



**Scottish
Water**

Always serving Scotland

Water safety

Second level

Description of module

If the class has done the module **Safe!** at an earlier level, they will have done at least some of the suggestions in activity 1. You may wish to pursue some of these in more depth and at a more challenging level. Activity 2 gives additional suggestions on the dangers of cold water. Pupils can develop their data handling skills using official statistics on water related accidents in activity 3.

Main experiences and outcomes

Expressive arts

I have experienced the energy and excitement of presenting/performing for audiences and being part of an audience for other people's presentations/performances.

[EXA 2-01a](#)

Health and wellbeing

I am learning to assess and manage risk, to protect myself and others, and to reduce the potential for harm when possible.

[HWB 2-16a](#)

I know and can demonstrate how to keep myself and others safe and how to respond in a range of emergency situations.

[HWB 2-17a](#)

Literacy and English

When I engage with others, I can respond in ways appropriate to my role, show that I value the contributions of others and use these to build on thinking.

[LIT 2-02a](#)

I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience.

[LIT 2-06a](#)

Numeracy and mathematics

I can show my understanding of how the number line extends to include numbers less than zero and have investigated how these numbers occur and are used.

[MNU 2-04a](#)

I have carried out investigations and surveys, devising and using a variety of methods to gather information and have worked with others to collate, organise and communicate the results in an appropriate way.

[MNU 2-20b](#)

I can display data in a clear way using a suitable scale, by choosing appropriately from an extended range of tables, charts, diagrams and graphs, making effective use of technology.

[MTH 2-21a](#)

Sciences

By investigating floating and sinking of objects in water, I can apply my understanding of buoyancy to solve a practical challenge.

[SCN 2-08b](#)

By investigating some body systems and potential problems which they may develop, I can make informed decisions to help me to maintain my health and wellbeing.

[SCN 2-12a](#)

Technologies

As I extend and enhance my knowledge of features of various types of software, including those which help find, organise, manage and access information, I can apply what I learn in different situations.

[TCH 2-03a](#)

Throughout all my learning, I can use search facilities of electronic sources to access and retrieve information, recognising the importance this has in my place of learning, at home and in the workplace.

[TCH 2-03b](#)

During practical activities and design challenges, I can estimate and measure using appropriate instruments and units.

[TCH 2-13a](#)



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Activity 1

Learning intention

- Pupils develop an understanding of the dangers of playing on and near water, and learn ways to stay safe.

Success criterion

- Pupils can contribute to a group demonstration of dangers and actions to take

Suggestions for teachers

Some of the best materials are on the websites of Scottish Water, the Royal Society for the Prevention of Accidents (RoSPA) and the Royal National Lifeboat Institution (RNLI). Look at www.scottishwater.co.uk, www.rnli.org.uk and www.rospa.com. Also see other relevant websites, e.g. national police and fire and rescue services websites. These provide a wealth of advice, including downloadable information and online games. In addition to pupil research using these sites, the following are some more structured suggestions.

Please note: given the subject matter, teachers are advised to consider whether particular children will be affected by this work.

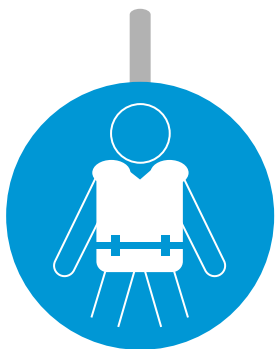
1 Research

Divide the class into groups, and ask each to research a particular topic, then report back to the rest of the class. Groups could be:

- beach safety
- ice dangers
- rivers and reservoirs
- canoeing
- rescue squad

Each group would be asked to come up with a poster - one for a summer campaign and one for a winter campaign - to illustrate what to do or what not to do, and why, in each situation, or in the case of 'rescue squad' to research what emergency services could be on hand, how to contact them and what they might do.

Even better would be to ask each group to produce a short play to do the same, and these could be presented at assembly as well as in the classroom. Hot seating some of the characters afterwards would enhance children's involvement (sample questions: 'How did it feel when...?', 'Can you swim?', 'Why didn't you...?', 'Was your dog scared?')



Mandatory action -
life jackets to be worn



No diving



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Activity 1 continued

2 Safety signs

Show children the signs on resource sheet 1 and discuss what they mean. Each child is then asked to design a sign that could warn of a danger or give advice as follows:

- Extremely cold water
- Slippery banks – easy to fall in, hard to climb out
- Dangers underwater – broken glass, shopping trolleys, rope, plants, currents
- Very deep water
- Fast currents
- Untreated water is not suitable for drinking
- Life jackets must be worn when on a canoe
- Thin ice
- Don't go in the sea if there's a red flag flying

Children could work individually or in groups, and explain their signs to the rest of the class afterwards. A display outside the class could be made, and under each could be a folded piece of card, with the meaning of the signs hidden; children in other classes could be challenged to guess what the signs mean, then peep under the card to find the answer.

The display could have two sections - summer and winter and pupils could place their posters under the relevant heading. If a poster spans both summer and winter, it could straddle both sections.

3 Reinforcement

Display resource sheet 2 and discuss the points. This is a good reinforcement and plenary activity in itself. This may a good time to change the focus and put the safety issues into context. If the children are mature enough, discuss the reasons FOR playing in the outdoors and at the beach in particular, and then set up a debate. One side could argue; 'We believe that the beach is a good place to play', and hopefully a consensus would emerge, with the children recognising that play in the outdoors is fun, educational and healthy, but safety does need to be considered. A follow up could be groups of children writing pros and cons on slips of paper and displaying these.





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Activity 2

Learning intention

- Pupils understand the effects of low temperatures on the human body

Success criterion

- Pupils can make realistic estimates of temperatures and survival times

Suggestions for teachers

1 Water temperature

Ideally, leave out small bowls of water overnight in order to bring them up to room temperature. Groups of children can measure the bowls' temperature in the morning. Make up pouches to hold ice cubes - net curtain is ideal; J cloths will do - with a string handle. Immerse these pouches in the water, and dunk them a bit, then measure the temperature at intervals - 30 minutes is practical, allowing other activities in-between measurements. If you have a digital thermometer which gives a continuous readout, that would be fun to watch for the first five minutes or so, as the temperature will go down quickly at first.

2 Recording results

Each child could prepare a blank graph for recording results. A vertical scale of 0 - 25°C and perhaps 10 x 30 minute divisions along the horizontal axis, depending on how long you wish the observations to continue. You may also want the pupils to prepare a recording grid, or simply give out a blank something like this:

Time	10.00	10.30	11.00	11.30	12.00	12.30	13.00	13.30	14.00	14.30
°C										

The results may be plotted on the graph. It is important to let the children stick their fingers into the water at intervals so that they can understand what each temperature feels like, but they mustn't keep their fingers there as it could become too cold for them, or the water

will warm up again. The bag of ice can be refilled after a time. For even faster results, the ice could be smashed up, perhaps by the janitor, by placing the cubes in a strong bag and hitting it with a hammer on a sturdy surface - a bit of theatre to liven things up!

3 Results chart

The results from the observations above could be inserted into a spreadsheet and turned into a chart, using something like Excel. In both this and the paper version it is useful to discuss with the pupils the merits of using either columns (which could resemble the liquid in a traditional thermometer) or points linked by straight lines, or points linked by a curved line (to show the trend) Different groups could use different methods, depending on abilities and previous knowledge of data handling.

4 Safety link

The link with water safety comes with studying hypothermia and survival times. A useful start is for pupils to take their temperatures, using whatever types of thermometer you have available: traditional, digital or plastic strips and discussing what the normal human temperature is: 36.5 - 37.5°C approx (NHS Choices website). Hypothermia results if the body's core temperature drops only slightly, to 35°C or less, and the body will chill 26 times faster in water than in the open air. Below 35°C muscles stop working properly, people get confused and finally lose consciousness.



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Activity 2 continued

The class could discuss/explore different situations where there would be a risk of hypothermia, such as rivers and reservoirs and, online, investigate the symptoms, what happens to the body and what to do if you find someone in difficulties.

The pupils could look at resource sheet 3, which shows temperatures around Scotland; this is good context for reinforcing local geography. Ask pupils to discuss a time when they felt extremely cold, how did they feel, how did their body react and what did they do to get warm again? The table shows survival times for adults wearing life jackets, so naturally children, and those without life jackets would lose consciousness and die much more quickly. The pupils should be able to understand what the temperatures feel like once they have carried out the water-cooling observations above. Emphasise the fact that inland water can often be colder than the sea - around 10°C - and the temperature below the surface can be a lot colder than that, which is one reason why deep lochs and water-filled quarries are so dangerous.

5 Follow-up work

Follow-up work could include:

- Making graphs of the figures on resource sheet 3
- Having a temperature quiz: put out large bowls of water of different temperatures and ask the children to guess what temperatures they are. It would be easy to prepare one of water straight from the tap, one of water that had been chilled in the freezer, and a couple with varying amounts of hot water added – and only the teacher would know in advance what the temperatures were, and which bowl was which. Could use bottles of water as an alternative, so children can touch/hold bottle rather than put hands in hot water
- Off topic a bit, but fun, is to have 3 bowls of water side by side, one almost frozen, one lukewarm and one very warm; a pupil puts one finger in the very cold and a finger from the other hand in the very warm and keeps them there for a minute or so, then puts both in the lukewarm bowl, then describe what they feel. It's a very good way of showing the need to use accurate instruments for measurements, and why not to rely on individual sense judgements; discuss this with pupils
- Extending the activities to explore temperatures below zero: an excellent introduction or reinforcement for negative number work
- Researching when life jackets and buoyancy aids should be used and presenting the results in a PowerPoint, poster or illustrated talk
- Inviting in a someone from a local kayaking, sailing, rafting or other water sport group to talk about various buoyancy aids and what to do in the event of a capsized
- Finding out about long distance swimmers, and what they do to keep warm
- Learning about buoyancy aids at the swimming pool, and using them to feel the difference they make



Water safety

Activity 3

Learning intention

- Pupils gain an understanding of the risks of water related activities through studying reliable data

Success criterion

- Pupils can analyse official statistics and form conclusions based on evidence

Suggestions for teachers

1 Risk statistics

Statistics on the risks to the public from water related activities produced by the National Water Safety Forum are provided in resource sheets 4 and 5. It might be worth starting by having a short class discussion about the value of having reliable information. Why is accurate data important? Governments, authorities and bodies such as schools all make decisions about policies, priorities and how money should be spent based on statistical information. Why might statistics on water related accidents be important? Who would be interested in this information? Where does this information come from? The Royal Society for the Prevention of Accidents (RoSPA), the Royal National Lifeboat Institution (RNLI), national police and fire and rescue services and other bodies contributed to these statistics. Pupils should be informed that the data is for 2010.

2 Accidental deaths

Perhaps begin looking at the data by considering the chart labelled 'Age & Gender - Accidental Deaths' on resource sheet 4. What do pupils think this chart shows? What are the numbers running left to right, and bottom to top? What conclusions can pupils draw from this chart?

3 What does the chart show?

What does the chart 'When - Accidental Death By Week' show? Why do pupils think most accidents happen on these two days? Show pupils the chart 'When - Accidental Death By Month'. In which months do most accidents occur? When do the lowest number of accidents happen? Can pupils suggest any explanations for this pattern?

4 Creating charts

After talking through these charts, pupils could be given the raw numbers and tasked to plot the figures on their own bar or pie charts by hand or by using computer software. Pupils should take care with the choice of colours and use of text to make their charts as clear as possible.

5 Report writing

If time allows, this activity could be extended into work in literacy. Pupils could use the information to produce a report about which group of people are most likely to be involved in a water related accident, and at which time of the year. Pupils could devise their own water safety information campaigns specially designed to reach this particular group of people. Their recommendations should be based on the data, with accurate statistics used to support the ideas behind their campaigns.

6 Data for 10 - 14 year olds

Alternatively, or additionally, the charts on resource sheet 5 can be used for data handling activities. These give a breakdown of accidents involving 10 - 14 year olds. According to the data, which activity was responsible for the highest number of accidents? (Some discussion on the meanings of the different categories might be useful). Where did most accidents occur? Statistically, who are more likely to be involved in accidents - boys or girls? Pupils could produce their own charts and reports, as described above.



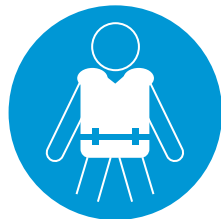
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Resource sheet 1

Signs warn you of danger and give you advice.
Write down what do you think each of these signs mean.





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Resource sheet 2

The Water Safety Code

Spot the dangers!

Water may look safe, but it can be dangerous. Learn to spot and keep away from dangers. You may swim well in a warm indoor pool, but that does not mean that you will be able to swim in cold water.

The dangers of water include:

- Very cold temperatures
- Hidden currents
- It can be deep
- It is difficult to estimate depth
- There may be hidden rubbish like shopping trolleys or broken glass
- It can be difficult to get out (steep slimy banks)
- No lifeguards
- Water pollution may make you ill

Take safety advice!

Special flags and notices may warn you of danger. Know what the signs mean and do what they tell you.

Go together!

Children should always go with an adult, not by themselves. An adult can point out dangers or help if somebody gets into trouble.

Learn how to help!

You may be able to help yourself and others if you know what to do in an emergency. If you see someone in difficulty, tell somebody, preferably a Lifeguard if there is one nearby, or go to the nearest telephone, **dial 999**, ask for the **fire and rescue service** at inland water sites and the **Coastguard** at the beach.



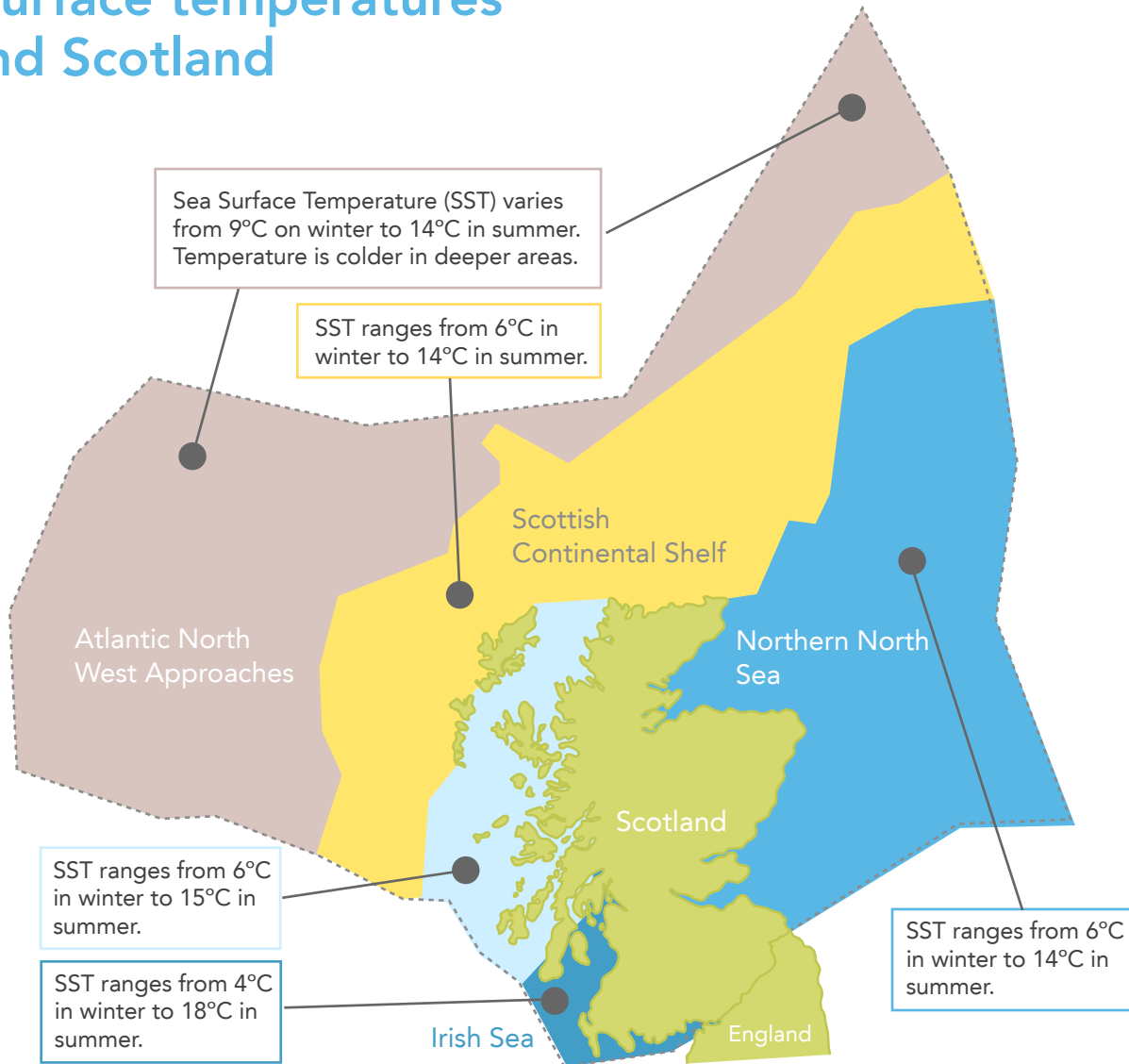
Scottish Water

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Resource sheet 3

Sea surface temperatures around Scotland



Key

- Scottish Continental Shelf
- Atlantic North West Approaches
- Northern North Sea
- Minches and Western Scotland
- Irish Sea
- Scottish Sea Areas

Water temperature °C	Minutes until unconsciousness
Around freezing	5
5	20
10	45
15	90
20	300

Source: The Scottish Government - www.scotland.gov.uk

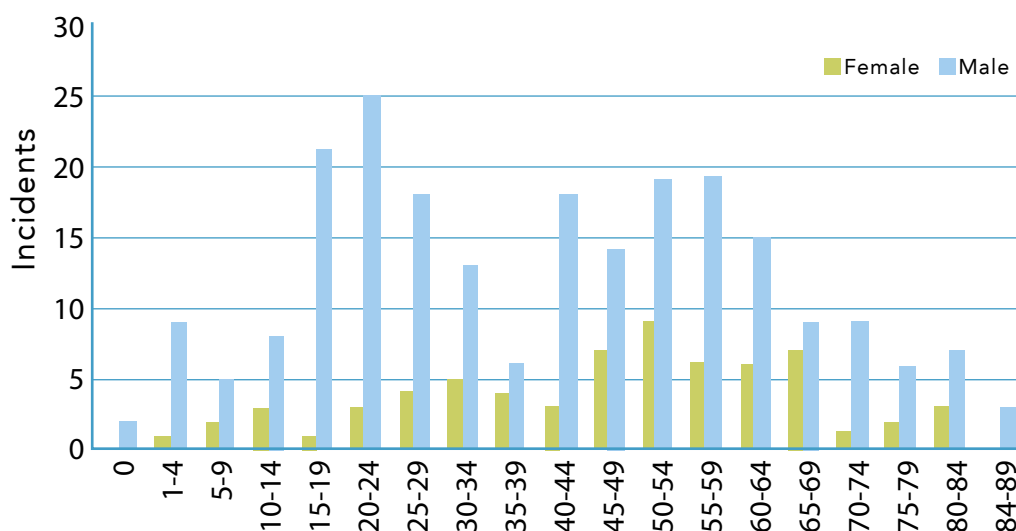


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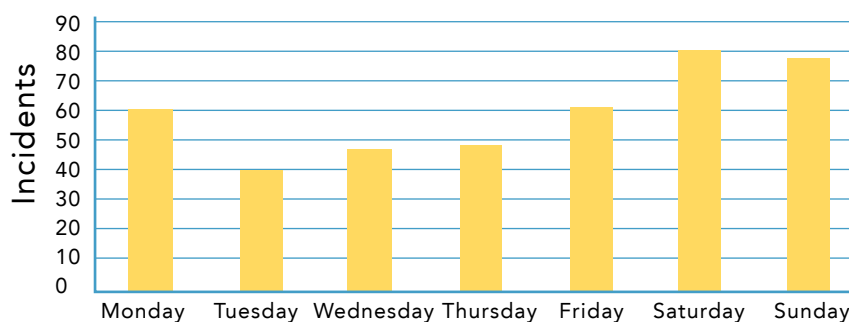
Resource sheet 4

Accidental deaths

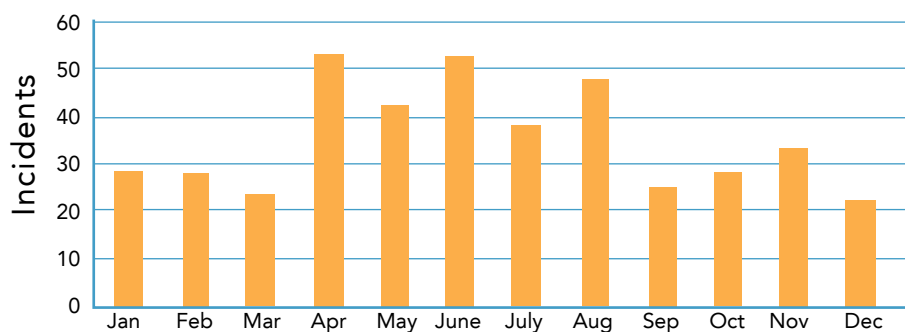
Age and gender - accidental deaths



When - accidental death by week



When - accidental death by month



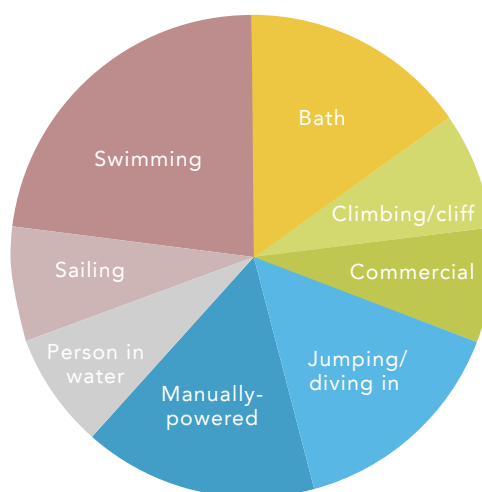


Water safety

Resource sheet 5

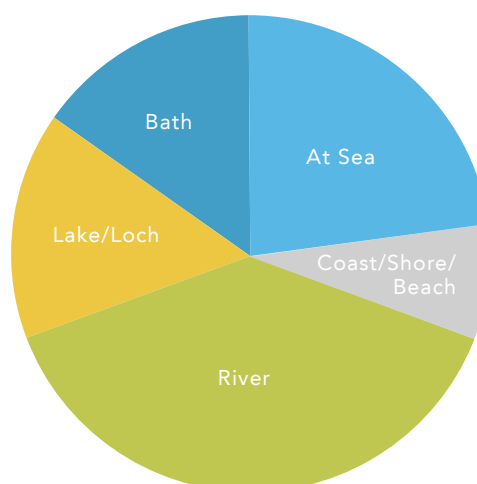
Activity 10 - 14 year olds

Activity 10 - 14	Total
● Bath	2
● Climbing/cliff	1
● Commercial	1
● Jumping/diving in	2
● Manually-powered	2
● Person/object in water, person of uncertain status	1
● Sailing	1
● Swimming	3
Total	13



Location 10 - 14 year olds

Location 10 - 14	Total
● At Sea	3
● Coast/Shore/Beach	1
● River	5
● Lake/Loch	2
● Bath (includes jacuzzis, hot-tubs)	2
Total	13



Gender 10 - 14 year olds

● Female	3
● Male	8
Total	11

