Unit 2E Questions and answers

ABOUT THE UNIT

In this unit children develop their awareness of different types of questions, how they can be asked and how ICT can be used to answer them using different types of software. They learn that some of the programs they have used so far to present data cannot provide the answers to some specific questions. They begin to realise that programs have limitations and that it is knowledge of the facilities and tools offered that helps us to select the most appropriate tool for a task.

Children learn how to ask questions that can be answered with yes or no responses. They have opportunities to work with a prepared file on a binary tree program to practise their questioning skills.

Children will have opportunities to enter and store information using some of the different types of ICT information resources that are available. Children will use what they have learned in this unit to help them to ask more focused questions to find specific information when studying Units 2C 'Finding information' and 3C 'Introduction to databases'.

A number of programs are appropriate for work on questions and answers. It is not suggested that they are all used by all of the children and, because of the scope of this unit, teachers may feel it is appropriate to break it down into sub-units that can be utilised over a slightly extended period.

WHERE THE UNIT FITS IN

This unit builds on Units 1C 'The information around us', 1D 'Labelling and classifying' and 1E 'Representing information graphically: pictograms'. It prepares children for Units 2C 'Finding information', 3C 'Introduction to databases' and 4C 'Branching databases.

The unit assumes that children:

- can collect data
- can sort and classify using a range of simple criteria
- can use a graphing program to create pictograms
- can explain data that is presented graphically
- can use print-based contents pages and indexes
- understand that questions can be asked in different ways.

TECHNICAL VOCABULARY

- information
- key words
- collect
- sort
- classify
- pictogram
- graph
- binary tree

RESOURCES

- a graphing program to create pictograms with a selection of prepared picture sets
- a binary tree program with a selection of prepared data files
- a database with a prepared data file for demonstration purposes

EXPECTATIONS

at the end of this unit

most children will:	know that there are different programs for collecting and presenting data; ask questions in different ways to find things out
some children will not have made so much progress and will:	know that there are different programs for collecting and presenting data; be aware that questions can be asked in different ways to find things out
some children will have progressed further and will:	construct different types of questions for different purposes, *eg questions that can only be answered by yes or no for use with a binary tree or questions that can only have one possible answer*

QCA

LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES

CHILDREN SHOULD LEARN

• **key idea:** that information can be represented as graphs but that this can only provide limited answers to questions

◆ Almost any topic could be used, *eg pets, ways of getting to school, favourite pastimes or houses and homes.*
◆ Ask the children to think about their house. Ask one or two to describe their house. Make a list of questions to ask about the houses, *eg How many people live there? What is it made from?* Make a class pictogram using a prepared set of pictures that are relevant to the location.
◆ Ask the children to use the pictogram to answer some simple questions, *eg How many people live in stone houses? How many live in brick houses? Do more people live in houses made of brick than stone?*
◆ Now ask the children more questions, *eg Who lives in a stone house? Does the pictogram or graph provide this information?*
◆ Repeat this process by making a pictogram of the number of residents and encourage the children to ask similar questions, *eg How many children live in houses with three other people? How many children live in houses with five other people? Who lives with four other people? Does the pictogram or graph provide this information?*

SHORT FOCUSED TASKS

• **key idea:** that there are different types of questions which can be answered in different ways

◆ Discuss with the children the kind of information that might be useful when looking at houses (but any topic would do).
◆ Ask children to suggest questions to find out the information needed. Record these questions so that all children can see them.
◆ Select one of the questions and ask the children what types of answers they would expect. If the question is, *Which family lives in this house?* they might suggest a surname as the answer. Write down the answer. There will be a different answer for each house they consider. If the question is, *Does this house have a garden?* there can be two possible answers – yes or no. These are the types of questions that will be practised over the next few activities.
◆ Games such as 'Guess Who' provide an excellent way of practising the asking of questions with yes or no answers. You can make your own version of the game using coloured photographs of children in the class. Children should be encouraged to ask simple questions, *eg Is it a boy?* In response to the answer, children should turn over the photographs that do not comply. This process should be completed until only one photograph remains.

• **key idea:** that some questions have only yes/no answers and have to be phrased carefully

◆ Construct a paper-based binary tree using a set of objects such as fruit. Prepare some strips of paper for recording the questions. Cut a set of red arrows for 'no' answers and green arrows for 'yes' answers. Collect a set of fruit, such as banana, apple, apricot, grapefruit, grape. Select two of these pieces of fruit, *eg the banana and apple.* Ask a question to distinguish between them (the answers can be yes or no), *eg Is it yellow?* Put down a red and a green arrow leading from the question strip. Put the banana at the end of the green (yes) arrow and the apple at the end of the red (no) arrow. Now choose another piece of fruit such as a grape. Ask the first question again. This time the answer will be 'no'. Follow the 'no' arrow and construct a question to distinguish between the apple and the grape. The question might be *Is it small?* Position this question strip at the end of the red arrow with a red and green arrow leading from it. The apple should follow the red 'no' arrow and the grape should follow the green 'yes' arrow. Repeat this process with each piece of fruit in turn.
◆ Use a commercially prepared file on a binary tree database to replicate this activity or create your own on an appropriate topic. Ideally, there will be relevant artefacts or visual aids available for children to handle so that this is a concrete activity. Children should select one artefact from the set and use the software to identify it. They should then select a second artefact and follow the question and answer sequence in order to identify it. Repeat this until all of the artefacts are named. Attribute blocks or 3D shapes might be appropriate.

LEARNING OUTCOMES

POINTS TO NOTE

CHILDREN

• understand that a simple graphing program has limitations in the features that it provides and it cannot answer some specific questions

Questions about whether children live in detached houses or terraced houses can raise sensitivities.

The teacher should prepare the data file or set of pictures based on the information offered by the children so that they are working with the real data. Try and include one or two types of dwellings that no one lives in so that the graph produces 'no returns'.

Children need to understand what features the program offers which make it worth using, particularly in the early stages of data handling, *eg the pictures in the pictogram are evenly spaced by the computer, it organises them into neat rows or columns, it prevents pictures being mixed up in a row or column, it is possible to change from one type of presentation to another very quickly.*

• understand what is meant by 'information'
• construct questions
• suggest plausible answers
• understand the difference between questions and answers
• ask questions that comply with the rule that it can only have a yes or no answer

It is important that children understand that when questions are asked answers can be: a word, yes or no, a number, a sentence or a description.

Although the main focus at this stage is to practise asking questions with yes or no answers, children will go on to look at other types of questions and answers.

Such activities provide a concrete context for asking and answering questions and using the information to find the solution. Another variation is to play games to find a number. Give each pupil a number line and some counters. One person thinks of a number and writes it down so they cannot cheat! Children ask questions such as *Is it an even number?* or *Is it less than n?* They use the counters to cover the numbers that do not comply. This is a very good way of 'making the thinking visible' and discussing strategies for solving these problems.

• use a prepared file to identify objects
• know that the program constructs a 'binary tree'

In these activities the focus is not on the software, the rules that it uses to produce the answers or the context. The main focus is on the development and practice of questioning techniques.

The main focus of this activity is to practise asking questions using a simple search tool and to reinforce the idea that questions can be asked in several ways and, similarly, answers can be found in different ways.

LEARNING OBJECTIVES

POSSIBLE TEACHING ACTIVITIES

CHILDREN SHOULD LEARN

- **key idea:** that some questions can have only one possible answer from a selection and others can have more than one answer from a selection
- **key idea:** that a database provides a means of storing information and can be searched
- **technique:** to use the search tool to find the answers to simple questions

- ◆ Discuss other types of questions and answers with the children. Refer to the original set of questions generated by the children. Perhaps one question might be, *How many windows has your house – three, four, five, six or seven?* This type of question has only one possible answer from the list. Have some samples of questionnaires available that use this type of question.
- ◆ Point out that questions can also be posed which are answered more easily by using a tick-box approach, where more than one choice may be appropriate, *eg Does your house have a chimney, a garden, central heating, an upstairs, a garage, a satellite dish?*
- ◆ Show the children a simple completed database (based on the information provided by the children) and demonstrate how the search tool enables specific questions to be answered. Encourage children to ask their own questions and see if they can use the search tool to find out the answers. Provide a simple aide-memoire to illustrate the process of asking questions using the search tool. Draw up a short list of questions from those suggested by the children with a simple means of recording their answers.

- **key idea:** that a database can only answer questions if appropriate data has been entered

- ◆ Using the same database, prepare a sheet of questions that can be answered, but include some that cannot because appropriate data is missing.
- ◆ Discuss with the children what data might need to be added.

INTEGRATED TASK

- to prepare data for a database
- to use the search tool on a simple database to find out the answers to specific questions
- to present findings

- ◆ Draw up a simple questionnaire with the children about their favourite teddy bear ensuring that all of the above types of questions are included. Produce a paper-based copy of the questionnaire for all children to complete. The questions might ask, *eg the name of the child, the name of the teddy if it has one, the teddy's height and weight, its favourite sandwich (from a choice of four varieties) and its favourite jelly (from a choice of four varieties).*
- ◆ Replicate the questionnaire structure in a simple database program and enter the data ready for the next lesson with the children's help, if possible.
- ◆ Show the children the completed database and demonstrate how the search tool enables specific questions to be answered. Encourage children to ask their own questions and see if they can use the search tool to find out the answers.
- ◆ Produce a list of questions with the children. These questions should be used as a starting point for a question and answer investigation. They should record their own questions and the answers they found.

LEARNING OUTCOMES

POINTS TO NOTE

CHILDREN

- know that this type of program is called a database and it can be used to find out the answers to questions
- use the search tool to find the answers to simple questions

Children will need access to a selection of prepared data files with a limited number of fields and a limited number of records. They will probably need to repeat this activity on a number of occasions.

Teachers will need to prepare the data files in advance. The children could enter the data.

- understand that if data has not been entered it cannot be used to provide the answers to questions

Questions need to be kept simple so that children can discover quickly that the answers cannot be found.

- collect information for a database
- use the search tool to find the answers to simple questions
- understand that questions cannot be answered if the relevant data has not been entered into the database