

The Bay of Naples

Teacher Fieldwork Resource Pack



The Bay of Naples

Contents



- 3 Maps**
- 4 Risk Guidance**
- 5-8 Activities Overview**
- 9 Student Kit List**
- 10 The Accompanying Booklet**
- 11-18 Vesuvius**
 - Information
 - Learning Opportunities
 - Pupil Activities
- 19 Vesuvius Observatory**
- 20-27 Pompei**
 - Information
 - Learning Opportunities
 - Pupil Activities
- 28-35 The Island of Capri**
 - Information
 - Learning Opportunities
 - Pupil Activities
- 36-41 The Amalfi Coast**
 - Information
 - Learning Opportunities
 - Pupil Activities
- 42-43 Phlegraean fields**
 - Information
- 44-48 Solfatara**
 - Information
 - Learning Opportunities
 - Pupil Activities
- 49-56 Monte Nuovo**
 - Information
 - Learning Opportunities
 - Pupil Activities
- 57-59 Pozzuoli**
 - Information
 - Learning Opportunities
- 60-61 Lemon & Olive Mill and Mozzarella Farm**
 - Information
- 62-63 Gragnano**
 - Information
- 64-67 Vannulo Farm**
 - Information
 - Learning Opportunities
 - Pupil Activities
- 68-69 Tourism in Naples**
 - Pupil Activities

The Bay of Naples

Vesuvius



The Bay of Naples

Vesuvius

Information

Vesuvius was formed by the collision of the African and the Eurasian plates. As these plates moved together, the African plate was subducted below the Eurasian plate. Intense heat and pressure caused melting of the crust producing magma. This rose to the surface and was extruded creating a volcano. The earliest eruptions occurred 25 000-17 000 years ago.

Vesuvius lies on the coast of the Bay of Naples approximately 9 km east of Naples. Its highest point is 1282m above sea level. The current crater has a diameter of 650m and a depth of 230m. Vesuvius' shape has resulted from a combination of explosive and effusive eruptions. The more explosive episodes were due to magma-water interaction (phreatomagmatic activity). It consists of a large cone partially encircled by the steep rim of a caldera caused by the collapse of an earlier and originally much higher structure called Monte Somma. It is made up of layers of lava, scoria, ash, and pumice.

The volcano boasts the first eruption to be witnessed and recorded in 79AD. The discovery of Pompeii in 1748 has offered a fascinating insight not only from a historical perspective but also into the nature of a volcanic eruption. The only active volcano on mainland Europe, Vesuvius is today one of the most densely populated in the world. More than 500 000 residents live on or around the volcano, within the 'eruption zone'. This combined with the three other volcanic complexes in close proximity, namely Campi Flegrei, Ischia and Procida makes the region extremely hazardous. Debris flows and earthquakes claimed more than 3000 lives in the 1990s.

The volcano is currently classified as dormant. The only sign of activity comes from fumaroles found at the base of the crater. In order to protect the last remaining active volcanic complex in Europe, the area was officially designated a National Park on June 5th 1995.

Notes

The aims of the Park are:

- conservation of its fauna, flora and geomorphologic structures
- promotion of educational, recreational and sustainable research activities
- reconstitution and defence of hydraulic and hydro geological balances in the area
- promotion of traditional cultural, agricultural and craftwork activities





The Bay of Naples

Vesuvius

Information

Despite the fact that Vesuvius is one of the most closely monitored and documented volcanoes in the world, attention has only recently focused on the serious hazard that it presents. As with many hazards it is impossible to accurately predict when the next eruption will be and what form it will take.

The nature of the hazard The volcano has been in a dormant state since the middle of the last century. The last period of activity lasted from 1631-1944 and it is widely believed that the next eruption whenever it occurs will be the largest since 1631, when a major eruption buried many villages under lava flows, killing around 3,000 people. Torrents of boiling water were also ejected, adding to the devastation.

Activity was then relatively continuous until 1944. There is no way of predicting how long the volcano will remain in its dormant state. It may do so for centuries. The longer it is inactive the more devastating the next eruption is likely to be. Vesuvius is continually measured and monitored. Many simulations and models have been generated to assess the impact of eruptions of varying magnitudes.

Should Vesuvius experience an eruption on the same scale as that in 1631, upwards of one million people will be displaced or affected. Pyroclastic flows are calculated to arrive in populated areas within 5-7 minutes after the onset of eruption column collapse (Dobran et al 1994) and widespread damage will result from tephra fallout. After more than 50 years of inactivity, this is believed to be the most likely scenario. For an eruption occur on the same scale as that of 79AD, Vesuvius will need to remain inactive for a number of centuries. In this scenario, flows are forecast to cover all of the present urban area of Napoli. Up to 20,000 people would be expected to lose their lives.

This figure would be far higher if no warning or planned evacuation was put into effect. Managing the hazard Vesuvius is the most densely populated volcano on Earth. Napoli is a major economic and cultural centre. Should a major eruption occur the socio-economic costs would be huge. The volcano is being carefully monitored and any early warning signs would be quickly recognised, yet it is very difficult to state for definite that an eruption would follow and to accurately pinpoint its timeframe. The costs and logistics of carrying out an evacuation would be huge.

A contingency plan has been developed to allow the evacuation of more than half a million people from the most at risk areas, based on a 20 day advance warning. Whether such a plan would operate successfully and whether Vesuvius will give that amount of advance warning remains to be seen.



The Bay of Naples

Vesuvius

Learning Opportunities

Learning objectives

- ✓ Understand the formation of Vesuvius
- ✓ Understand the nature of the 79AD eruption that buried Pompeii
- ✓ Identify and contrast types of volcanic material
- ✓ Suggest strategies for tourism management

Activities

- ✓ Worksheet completion
- ✓ Reading articles
- ✓ Primary data collection
- ✓ Observation

Resources required

- ✓ Information sheet
- ✓ Pencil/pen & clipboard
- ✓ Cameras/camcorders/mobile phones
- ✓ Pupil booklet
- ✓ Calculator

Leisure time

Time can be made available to have drinks and light refreshments once you have visited the crater. You should then transfer to Pozzuoli, which is just 10 minutes away.

Toilet facilities

There are two very basic toilets belonging to the café in the car park. There is a charge to use them. Bring your own toilet paper! There are also two portaloos in the car park.

Eating & drinking

There is a small café at the entrance to the site and soft drinks may be purchased. There is also a small kiosk near the crater. A packed lunch is advisable for this visit. Areas in which to eat are very limited. It would be best to eat lunch before or after the visit depending on itinerary.

Organising activities

The worksheets on the formation of Vesuvius and the 79AD eruption can be done in advance of the visit either in the classroom, on the plane or at the accommodation. The study of volcanic material can be carried out on the climb up to the volcano. It can provide a welcome mid-way break! Material is piled up to the side of the path. The management strategies sheet can be completed at the end of the visit.

Additional information

The access path to the crater is steep and unconsolidated underfoot. Sticks are provided to assist with the hike. A 'tip' is expected on their return. Appropriate footwear must be worn. There is no shelter or shade so appropriate wet/hot weather clothing should be worn. The site is not accessible for those with mobility problems. Please refer to the risk assessment regarding this walk. The Vesuvius observatory can be visited if an appointment is made in advance. This building is located on the route up to the crater car park. The observatory houses the world's first seismograph, a human cast from Pompeii and a library containing the first book of volcanology! There is a room dedicated to pyroclastic material ejected by Vesuvius and also videos on the two most famous eruptions. Information boards are in Italian only and the guides speak very limited English.

The Bay of Naples

Vesuvius

Pupil Activities

Themes: 1. Tectonics 2. Hazard Geography

Aims

- Students to complete the questions in their booklets

Task 1 – Vesuvius. This task is a simple fact sheet based on an eye witness account.


Notes

This is an activity that can be done as a preliminary activity on the coach on your way to the site.

The Bay of Naples
Vesuvius

Task 1: Eyewitness Account

An Eyewitness Account of the Eruption of Vesuvius by Pliny the Younger



My uncle was in command of a fleet of ships that was in a port called Misenum. At about 1:00 pm on August 24 (79 AD), my mother warned my uncle to see an unusual cloud. My uncle was resting after having lunch, but he got up right away to look at this cloud.

The cloud appeared to come out of the top of a mountain that was a long way away. The best way to describe it is to say that it looked like a pine tree. It stood straight up like a very tall bush. At the top of the trunk, the cloud spread out like branches. Parts of the cloud were very bright, and parts were quite dark. The different colours were caused by the amount of cinders in the different parts of it.

My uncle, who was a man of science, thought that this cloud was something that needed investigation. He ordered one of his smaller ships to be readied, and told me that I could go with him if I wanted to. I told him that I needed to finish some work that he had given me. As he was getting ready to go onto his ship, he received a note from Flaccius, the wife of his friend Bassus. She was very frightened by the danger that threatened. Her huge house was at the foot of Mount Vesuvius, and there was no way for her to escape except by sea. She begged him to come and save her. So my uncle's expedition changed from a scientific journey to a rescue mission.

My uncle Pliny ordered his ships to sail across the bay to rescue the people not only in Flaccius's house, but also in all the houses and towns that lined the shore near Mount Vesuvius. He hurried toward the danger that people were already naming from. As he sailed, he dictated notes about what he observed to a scribe, who wrote them down.

My uncle Pliny sailed so close to the mountains that the hot cinders from the volcano fell onto the ships. Besides the cinders, there were also big chunks of burning rock. The ships were in danger from the rocks, by the sudden retreat of the sea from the area caused by the volcano, and from the huge boulders that were rolling down the mountain.

He thought about turning back, and the pilot of the ship he was on thought that was a good idea. But my uncle said, "Fortune favours the brave!" He ordered the pilot to steer toward Stabiae, which is the part of the city of Pompeii. Stabiae is about 16 kilometres away from Mount Vesuvius. When they arrived at Stabiae, my uncle met his good friend, Poppoianus, and tried to calm him down.

Even as my uncle was doing this, broad sheets of flame were coming out of Mount Vesuvius. Night had fallen so these flames could be seen more clearly than they would have been during the day. In order to calm his friend, my uncle told Poppoianus that they were just flames from burning villages on the slope of the mountain.

After this everyone went to bed at Poppoianus's house. They had slept only a short time, but the ash and stones were falling so thickly that they were rapidly filling the courtyard. If they stayed any longer, they would not be able to get out of the house. My uncle was a sound sleeper and had to be awakened. My uncle and his friends debated whether it would be better to stay in the house or go out into the open field. There the stones and rocks that were being thrown out of the depths of the mountain might not hit.

The Bay of Naples
Vesuvius

Task 1: Eyewitness Account


Read the eyewitness account of the eruption of Vesuvius in 79AD and highlight any description of the eruption itself.

1. Put the effects of the eruption into the correct sequence by adding numbers in the boxes provided.

- Sulphurous gases spread out over the area
- The sky turned black at night
- Broad sheets of flame shot out of Vesuvius
- A tall pyroclastic cloud, thick with cinders, rose up into the sky and spread out at the top
- Ash and burning rocks fell down from the sky
- The sea suddenly retreated

2. What do you think was actually happening when Pliny describes flames shooting out of the volcano?

3. On the map of the Bay of Naples, find Misenum and Stabiae. Draw the route that the boat would have taken.



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The Bay of Naples
Vesuvius

Task 1: Eyewitness Account

4. What effect did the eruption have on the sea in the Bay of Naples?

5. Using the scale provided estimate the area covered by the ash cloud.

6. In what direction were the winds blowing for the ash to fall so heavily and bury Pompeii?

7. What settlements would have been buried if the wind's direction was Westerly?

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The Bay of Naples

Vesuvius



Pupil Activities

Themes: 1. Tectonics

Aims

- Students to complete the description and diagram in their booklets

Task 2 – Vesuvius. This task is a question sheet based on volcano formation.

Notes

This is an activity that can be done as a preliminary activity on the coach on your way to the site.

The Bay of Naples Vesuvius

Task 2: The Formation of Vesuvius

Fill in the gaps in the following passage. The diagram will help.

Vesuvius was formed by the _____ of the African and the Eurasian plates. As these plates moved together, the African plate was _____ below the Eurasian plate. Intense heat and _____ caused melting of the crust producing _____. This rose to the surface and was extruded creating a _____. The earliest eruptions occurred 25000-20000 years ago.

Add labels in the boxes to show the main characteristics of this type of volcano

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Notes box:



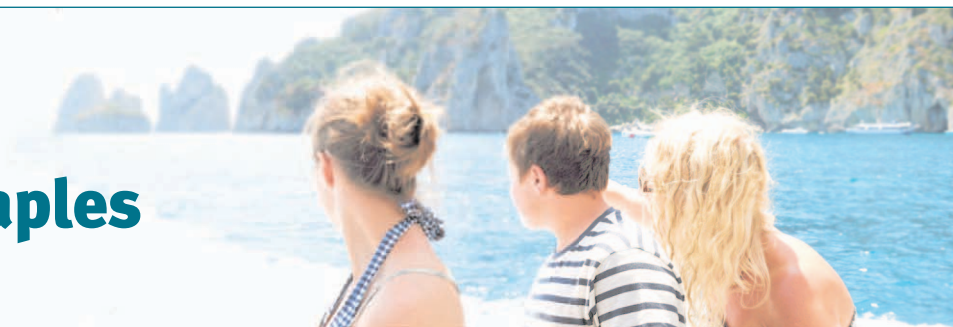
The Bay of Naples

Student Fieldwork Activity Book



The Bay of Naples

Contents



3 Map

4 Student Kit List

5-10 Vesuvius

Task 1

Task 2

Task 3

11-14 Pompei

Task 1

Task 2

15-17 The Island of Capri

Task 1

Task 2

Task 3

Task 4

Task 5

21-24 The Amalfi Coast

Task 1

Task 2

Task 3

25-26 Solfatara

Task 1

27-31 Monte Nuovo

Task 1

Task 2

Task 3

32-34 Vannulo Farm

Task 1

Task 2

Task 3

35-38 Tourism in Naples

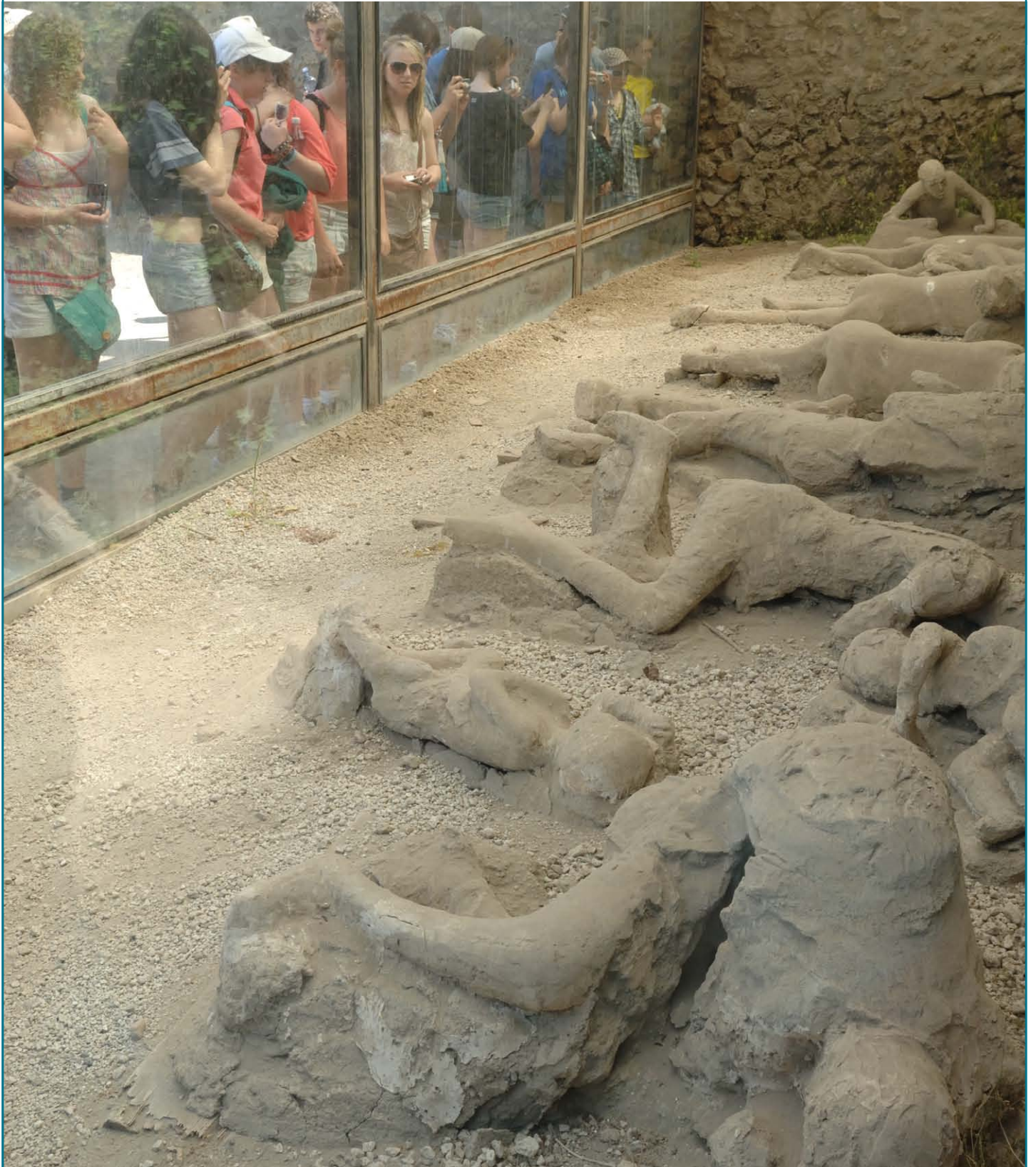
Task 1

Task 2

Task 3

The Bay of Naples

Pompeii



The Bay of Naples

Pompeii

Task 1: Data Collection

Within the excavations certain areas attract more visitors than others. Places that attract a large number of visitors are known as honeypot sites. By undertaking visitor counts at a number of locations throughout the site at a given point in time, it will be possible to build up a picture of where the honeypot sites are.

You will need:

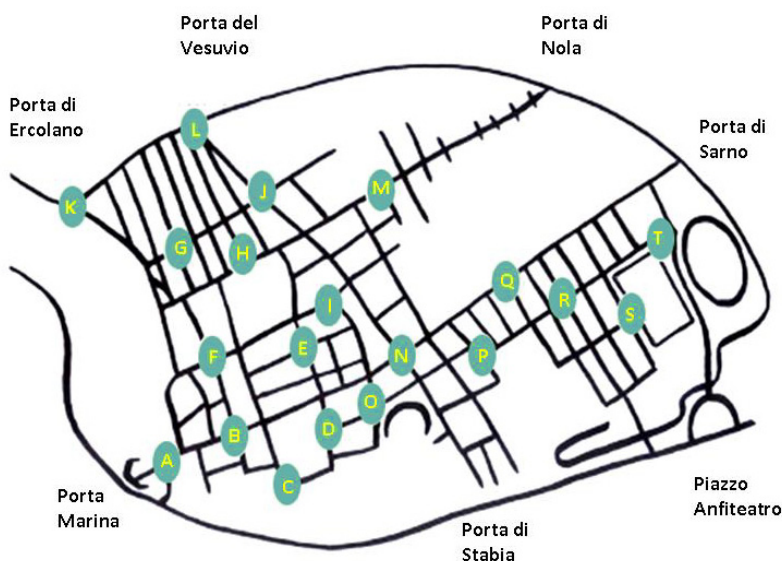
- ✓ A clipboard and pencil
- ✓ Watch or phone for time keeping
- ✓ Data collection sheet
- ✓ A map of the excavation site (issued at the ticket office or information point)

Method:

1. In your pairs/groups go to the location that your teacher has allocated to you.
2. At the time that you have been told to start counting, record each person that passes you in all directions. Record this information on your data record sheet. If the same person passes you one way and then passes you again in the other direction, count them twice.
3. Count for 10 minutes and then total up your results
4. When the time is up return to the meeting point that your teacher has told you and share your data with the group
5. Fill in the data record sheet with the totals for all the sites

Follow up work:

This information can be used to draw proportional circles, flow lines or visitor isolines on the map sheet provided. Now you have identified the busiest areas, think about the implications that this has for managing the site. Complete the sheet suggesting management strategies to limit the impact of tourism on the site of Pompeii.



The Bay of Naples

Pompeii



Task 1: Data Collection

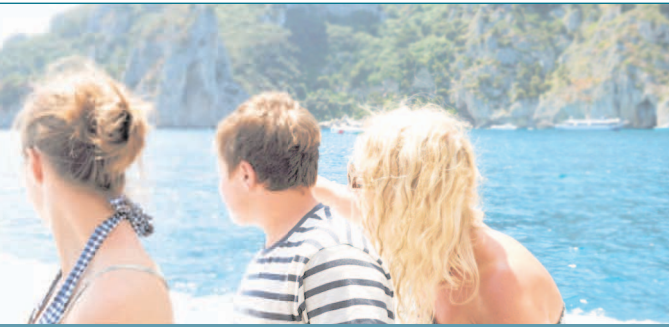
Location: _____

Visitor count (tick for each person that passes in any direction)	Total

Location	Total	Location	Total
A		K	
B		L	
C		M	
D		N	
E		O	
F		P	
G		Q	
H		R	
I		S	
J		T	

The Bay of Naples

Pompeii



Task 2: Visitor Impact

Aim: To assess the impact of visitors on the excavation site and its surrounds.

Use your observations and ideas to complete the following table:

Visitor impact	Strategy for impact reduction
Walking on the ruins, climbing on walls and sitting on stones	
Removal of material as souvenirs	
Litter and visual pollution	
Noise pollution	
Flash photography of friezes, pottery and figures	
Demands for food, drink and toilet facilities	
Large groups moving about the site	
High demand for parking	