

Unit 8 Public information systems

About the unit

In this unit pupils collate data from a variety of sources to develop a daily information service about weather. They will use a range of sources, *eg a school weather station, measurements, satellite (remote sensing), the internet, other files.*

A key aim of the unit is to develop a system that will meet the potential audience's needs. Pupils investigate these needs and then model the system using presentation software, teletext and multimedia presentations.

This unit is expected to take approximately 7 hours.

Where the unit fits in

This unit builds on datalogging developed in unit 6C 'Control and monitoring – What happens when...?' in the key stage 2 scheme of work and unit 7 'Measuring physical data'. It also builds on the use of presentation software in unit 2 'Information and presentation' and information handling in unit 5 'Data: designing structure, capturing and presenting data'.

The unit could be linked to a range of science or geographical enquiry. Both subjects could build on the basic work developed in this unit to address scientific and geographical concepts and to make more use of the data collected.

Expectations

At the end of this unit

most pupils will: collect data from a range of sources and complete an analysis of their data; prepare information using complex lines of enquiry for publication in a public information system (which may have had a preprepared structure)

some pupils will not have made so much progress and will: collect data appropriate to their needs and prepare it for processing; present information in a public information system (which may have had a preprepared structure)

some pupils will have progressed further and will: collect and combine data from a range of ICT-based and other sources; complete an analysis of their data and prepare information using complex lines of enquiry; design and publish a public information system for the display of their results

Prior learning

It is helpful if pupils have used data-handling and presentation software.

Language for learning

Through the activities in this unit pupils will be able to understand, use and spell correctly:

- satellite
- remote sensing
- CSV (comma separated variable) data

Reading – through the activities pupils could:

- distinguish facts from opinions and how far information is complete and helpful
- select relevant information and demonstrate links to a range of sources

Resources

Resources include:

- automatic weather station or temperature sensors. Where available a weather satellite receiving station could be helpful, but can be replaced by internet access
- internet access with a list of weather information sites and sites which present weather information for different audiences
- data-handling software (spreadsheet and/or database with appropriate graphing facilities, *eg to be able to plot bar and line graphs on the same graph and preferably to be able to plot more than one vertical axis scale*)
- presentation software, multimedia or web authoring software
- access to samples of different approaches to presenting weather information, *eg internet, TV, newspapers and teletext*

Extension and enrichment

Pupils could visit a weather station.

Pupils should learn:

Pupils:

Activity 1

- | | | | |
|---|---|---|---|
| <ul style="list-style-type: none"> • that information can be presented in a variety of ways depending on purpose and audience • the importance of identifying user requirements when starting to develop a system | <ul style="list-style-type: none"> • Discuss with the class the task of developing a presentation system and the need to investigate how weather information is presented, <i>eg on TV, in newspapers, on teletext</i>. The discussion should elicit the different forms of information, <i>eg weather maps, graphs, statistics, written form</i>. • Ask the pupils to work in groups to investigate two different sources. These sources can then be shared between the groups. Ask the pupils to identify how the weather is presented in detail and what purpose it performs, <i>eg giving predictions for visitors or farmers, reviewing holiday resorts</i>. • Hold a plenary discussion to compare different ways of presenting weather information and the reasons for presenting information in different ways. • Explain to the pupils how to distinguish facts from opinions and how far information is complete and helpful. | <ul style="list-style-type: none"> • investigate a range of electronic and print sources • understand that information can be presented in different forms for different audiences and purposes • consider the usefulness and appropriateness of information and texts | <ul style="list-style-type: none"> • A good selection of sources is important to ensure that pupils are able to identify the range of purposes of information. Include tables, graphics, opinion, etc. • Homework could involve each pupil asking a cross-section of people about what type of weather information would be useful. A prepared questionnaire sheet might be helpful for this task. These can be used when planning the presentation and identifying the audience. |
|---|---|---|---|

Activity 2

- | | | | |
|--|---|--|--|
| <ul style="list-style-type: none"> • to appreciate the range of sources of data and the difference between primary and secondary data • to assess the range and sources of weather data critically | <ul style="list-style-type: none"> • Hold a class discussion to review homework and the findings. Discuss the development of user needs to identify a small number of key requirements for the project, <i>eg weather report for the last 24 hours, information on current conditions, a forecast for the next 24 hours</i>. • Ask the class to identify the range of electronic sources of weather data (as opposed to interpreted information), <i>eg automatic weather station, satellite-receiving station, temperature and light sensors, internet weather data and cameras</i>. They should learn to recognise which sources are primary data and then compare this with interpreted data (secondary) as it might appear in newspapers or TV reports. • Ask pupils to work in pairs to investigate one or two sources and report back to the class on the type, range and frequency of data available, <i>eg from the weather station – wind speed, temperature, light, humidity – and if the information is available as hourly and daily averages or totals</i>. | <ul style="list-style-type: none"> • understand that weather data can come from a wide range of sources • analyse the form and structure of data from specific sources to inform future planning | <ul style="list-style-type: none"> • A good selection of suitable electronic sources is important to ensure that pupils are able to make choices. • A prepared sheet for assessing or reporting the variety of weather data sources might be helpful to aid assessment. • The use of a large-screen display and a prepared spreadsheet could be a useful way of collating source information. • Homework could involve an investigation into which people would make use of weather information, or to take the information from the last activity and identify gaps in the information and how this missing information might be collected. |
|--|---|--|--|

Pupils should learn:

Pupils:

Activity 3

- to develop a project specification
 - about the need for planning and matching of outcomes to user needs
- Review with the class what has been found previously and lead the class through the key choices each group will make in choosing data, methods of presentation and the system they will use.
 - Ask pupils to work in groups to establish the project 'specification' which they should ensure meets the needs identified earlier. Each group could be set a different task based on a different need, *eg weather information for sports teams, planning for holidays.*
 - The plan could include the use of raw data from an automatic weather station, and images from an internet site, which will need to be manipulated, *eg selecting appropriate data, drawing suitable graphs and the information inserted in a presentation package.*
- understand the needs of an audience and the constraints of a software presentation package
 - appreciate a range of methods of presenting information and select appropriate methods of display with respect to the needs of an audience
- It is important to ensure there is a range of data sources to enable pupils to make some judgements about the quality of data.
 - A sample 'frame' may be useful to guide or structure pupils' work.
 - Careful research and sample data for investigation is worth preparing to help those who have problems.
 - Homework could involve pupils reporting on or suggesting what information could be provided in another public information system, *eg a train station system.*

Activity 4

- how basic sensors work and how data is stored and transmitted
 - to download and store primary data
 - how data is stored in ROM in a specific format and can be downloaded to the computer
- Introduce the principles of remote sensing using two different examples, *eg how an automatic weather station measures rainfall and measures wind speed by sensing rotations of the anemometer by light.*
 - Ask the pupils to work in groups to collect data from their chosen source(s), downloading, copying and storing data as appropriate, ready for further analysis. Ask the pupils to write up the completed process individually.
 - Remind pupils that data must always be used carefully, *eg weather station data can contain incorrect data, either through a weakness in the system or the way an element is sensed.*
 - Encourage pupils to undertake independent research, using knowledge of how texts and databases are organised and using appropriate reading strategies.
- present results of analysis in ways that inform the specification of future working
 - collect, download or save appropriate data from datalogging or other sources
 - understand that remote sensing produces data in particular formats and know what these represent
- An automatic weather station is an ideal piece of equipment for this activity, but if there is not one available, temperature and light sensors could be used to measure local information.
 - Homework could involve pupils identifying different remote sensing applications in society and describing what type of data is collected and how it is used.

Activity 5

- to interpret and analyse information and to graph and present data appropriately
- Ask the pupils to work in groups and individually to process the downloaded data and prepare it for presentation, *eg weather station material will probably provide more data than is required (48 hours rather than one day) and internet sites will have more data, satellite images and other information than is required.*
 - Ask pupils to analyse and present information (in an appropriate format/medium – graphs, reports, maps and images), considering what would be appropriate given their target audience. Show the pupils how to select relevant information and link to other information from a range of sources.
- make critical selections from the available data
 - complete an analysis of the selected data
 - choose appropriate methods of graphical, diagrammatic, map and textual presentation so the information is suitable for the intended purpose and audience
 - synthesise information and ideas from different sources
- A large screen display is very useful for illustrating and discussing the appropriate use of graphs and other presentation techniques.
 - A common mistake is the use of line graphs for non-contiguous data, *eg rainfall totals.*
 - Homework could involve pupils producing rough drafts of their presentation.

Pupils should learn:

Pupils:

Activity 6

- | | | | |
|---|---|---|--|
| <ul style="list-style-type: none"> • to develop a presentation that is suitable for an audience and purpose • to incorporate data into a presentation package | <ul style="list-style-type: none"> • Discuss with the class the public information system they are planning, to elicit the options within the outline plan, <i>eg the issues associated with the placing of a computer in the entrance hall and the approach to using the presentation package, or other software.</i> • Ask the pupils to work in groups to incorporate their information into the software. Suggest one group has responsibility for setting up the public information system. • Ask each group to develop its presentation so it is ready to insert previously gathered information, <i>eg to test their ideas.</i> • Confirm with the class details for the updating of the information system. | <ul style="list-style-type: none"> • develop a presentation suitable for a specific audience • combine a variety of media in a presentation | <ul style="list-style-type: none"> • The approach to sharing out responsibility for providing data on a daily basis may not be possible. Another approach would be for each group to concentrate on a different audience. • A presentation package would be useful in setting up a revolving, self-timed presentation. It can also be used to have a non-timed user-controlled information source. Some schools may have web templates that can be used in a similar fashion. The presentation could be put onto a school intranet and updated during the project. • Homework could involve each group taking responsibility for providing/maintaining one-day's information on the system, and asking other users what they think of the system. |
|---|---|---|--|

Activity 7

- | | | | |
|---|---|---|--|
| <ul style="list-style-type: none"> • to establish the need for evaluation and for criteria • to consider the needs of the audience in the presentation of information | <ul style="list-style-type: none"> • Lead a discussion about ways in which the pupils can evaluate the public information system and identify the range of opportunities that might be beyond the scope of this unit or the equipment available. • Ask pupils to work in pairs or individually to identify the improvements that could be developed and to write up their evaluation of the work done and the potential improvements. | <ul style="list-style-type: none"> • make critical evaluations of the public information system and identify the criteria that are independent of the project • understand that user requirements are vital for all ICT systems | <ul style="list-style-type: none"> • A pro forma of evaluation criteria might be helpful as a handout for pupils to guide their discussion and writing. • An extension for this work could be the identification of similar public information systems and the role they play for their users. |
|---|---|---|--|