Wareham

Enquiry 9: Why does Wareham flood?

Context and Learning Aims

Pupils will be supported in and outside of the classroom to:

- Identify the key physical and human features of Wareham and its relationship both to the River Frome and Poole Harbour;
- Understand the two principal reasons which explain why Wareham is vulnerable to flooding (tidal and fluvial);
- Know why the extreme weather events in December 2013 and January 2014 led to serious flooding in and around Wareham;
- Appreciate what has been done to date to protect the environment at Wareham from tidal and fluvial flooding;
- Explain why climate change is likely to increase the vulnerability of Wareham to flooding in the future;
- Recognise, describe and explain what is occurring at Wareham which is likely to increase the likelihood of flooding here in the future;
- Consider what people can do to prepare and become more resilient to flooding in the future e.g. prepare a community flood plan.
Learning and teaching activities and curriculum progression

Key Question 9.1: What were the floods of 2014 like in Wareham?

Provide the children with the location map of Wareham in Resource 9.1. This map shows the town of Wareham on the western edge of Poole Harbour along with the situation of Poole, Brownsea Island, Studland and Swanage. Now project the aerial photograph of Poole Harbour (Resource 9.2) and encourage the children to orientate their maps so that they can point out the location of the five places on the aerial photograph.

Show the children the pairs of images in Resource 9.3. What do they show? In addition project the photographs in Resource 9.4 which were all taken in and around Wareham in January 2014. The floods in that year were the worst that the town had experienced in more than 15 years. What do the children notice about the areas which have been flooded? Support children to identify that it was the roads, and particularly the causeway connecting Stoborough and Wareham, and not the properties that were affected.

Next give the children copies of the Ordnance Survey map (Resource 9.5) and the aerial photograph of Wareham (Resource 9.6) taken during the 2014 floods. The photograph was taken at Grid Reference SY922873 looking South East. The children can stick their A4 photograph in the middle of an A3 piece of plain paper and then annotate it with labels to show the location on the photograph of:

- Stoborough
- The Causeway
- Redcliffe Path
- Ridge
- Redcliffe Farm
- Bestwall
- South Bridge
- The B3075 between Wareham and Stoborough
- Poole Harbour
- Purbeck Hills

The 2014 floods affected many people in the town. In Resource 9.7 can be found personal accounts of the floods written by children of Mr. Logan’s Year 5 class at Stoborough Primary School. Read through these with the children. Some accounts are diary entries whilst others are transcribed interviews and stories. Of all the problems created by the floods, which one do most of the children mention? The loss of the road connection between Stoborough and Wareham is most frequently written about. This reflects the fact that few properties were affected by the 2014 floods whereas some local people tried to close the flooded Causeway to traffic as the wash from vehicles was endangering their properties.
Three months after the floods water still remained on the floodplain either side of the River Frome in Wareham. All of the following photographs were taken from SY930864 towards Wareham:

**Resource 9.8**: looking NNW
**Resource 9.9**: looking NW
**Resource 9.10**: looking N
**Resource 9.11**: looking NNE
**Resource 9.12**: looking NE

**Key Question 9.2: Why is Wareham vulnerable to flooding?**

Tell the children to look carefully at the course of the River Frome on the map in **Resource 9.5**. Look particularly at the mouth of the river as it flows into Poole Harbour at Swineham Point at SY945877. This area is also shown on the aerial photograph in **Resource 9.13**. Print off this aerial photograph and support the children to use the map to label on the photograph each of the following:

- Gigger's Island
- Bower Point
- Turner's Cove
- Swineham Point
- Buck's Cove
- River Frome
- River Piddle
- Mud banks
- Route of deep navigational channel

What has happened to the Gravel Pit that is shown on the map SY940880? Do the children think that the aerial photograph is more recent than the map or the map more recent than the photograph? Has the Gravel Pit been dug up after the photograph was taken or filled in before it was taken?

Next ask the children to place a finger at the mouth of the River Frome at Swineham Point and slowly follow the course of the river inland until they reach the letters NTL at SY918864 close to the main road by pass. What do they notice about how the edge of the river is shown on the map after this point compared with before? NTL means Normal Tide Level and shows the point upstream on a river where high tide from the sea reaches. At high tide sea water from Poole Harbour flows up the River Frome.

The children can now compare **Resource 9.14** with the map. The red lines on the aerial photograph show the tidal limits of both the River Frome and River Piddle to the north. They also show the position of tide banks which have been built up to help drain the flood plain of water and keep the River Frome and Piddle from overflowing when the water in the river rises during high tide. The first tide banks were built along the River Frome in the 1700s (**Resource 9.15** and **Resource 9.16** and today there are 22km of banks.
Today however three things are occurring:

- Firstly, sea levels are rising as a result of climate change and the Environment Agency predicts that levels based on ‘still water’ will rise by 110mm by 2030; 310mm by 2060 and 730mm by 2104. If there is a high incoming spring tide, storm conditions including tidal surge and very strong winds can lead to extreme flooding events like those seen in December 2013 and January 2014.

- At the same time things are happening to the tide banks as shown in the photographs of the north tide bank of the River Frome in Resource 9.17 and the south tide bank in Resource 9.18. Ask the children to look carefully at the photographs. What is happening to the tide banks? They are breaking down (eroding) and as a result of this when there is a high tide there is danger of the river water pouring over them (overtopping) as shown clearly in Resource 9.19.

- What do the children notice about the height of the river behind the tide banks which run alongside the Redcliffe Towpath on which people are walking, compared with the land around it in each of the photographs in Resource 9.20? At several points along the River Frome to the east of Wareham the normal height of the river level is now above the level of the land either side of it. This means that when high tides coincide with storm surges and strong winds it is becoming more common for the river to overtop the embankments.

Next, ask the children what rivers such as the River Frome do? What job do all rivers do? Show the children the simple diagram in Resource 9.21 to help them identify that rivers carry water that the land does not require back to the sea as an integral part of the hydrological or water cycle (Resource 9.22). The River Frome flows for 48km before meeting the sea to the east of Wareham at Poole Harbour. During December 2013 and January 2014 Dorset had twice the average amount of rain than it normally gets. Talk to the children about what the land would be like after two months of fairly constant heavy rain? If the land is saturated then rain water reaches a river much quicker than normal. This was the case with the River Frome. During December and January the river was running very high because of the amount of rain that had fallen (pluvial flooding). What do the children feel would have happened when the water coming down the River Frome met the sea water coming up the river at high tide from Poole Harbour? The river would have burst its banks and flooded the surrounding land, including the Causeway road between Wareham and Stoborough.
Key Question 9.3: How can community in Wareham prepare for the risk of flooding?

Explain to the children that in the event of a possibly serious flood anywhere in the country, the Environment Agency releases a flood warning online at:


and also via the television and radio. As the likelihood of flooding increases in places around the coast of the United Kingdom such as Wareham, so it becomes more important for individuals; households and whole communities to become more resilient. Resilient means to be strong or unaffected when approached with something, such as a difficult situation. If someone is resilient, they are not changed by anything unless they choose to be.

The children can access advice about making a personal flood plan at http://www.environment-agency.gov.uk/homeandleisure/floods/38329.aspx An activity here is for the children to consider the top ten most important things they would put in their own flood kit and then to compare it with the advice of the Environment Agency at http://apps.environment-agency.gov.uk/flood/151256.aspx How many things were the same?

Now ask the children how the community of people in Wareham could work together to respond quickly and be more resilient to flooding. Divide the children into groups to discuss all of the things that people working together might decide to do e.g. elect a flood committee for the town with particular responsibilities such as getting messages to people quickly; making sure that the most vulnerable people e.g. the disabled living alone are known about and taken care of. There is a Community Flood Plan template that some of the children could use on the Environment Agency website at http://apps.environment-agency.gov.uk/flood/151256.aspx and further guidance can be found at https://www.gov.uk/government/policies/reducing-the-threats-of-flooding-and-coastal-change and at http://www.local.gov.uk/flood-resilience

For the town of Wareham one of the key aspects of a community flood plan will be to come up with ideas about dealing with the flooding of the causeway to Stoborough in the future. What do the children think could be done here that would make the community more resilient to the challenge of flooding in the future?
Sample Resources from Enquiry 9. The complete set of resources supporting learning in this enquiry are available on the accompanying DVD and online at www.licco.eu.

Resource 9.3
The Floods and Me

We were lucky in Wareham, as the floods weren’t as bad as they were in other parts of the country. Somerset wasn’t that far away from us, but I remember seeing people up to their waists in water, using boats and canoes to move around. Their houses were wrecked, as the water had covered the lower floor. Even now, they still haven’t recovered, and got their lives back to normal.

Our school is on the edge of the flood plain, so we have seen the water high on the Causeway before. This year, it was the highest we’ve seen it. The road was completely covered in water, and even 4 by 4 vehicles couldn’t get through. We started trying to drive across it one morning, but the water was too high, and we reversed back out of it. Then the road was closed for several days until the water levels had gone down. The river by Wareham Quay was flooded too, and the water had spread across the Quay car park, and the green area on the other side. Even the Granary was flooded, and had sandbags to prevent the water getting in. People in Stoborough are used to being flooded, so all of the houses had sandbags by doors and walls, hoping that the water wouldn’t get inside their homes. Luckily it didn’t get that far this time, so they were lucky. Even though the water levels have gone down now, the grass that can be seen is a greyish colour, and still isn’t back to normal yet.

By Hope Derrick

The Flood and Me

This piece of work is about me and the recent floods.

It was February 14th 2014, Valentine’s day. We were eating pizza at the pizzeria which is close to the river. But suddenly a huge storm hit Wareham there was lots of rain and the wind was whistling and the sky went black. As the rain kept on shooting down the river started to rise! The river started to rise and flood on to the car park! A few days later we were walking past the granary (also near the river) we saw they had the flood gates on! We talked to the granary people they said they had to move people, tables and chairs out!

By Thomas Howard
The frantic flood and me.

By Emily Rogers, Y5

Dear diary,

Last night I thought everything was fine and it didn’t worry me about the heavy rain that was lashing down outside when I was all cozy in my bed.

This morning we all woke up and couldn’t believe our eyes. The entire garden, driveway and garage was flooded! My mum opened the front door and saw that murky brown water was half way up our BMW wheels, not to mention our Golf! If we had any more rain there would be water in the house! My mum was really upset as all her souvenirs from her childhood were stored in the garage and had been wrecked. Also all her books, old teddies, my dad’s tool box and our freezer!

We had to act fast, all hands on deck! My mum and dad rang some of our friends and family to come and help. We needed sandbags urgently! We could only find a place that had sand and some bags for sale but they weren’t made up. My uncle took his van there to collect the sand and drove it back to my house. We all packed sand into the bags and laid them all around the house. It took ages and was back-breaking work. Thankfully the sandbags prevented any more water coming into the house but when it eventually drained away we were left with a huge mess to clear up. Copper coloured mud and silt coated everything.

How the floods of Wareham affected me.

I live in Holton Heath on a hill and the floods didn’t really affect me too much. However getting to school was a bit trickier because we usually drive to school over the causeway from Wareham to Stoborough but this way was flooded. Even driving the other way we had to pass through huge puddles. Mummy was worried the car would break down.

When I got to school I wasn’t allowed to go on the field during football club instead of going on the field we went on the playground which I thought wasn’t as good as playing on the field. I think most of the players would agree.

When I first saw the floods I was amazed at the sight of all the water. I had hoped that the floods would rise so I couldn’t get to school unless we travelled by boat!

By Henry Birtwistle.