment delivery.
3. Tutors are required to consider the aspirations of the learners and develop their knowledge appropriately in the context of where they are paddling. For aspirants Leaders that want to operate on the sea, additional methods and practices may need to be covered.
4. If delivering using a blended approach, (on and off the water), Tutors are required to obtain an understanding of water confidence and ability in the environment that will be used. This can be done through introductions or part of a more formal process.

The main focus for the Tutor is to ensure all participants are able to contribute, explore and practice. The 3-hour module does not take into account introductions, information gathering, administration or any logistics. The timings provided are for the delivery of the activities.

All activities are interactive sessions, discussing and using resources, exploring and practising the knowledge to better understand the tides to aid decision making and planning.

Participant prerequisites

- There are no prerequisites for this module.
- Tutors should check participants' suitability to attend the course, as well as having appropriate mechanisms for anyone under 18.

Venue

The Tides module can be delivered online, blended or face to face, of which Tutors should ensure all participants are able to engage throughout.

Course duration

The Tides module is a minimum of a 3-hour programme that consists of 6 activities, which can be delivered in one session or modular.

Weather Module

Activity	Time	Activity Outline
Activity 1	30 minutes	Tidal information for paddlesports <ul style="list-style-type: none"> • Different sources • Understanding spring and neap tides
Activity 2	40 minutes	Components of tides <ul style="list-style-type: none"> • High and low water - flood and ebb • Range • BST and GMT • Environmental factors affecting tide heights
Activity 3	30 minutes	Tidal flow <ul style="list-style-type: none"> • Rule of thirds • Trip application • Environmental considerations - wind against/wind with tide
Activity 4	30 minutes	Tidal windows <ul style="list-style-type: none"> • Tidal diamonds • Sources of information • Trip application
Activity 5	20 minutes	Depth of tide <ul style="list-style-type: none"> • Rule of twelfths • Trip application
Activity 6	30 minutes	Environmental considerations <ul style="list-style-type: none"> • Headlands and reefs (bathymetry) • Races and overfalls • Complex coast - South Coast • Environmental cues

Tides Module

Activity 1

Activity Title:	Tidal information for paddlesports
Time:	30 minutes
Activity Outline:	
<ul style="list-style-type: none"> • Different sources • Understanding spring and neap tides 	
Delivery:	
<p>Different sources:</p> <p><i>Keep focus wide - detail will be added throughout the module - avoid overloading learners.</i></p> <p>Using resources, explore and then compare different sources of tidal information, taking into consideration what information is available.</p> <p>Potential sources such as pictures and screenshots (representing different geographical areas): Tide table booklets / Apps and websites / Guide books / Charts / Almanacks.</p> <p>Explore what information in the resources may be useful to paddlers</p> <p>Avoid using just the participants' local areas, select a range of typical example areas.</p> <p>In some parts of the country (e.g., South Devon and Dorset coast), there may only be a small difference (range) between the HW and LW heights. Whereas in other parts of the UK (e.g., Bristol Channel and Pembrokeshire), the difference (range) can be significant, up to 15 metres. Having a good understanding of the tidal environment in which you paddle is crucial to safe and enjoyable trips and expeditions.</p>	

Suggested activity: Using a chart (paper or electronic), circle anything that might have something to do with tidal: height, flow direction, absence of, spring, neap etc. This is an opportunity for learners to see a nautical chart and the information available to them that is not present on an OS map.

Understanding Spring and Neap Tides:

Explore existing knowledge and fill in gaps in understanding of spring and neap tides.

Revisit or introduce tide tables to see if learners can identify the spring and neap tides. Note: If using the example from the eLearning, explain that it has been simplified for ease of understanding and then show a real time tide table.

Discuss general rules associated with spring and neap tides - such as:

- 7 days (approximately) between spring and neap tides.
- Spring tides occur 1-2 days after full or new moons
- There is approximately twice as much water moving about each tide when you compare a neap to spring tide.
- Large equinoctial tides in the Spring and Autumn and their cause.

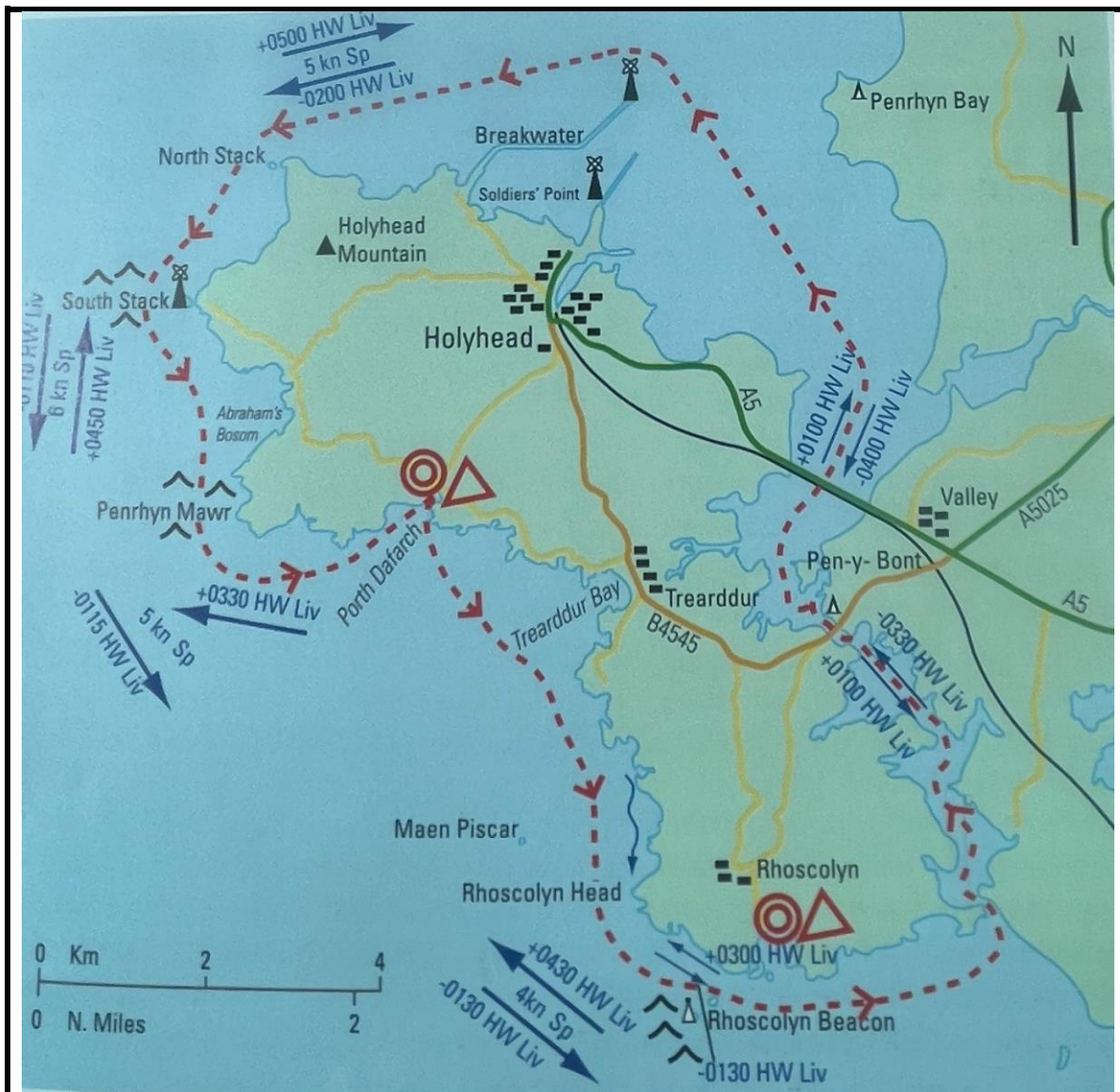
Suggested Activity

1. Encourage learners to identify today's HW and LW times and where this sits in the spring/neap cycle. Explain the reason behind the variations from secondary ports when using different sources for the same location.
2. Have cards with different phases of the moon on them - do they relate to spring or neap tides (roughly)? Extension task - add a date, i.e. 23rd September and 23rd December, how will these tides differ?

Tides Module

Activity 2

Activity Title:	Components of tides
Time:	40 minutes
<p>Activity Outline:</p> <ul style="list-style-type: none"> • High and low water - flood and ebb • Range • BST and GMT • Environmental factors affecting tide heights 	
<p>Delivery:</p> <p>It is envisaged that the following will be covered through the exploration of a practical example, rather than several individual sections.</p> <p>High and low water - flood and ebb:</p> <p>Introduce the concept of flood and ebb tides, ensuring that learners understand that tides typically flow along the coastline as opposed to flowing in and out from the beach.</p> <p>Be aware of potential confusion with wind direction from the weather module. A useful phrase for learners might be: ‘Winds and tides come and go’ i.e. an easterly wind comes from the East, an easterly tidal flow goes East.</p> <p>Ensure that learners are aware of the concept of slack water and that it doesn’t necessarily coincide with high water and low water, which is why paddlers use pilots, tidal diamonds, tidal atlas, etc., to work out slack water.</p> <p>Suggested Activity</p> <p>What direction are the tides flowing at a given point on the below diagram? What speed would it be travelling on a neap tide?</p>	



Pesda Press – Welsh Guidebook

Range:

Explore learner understanding of tidal range. Use the HW and LW information from the first section to work out the range for a given date and location. Introduce chart datum as a concept and its implications throughout different times of the year.

BST and GMT:

British Summer Time and Greenwich Mean Time - discuss how to work out if tide tables are in GMT or have been adjusted for BST and the implications for getting this wrong when planning trips.

Environmental factors affecting tide heights:

Explore the following phenomena and their effects on tides, giving examples where appropriate:

- Extremes in high and low atmospheric pressure systems (see weather module),
- Narrow inlets and estuaries creating tidal bores,
- Perigee, Apogee and Perihelion tides.

Suggested Activity

Use of images - Look at the dates and heights of the tides for a location. Can they match the Perigee, Apogee and Perihelion tides to the correct image?

Tides Module

Activity 3

Activity Title:	Paddling with Tidal Flow
Time:	30 minutes
Activity Outline:	
<ul style="list-style-type: none"> ● Rule of Thirds ● Trip application ● Environmental considerations - wind against/wind with tide 	
Delivery:	
<p>Introduce the concept that the “rules” that will be introduced over the next three activities are general “rules of thumb” rather than absolute fact. It is possible to use the different rules interchangeably but this can be confusing. For this module, we will have one practical application for each rule.</p>	
Rule of Thirds:	
<p>The rule of thirds is a quick and easy way to work out how much the tidal drift will help or hinder a paddler over a given time - remember this is an approximation.</p>	

Rule of Thirds

1/3 of max rate first hour (1knt)

2/3 of max rate first hour (2knts)

3/3 of max rate first hour (3knts)

3/3 of max rate first hour (3knts)

2/3 of max rate first hour (2knts)

1/3 of max rate first hour (1knt)

3 Knots Max Rate

Example: If we took the second hour of the above table (2 knots) and we travelled with the tide for that hour at a speed of 3 knots (typical average speed for a sea kayak). Then we would put the effort in to cover 3 nautical miles but would actually cover 5 nautical miles over the ground. If we were against the tide, we would put the effort in to cover 3 nautical miles, but because we have 2 knots of tide against us, we would actually only cover 1 nautical mile over the ground.

Trip Application - Suggested Activity

You intend to Stand Up Paddleboard from Gore Point to Minehead Bluff on a Neap tide. You decide to set off in the second hour to get the most assistance from the flood tide without exceeding the 2 knots of tidal flow outlined as the upper remit for some leadership awards.

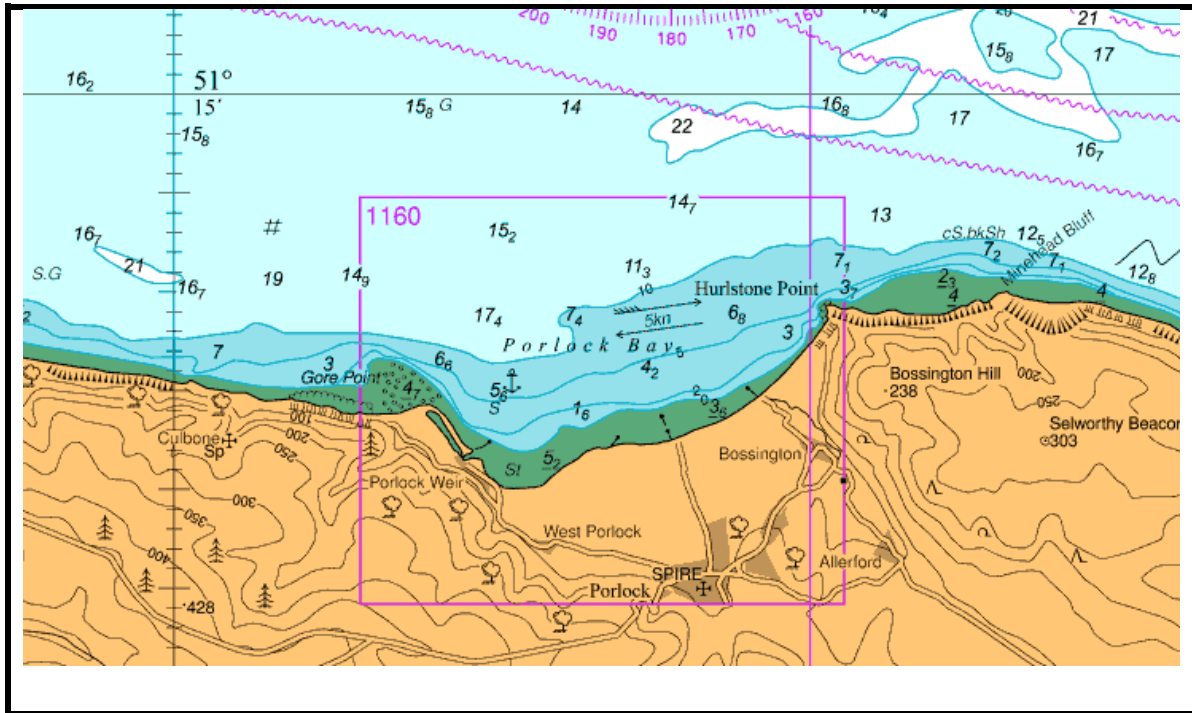
- Low water 08:00 - High water 14:00
- Average paddling speed of 2 Knots
- Light, Westerly wind, F2 on the Beaufort scale.

Using the map and chart below, work out the following:

- How far is it to travel?
- What time will you leave and arrive?
- How fast will you be travelling?
- Potential hazards?
- What would this trip look like if we had a F3 (F4) wind from the East?

Remember, keep it simple. It doesn't have to be exact to the nearest second/decimal point, it just has to work for you.





Tides Module

Activity 4

Activity Title:	Tidal windows
Time:	30 minutes
Activity Outline:	
<ul style="list-style-type: none"> • Sources of information • Tidal diamonds • Trip application 	
Delivery:	
<p>Sources of Information:</p> <p>Provide participants with an understanding of why we might need to time our arrival at specific points (headlands, estuary mouths, overfalls) along the coast for reasons of; safety, experience, enjoyment, learning, etc. These points often have specific sources of information such as guide books, flood and ebb arrows on charts and tidal stream atlases - explore these with learners. Ensure that participants understand that the area they are paddling may not always be close to the standard port, i.e., they might be paddling around Lands End but the standard point the tidal stream atlas, tidal diamond, etc., relates to is Dover, which is 350 miles away.</p>	
<p>Tidal Diamonds:</p> <p>Explore tidal diamonds with participants and make the link between them and tidal stream atlases, guidebooks, apps etc. Remind participants that these flow rates are averages rather than definitive and there will be variations throughout the year. Looking at a chart, can they start to identify commonality in the situation of tidal diamonds?</p>	
<p>Trip Application - Suggested Activity</p> <p>If you want to paddle across to the Isle of Wight from Hurst Point to Fort Albert, you can see from the chart that the tidal flow will not be able to assist you as you</p>	

are paddling across it rather than with it. High water Portsmouth is at 13:00 and the wind is light and from the South West.

Can you?

- Using tidal diamond 'E' identify a tidal window that would make the crossing as efficient as possible?
- Are you going on a Spring or a Neap tide?
- Identify where you could start your journey from on the mainland and work out a ETD (Expected Time of Departure), a time you'd start the crossing and an ETA (Expected Time of Arrival) at a location of your choosing on the Island?
- What weather conditions would make this uncomfortable or even dangerous?

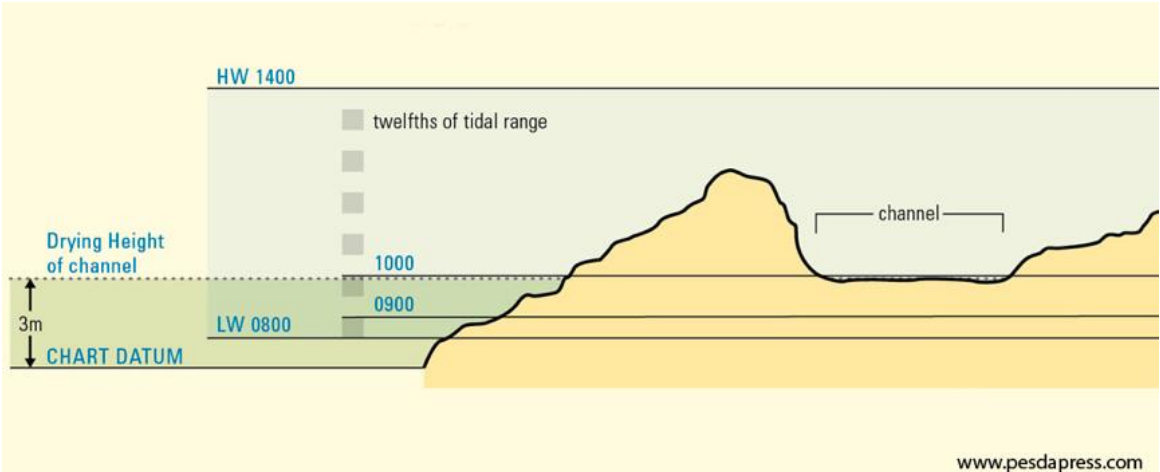


Tidal Streams referred to HW at PORTSMOUTH											
Hours	Geographical Position	A 50°35' 5 N 1 38 6 W	B 50°39' 0 N 1 37 5 W	C 50°33' 9 N 1 29 3 W	D 50°25' 0 N 1 25 0 W	E 50°35' 9 N 1 23 0 W					
Before High Water	Directions of streams (degrees)	075	083	094	087	129					
		083	076	100	092	127					
		086	082	102	098	125					
		088	083	101	097	120					
		091	074	102	093	109					
		097	074	106	104	320					
High Water	Rates at spring tides (knots)	255	268	282	258	302					
		265	264	285	276	300					
		267	258	286	270	300					
		265	245	281	272	301					
		266	241	283	280	290					
		272	258	310	290	135					
After High Water	Rates at neap tides (knots)	063	048	090	069	129					
		083	076	100	092	127					
		086	082	102	098	125					
		088	083	101	097	120					
		091	074	102	093	109					
		097	074	106	104	320					

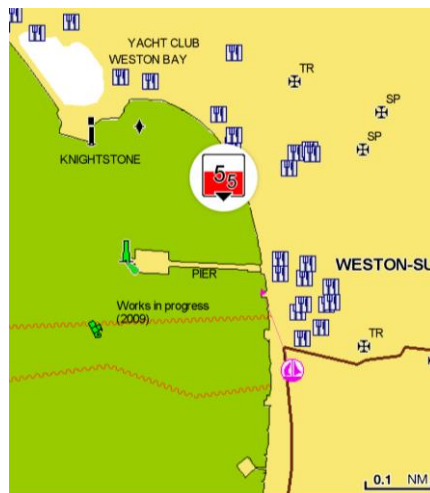
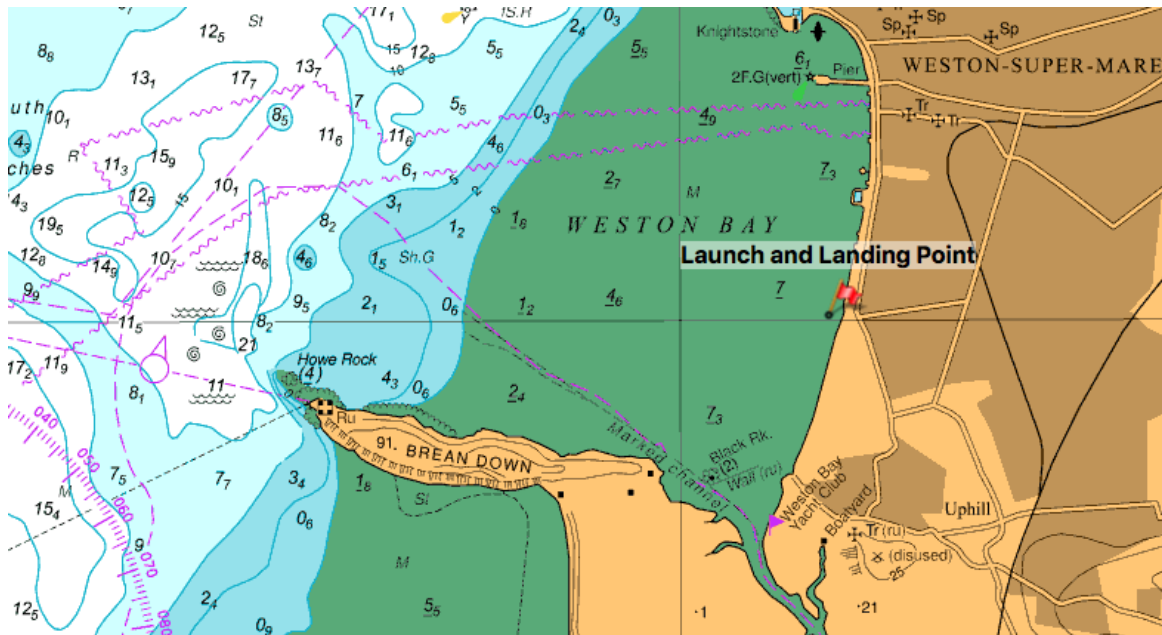
If learners already have the above knowledge and time permits, you may like to explore the 50/90 rule.

Tides Module

Activity 5

Activity Title:	Depth of Tide
Time:	20 minutes
Activity Outline:	
<ul style="list-style-type: none"> • Rule of twelfths • Trip application 	
Delivery:	
Rule of Twelfths:	
<p>Provide participants with an understanding of when we might need to know what the height of a tide is in a certain location. For most of the time, it's largely irrelevant as we have a small draught on our boards and boats. However, for certain beaches this information is crucial to avoid getting stuck in deep coastal mud/quicksand, landing launching on sand rather than boulders or, working out how far you might need to carry a heavy boat/board up the beach.</p>	
 <p>The diagram shows a cross-section of a beach and a channel. The chart datum is 3m below the drying height of the channel. High Water (HW) is at 1400 and Low Water (LW) is at 0800. The tidal range is divided into six twelfths. The first two twelfths (0800-0900) are the shallowest, and the last two twelfths (1300-1400) are the deepest. A channel is shown in the middle of the beach.</p>	
Trip application - Suggested Activity	
<p>You and your friends decide you'd like to go and explore Brean Down in the Bristol Channel. Using the following information and the rule of twelfths can you:</p>	

- Identify the earliest you'd be able to get on the water from the launch/landing point without getting covered in mud and what would be the latest you could arrive back?
- Would this be a viable trip do you think?

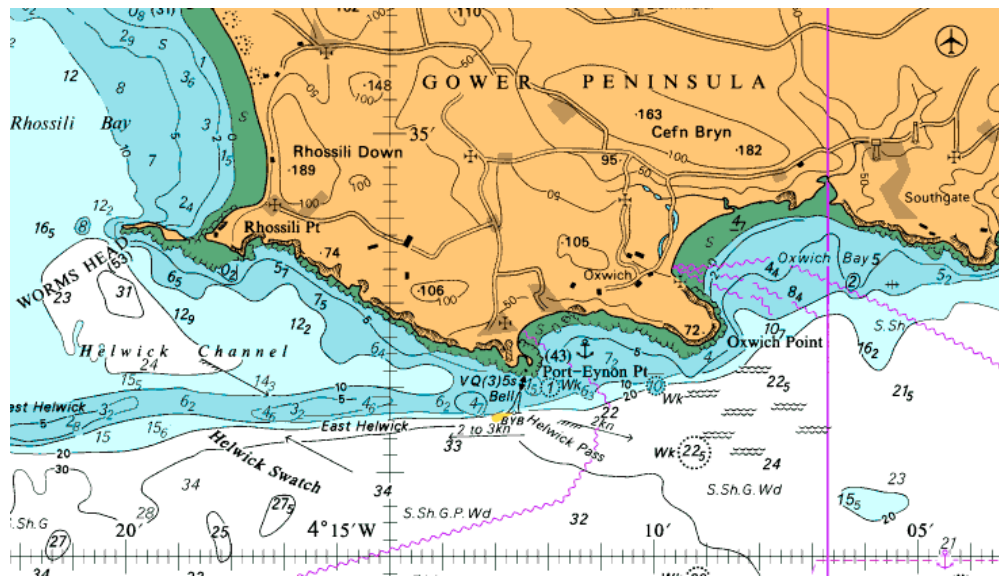


Tides Module

Activity 6

Activity Title:	Environmental Considerations
Time:	30 minutes
Activity Outline:	
<ul style="list-style-type: none"> • Headlands, reefs (bathymetry), Races and overfalls • Complex coast and its effect on the tide 	
Delivery:	
Headlands Reefs, Races and Overfalls:	
<p>Setting the Scene - If our coastline was completely uniform in nature (think huge canal), then our tides would be similarly uniform in that they would have consistent flow that simply sped up and slowed down according to the phase of the tide.</p> <p>Explain and show that any disruption to that flow will cause a deceleration or acceleration in the flow of water:</p> <p>Headlands, promontaries of land that stick out into the flow forcing the water to be compressed and accelerate around the headland. This can cause tide races and overfalls, areas of rough water that can be made rougher still by the effects of swell and wind.</p> <p>Explain and show that reefs are also examples of where water is forced to speed up or slow down. As a deep tidal flow is pushed over these areas of shallow water - the constriction of flow forces it to accelerate.</p> <p>While significant headlands and reefs may well be marked with tidal diamonds and relevant chart symbols, this does not mean other, lesser, unmarked points, such as cliffs, islands etc., will not experience similar conditions seen at the more prominent points.</p>	

See example below:



Suggested Activity

Using an OS map, participants identify likely areas a paddler may experience overfalls and tide races. This can then be checked using the corresponding nautical chart and any relevant information added to the OS map.

Depending on the group's understanding from activity 4 and time allowing, this might be an opportunity to introduce the 50/90 rule using the above section of chart.

Complex coast and its effect on the tide:

If you haven't already, find out where the participants paddle. It is likely that where they paddle will have a 'classic' semi-diurnal tidal pattern. Meaning that they will see the tide flood for six hours and then ebb for six hours twice in a 24-hour period. However, this is not the case everywhere.

Suggested Activity

Look at the tidal charts below, what, if any, considerations might you need to make when planning a trip? For the Solent example, how would tidal diamonds work?

Barnstaple, England

Sun 16th July - Sat 22nd July 2023

Tide times

Times have been adjusted for BST

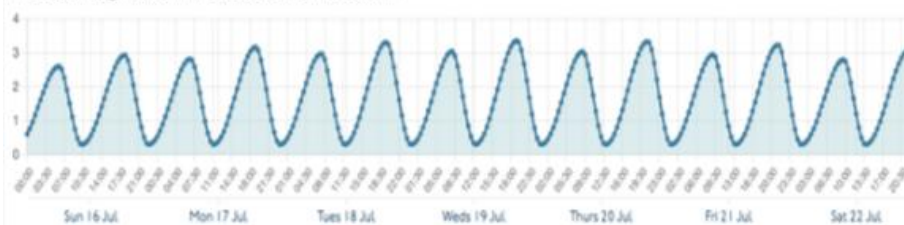
	High Water	Low Water	High Water	Low Water	High Water
Sun 16 Jul	06:00 2.6m	10:15 0.3m	18:20 2.9m	22:49 0.3m	-
Mon 17 Jul	06:42 2.8m	11:02 0.3m	18:59 3.2m	23:34 0.3m	-
Tues 18 Jul	07:21 3.0m	11:45 0.3m	19:36 3.3m	-	-
Weds 19 Jul	-	00:12 0.3m	07:56 3.0m	12:20 0.3m	20:11 3.4m
Thurs 20 Jul	-	00:42 0.3m	08:31 3.0m	12:48 0.3m	20:45 3.3m
Fri 21 Jul	-	01:10 0.3m	09:05 3.0m	13:16 0.3m	21:18 3.2m
Sat 22 Jul	-	01:37 0.3m	09:38 2.8m	13:44 0.3m	21:53 3.1m

Predictions should be read in conjunction with the graph

☾ New moon on this day

Tidal curve

Predicted heights are in metres above Chart Datum



Calshot Castle, England

Sun 16th July - Sat 22nd July 2023

Tide times

Times have been adjusted for BST

	Low Water	High Water	Low Water	High Water	Low Water
Sun 16 Jul	04:23 1.4m	10:33 3.8m	16:45 1.5m	22:50 4.0m	-
Mon 17 Jul	05:11 1.3m	11:21 3.9m	17:31 1.4m	23:35 4.0m	-
Tues 18 Jul	05:54 1.1m	12:07 4.0m	18:13 1.3m	-	-
Weds 19 Jul	-	00:17 4.1m	06:34 1.1m	12:45 4.1m	18:51 1.3m
Thurs 20 Jul	-	00:53 4.1m	07:09 1.2m	13:22 4.1m	19:24 1.4m
Fri 21 Jul	-	01:25 4.1m	07:38 1.3m	13:48 4.1m	19:53 1.5m
Sat 22 Jul	-	01:52 4.0m	08:05 1.3m	14:22 4.1m	20:21 1.5m

Predictions should be read in conjunction with the graph

☾ New moon on this day

Tidal curve

Predicted heights are in metres above Chart Datum



Environmental Cues:

Continuing on from previous modules, reinforce with the participants that planning is all well and good, but it is just a plan, we need to be attuned to the environmental cues around us while we paddle.

Suggested Activity

What do these pictures tell us about the tide?



We turn up at the beach and see the above, what questions should we be asking ourselves and the people we are paddling with? Three hours ago, the water was much smoother, what happened?

What could seeing Kelp like this indicate?



If the shingle bank in this photo appeared to be moving to the left, which way are we paddling? If the shingle bank was stationary or moving very slowly, what would this tell us?



What other environmental clues are available to us? Discuss as a group with support from the Tutor.

Tides Glossary

- Spring tides - high high water and low low water
- Neap tides - low high water and high low water
- Flood tide - tide floods to high water
- Ebb tide - tide ebbs to low water
- Slack water - a short period of time where the tide changes from the flood to the ebb or vice versa.
- Tidal range - difference between high and low water

- Chart datum - lowest astronomical tide
- Perigee tide - moon closest to earth
- Apogee tide - moon furthest from earth
- Perihelion tide - sun closest to earth tides
- Standard port v secondary port - ports where tidal information is directly measured v ports where mathematical calculations are used to extrapolate HW and LW from standard ports.
- Tide race - constrictions of tidal flow caused by changes in depth or headlands protruding into sea.