



Developing **number**

Optional Skills Assessment Materials

Then and now



Optional Skills Assessment Materials

Developing number

Audience	Teachers at Key Stage 2, in particular those with Year 5 classes; local authorities; tutors in initial teacher training; and others with an interest in education.
Overview	These new materials support learning, teaching and assessment of learners' skills in Year 5. They are designed to assist schools in implementing the revised school curriculum and its frameworks.
Action required	Schools' senior managers and local authority advisers are requested to raise awareness of these new materials within their schools, and to encourage teachers to use the materials to support their focus on developing learners' skills.
Further information	Enquiries about this document should be directed to: Curriculum and Assessment Division Department for Children, Education, Lifelong Learning and Skills Welsh Assembly Government Cathays Park Cardiff CF10 3NQ Tel: 0800 083 6003 e-mail: C&A3-14.C&A3-14@wales.gsi.gov.uk
Additional copies	Can be obtained from: Tel: 0845 603 1108 (English medium) 0870 242 3206 (Welsh medium) Fax: 01767 375920 e-mail: dcells1@prolog.uk.com Or by visiting the Welsh Assembly Government's website www.wales.gov.uk/educationandskills
Related documents	<i>Optional Skills Assessment Materials for Year 5 – An overview;</i> <i>Optional Skills Assessment Materials: Developing communication;</i> <i>Optional Skills Assessment Materials: Developing thinking</i> (Welsh Assembly Government, 2009) These materials are also available in Welsh.



Contents

Overview	2
Links to the skills framework	3
Links to the curriculum	4
Activity 1: Joseph's day	5
Links to the skills framework	5
Context	5
Resources	5
Developing the activity (part 1)	6
Developing the activity (part 2)	7
What to look for	10
Photocopiable sheets	11
Activity 2: Work and play	15
Links to the skills framework	15
Context	15
Resources	15
Developing the activity (part 1)	16
Developing the activity (part 2)	18
What to look for	23
Photocopiable sheets	24

Overview

Two related activities are presented. These are based around the life of a 10-year-old boy working in a coal mine in Wales during the 1840s:

- **Activity 1: Joseph's day**
- **Activity 2: Work and play**

Since the 2008 Programme of Study for History requires the study of daily lives in your locality in the nineteenth century, this description of a child coal-worker's day is a fictionalised account. It is, however, based on evidence from the coal-mining areas of Wales in the Royal Commission Report on the Employment and Condition of Children in Mines and Manufactories, 1842. Similar evidence for other localities in Wales can be found in the reports of Royal Commissions on the Employment of Children, Young Persons and Women in Agriculture and the Royal Commission Report on the Employment of Children and Young Persons in the Collieries and Iron Works.

In Activity 1, learners sequence a set of cards, each containing information about the way in which Joseph Evans spent a typical working day in a coal mine in the 1840s. Learners then discuss illustrations provided on a resource sheet in order to gain a better understanding of working conditions in a coal mine during the nineteenth century. Finally, learners use a fact sheet and a worksheet to solve number problems based on the life of Joseph Evans.

In Activity 2, learners compare the way Joseph spent his time with the way in which they spend their time during a school day. Learners are asked to complete tables, construct appropriate charts and talk about the similarities and differences between their day and Joseph's day, using their graphs to illustrate their ideas.



These activities are not timed assessment tasks, so you should feel free to adapt the materials provided to suit the needs of your learners.

The timings given at the beginning of each activity are suggestions. Some activities may take less time, while others may take considerably more. This will depend on the routes learners take and their interest in the activity itself.

Learner groupings

To promote collaborative learning, most activities are best undertaken by groups or pairs of learners who should be encouraged to share and discuss their ideas. At appropriate times, these groups could come together to present and compare their findings and the methods they use.

At other times, you may wish learners to work individually to provide evidence of their knowledge and skills. Consequently, the worksheets that accompany the activities can be used with groups, pairs or individuals as you consider appropriate.

Links to the skills framework

As learners engage with these materials they will generate evidence that contributes to their individual skills profile.

The 'Developing number across the curriculum' section of the skills framework has three main elements: **Use mathematical information**, **Calculate** and **Interpret and present findings**, with each of these sub-divided into a further two or three strands. These strands are referred to as 'principles' in the skills framework and are shown below.

Use mathematical information

- Using numbers
- Measuring
- Gathering information

Calculate

- Using the number system
- Using a variety of methods

Interpret and present findings

- Talking about and explaining work
- Comparing data
- Recording and interpreting data and presenting findings

Each principle contains six cells that correspond to stages in the development of the related skill. For example, the six cells identified in the **Measuring** principle are shown below.

Compare two or more objects by direct comparison of physical properties.	Measure and compare length and mass; order events in time.	Choose and use everyday units of measure and familiar measuring equipment; read scales to an appropriate degree of accuracy.	Use more precise measuring equipment with finer calibrations. Make reasonable estimates of a range of measures in everyday situations. Use correct units for compound measures such as volume, density or speed.	Read scales on a range of measuring equipment to given levels of accuracy.	Make accurate and reliable observations choosing suitable equipment; measure in a variety of appropriate units.
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Evidence generated by the activities can be linked with cells to provide an indication of an individual learner's progress in the related skill area.

However, when doing this you should bear in mind the following points:

- The evidence generated by the activities will be a small part of the overall evidence that is available to you.
- Much evidence will be generated during other day-to-day learning and teaching; significant elements of this should also contribute to the learner's skills profile.
- The evidence generated by any activity is likely to contribute to a variety of principles and cells.

This final point is of particular importance when you review the **What to look for** section included with each of the activities.

These sections are designed to make evidence gathering more manageable by deliberately focusing on just two or three of the eight principles. However, this means that only some of the evidence that emerges is being considered.

As your familiarity with each of the activities increases, you may find that you are able to incorporate more of the available evidence into a variety of other principles and/or cells.

Links to the curriculum

History

Skills: Chronological awareness

2. use appropriate key words to estimate, measure and describe the passage of time

History

Skills: Historical knowledge and understanding

1. identify differences between ways of life at different times

History

Skills: Historical enquiry

1. ask and answer relevant questions about the past

History

Skills: Organisation and communication

1. select, record and organise historical information
2. communicate ideas, opinions and conclusions with increasing independence in a variety of ways, including ICT

PSE

Skills: Developing communication

- listen carefully, question and respond to others

PSE

Skills: Working with others

- work cooperatively to solve problems
- empathise with others' experiences and feelings

English (Oracy)

Skills:

3. communicate clearly and confidently, expressing opinions, adapting talk to audience and purpose, using appropriate gesture, intonation and register in order to engage the listener

English (Reading)

Skills:

5. consider what they read/view, responding orally and in writing to the ideas, vocabulary, style, presentation and organisation of image and language, and be able to select evidence to support their views

Mathematics

Skills: 2. Communicate mathematically

- use a variety of methods to represent data

Mathematics

Skills: 3. Reason mathematically

- develop a variety of mental and written strategies of computation

Activity 1: Joseph's day



Links to the skills framework

In order to make evidence gathering more manageable, it is suggested that you concentrate initially on each of the principles shown as a main focus in the table below.

Use mathematical information

- Using numbers
- Measuring
- Gathering information

Calculate

- Using the number system
- Using a variety of methods

Interpret and present findings

- Talking about and explaining work
- Comparing data
- Recording and interpreting data and presenting findings

Key

- Main focus ● Incidental focus
- No intentional focus

The **What to look for** section at the end of this activity provides an indication of some of the evidence that you might expect and the cells with which this evidence might be matched. However, it is important to appreciate that a range of other evidence may also be generated and that this may be more validly associated with other principles and/or cells.

Context

This activity is in two parts. Consequently, you may wish to spread it over two or more sessions.

In the first part of the activity, learners are asked to sequence a set of cards containing information on a typical day in the working life of Joseph Evans. Many different sequences are possible, and learners are encouraged to discuss the particular order in which they have chosen to sequence their cards.

In the second part of the activity, learners use the resource sheet and the fact sheet to gather more information on working conditions in a coal mine in the 1840s. They then use the information on the fact sheet to solve some number problems associated with the life of Joseph Evans.

Resources

For the first part of the activity, each group of learners will require a set of the cut-out cards provided. Before you begin the activity, photocopy, laminate (if possible) and cut-out sufficient sets of cards for your needs.

For the second part of the activity, each group or pair of learners will require a copy of the resource sheet, the fact sheet and the worksheet that are provided.

If you consider it appropriate, you may choose to provide calculators.

Activity 1 | Joseph's day

Developing the activity (part 1)

- Distribute a set of cards to each group of learners.
- Stimulate whole-class discussion and thinking by asking questions such as:
 - What information is given on the cards?
 - How do you think you could use the cards?
 - Which card might come first? ...last?
- As learners provide feedback, encourage other learners to comment and/or ask further questions.
- Ask each group of learners to arrange their cards to 'make a story'.
- Careful observation of learners as they work will provide opportunities for gathering evidence relating to thinking, communication and number skills.
- Allow adequate time for groups to engage with the task, before bringing them back together to share and compare their card sequences.
- Selecting particular learners and asking appropriate questions, e.g. 'Why did you choose to put the cards in that order?' and 'Would it make sense to arrange them in a different way?' will allow you to gather further evidence.
- Following the reporting back session, you may wish to allow further time for learners to follow up the ideas discussed.

Joseph Evans is a fictitious character. However, the description given is based on the evidence given by child workers to the Royal Commission on Children in the Mines 1840–1842.

Developing the activity (part 2)

- Display a copy of the resource sheet on the whiteboard and/or distribute a copy to each group of learners.
- Stimulate whole-class discussion and thinking by asking questions such as:
 - What do you think the sheet shows?
 - Are there some things in the pictures that you read about on the cards?
 - How do you feel about what the pictures show?
- Distribute a copy of the fact sheet and a copy of the worksheet to each group. The fact sheet contains the same information that is shown on the cards.
- Challenge learners to find out more about Joseph Evans' life by solving the problems on the worksheet, using the fact sheet provided to gather information.
- Careful observation of learners as they work will provide opportunities for gathering evidence relating to thinking, communication and number skills.
- Allow adequate time for groups to engage with the task before bringing them back together to share and compare their findings and methods.
- Selecting particular learners and asking appropriate questions, e.g. 'How did you work out this answer?', 'Can you do it another way?' and 'How can you check it is correct?' will allow you to gather further evidence.
- Following the reporting back session, you may wish to allow further time for learners to follow up the ideas discussed.

Then and now	Activity 1: Joseph's day	Resource sheet
  		
All images © National Museum Wales		

Activity 1 | Joseph's day

An example of classroom practice

After spending some time reading and discussing the fact sheet, the teacher challenged the learners to solve the problems on the worksheet. The teacher told the learners that they should work together to identify the number facts that would be needed to solve each problem and then to work out the answers.

As soon as the learners began the activity, it became apparent to the teacher that some learners were 'sitting back' and allowing others to do all the work. Consequently, the teacher encouraged the learners to take turns to write out the facts, the calculations and the answers. This ensured that all learners were involved. Those who were unsure of how to proceed questioned other members of their group, so that all learners discussed each problem and the methods that might be used to solve it.

The teacher circulated between the groups as they were working and noted some thoughtful discussions where learners were weighing up the different approaches that they might take to specific problems.

One learner stated that she could work out the answer to how long ago Joseph was born by 'finding out what adds on to 1829 to make 2008 or by taking away 1829 from 2008'. Another suggested an approximate value for this answer would be 'a hundred and something – nearer two hundred than one hundred'.

The teacher also provided some input into group discussions when learners experienced difficulties with specific calculations. For example, one group was struggling to work out 6 lots of $6\frac{1}{4}$ p in order to find out how much Joseph earned in one week. The teacher suggested that they first work out 6 lots of 6 and then find 6 lots of $\frac{1}{4}$. The learners found this approach helpful and were able to utilise a similar approach for the next problem on the worksheet.

Then and now	Activity 1: Joseph's day	Worksheet	
Name(s): <u>Ellie, Sophie, Owen + James</u>			
Problem	Number facts I can use	Working out	Answer
How old do you think Joseph was when he started work?	Joseph is nearly <u>11</u> years old. He has been working for about <u>10</u> months.	<u>11 years - 10 months</u> <u>= just over 10</u>	<u>10</u> years
In what year do you think Joseph was telling his story?	Joseph was born in <u>1829</u> . He is nearly <u>11</u> years old.	<u>1829 + 10</u> <u>= 1839</u>	<u>1839</u>
How long ago was Joseph born?	Joseph was born in <u>1829</u> . The year is now <u>2008</u> .	<u>2008 - 1829</u> <u>= 179</u>	<u>179</u> years
How many pence does Joseph earn in one week?	Joseph is paid <u>6</u> $\frac{1}{4}$ p a day. He works <u>6</u> days a week.	<u>6 x 6 = 36</u> <u>6 x $\frac{1}{4}$ = $1\frac{1}{2}$</u> <u>36 + $1\frac{1}{2}$</u>	<u>37 $\frac{1}{2}$p</u>
About how much money has Joseph earned since he started to work?	Joseph earns <u>37 $\frac{1}{2}$p</u> a week. He has been working for about <u>10</u> months.	<u>37 $\frac{1}{2}$ x 4 = 148</u> <u>+ 2 = 150</u>	<u>15.00</u>
About how many baskets of coal does Joseph move each day?	Each drum carries <u>3</u> baskets. Each train is made up of <u>2</u> drums. Each day Joseph moves about <u>20</u> trains.	<u>3 x 2 x 20</u> <u>= 120</u>	<u>120</u>

Although the teacher had provided calculators, most calculations were done mentally.

After completing the worksheet, the learners were keen to discover whether their answers had been correct. There was a great deal of questioning between the groups at the end of the session, for example, 'Could you do that question?' and 'What did you put for that answer?'.

The teacher then went through all the problems with the class, discussing the answers and the methods that they had used. The teacher and the learners thought that this was a valuable exercise, as the learners were pleased to receive feedback on their performance.

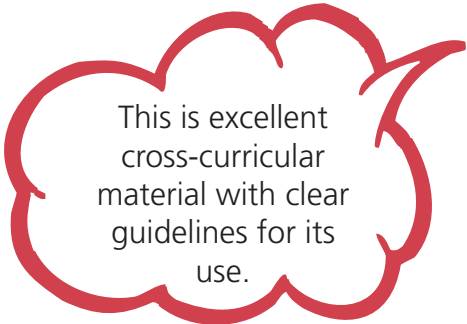
Expected answers to problems

- | | | |
|---------|------------------|-------------------------|
| (1) 10 | (2) 1839 or 1840 | (3) current year – 1829 |
| (4) 37½ | (5) 15 or 16 | (6) 120 |

What some teachers said about the activity



I would 'hot spot'
Joseph Evans.



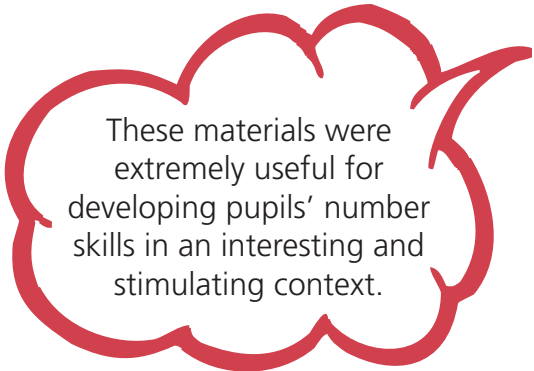
This is excellent
cross-curricular
material with clear
guidelines for its
use.



This fits in well with a
study of child labour,
both in history and in
modern times.



There were excellent
opportunities to assess
how well pupils could
apply the skills they had
previously been taught.



These materials were
extremely useful for
developing pupils' number
skills in an interesting and
stimulating context.



This activity fits
perfectly with the Year
5 topic on nineteenth
century local history.

What to look for

Measuring

When deciding on an appropriate sequence for their cards, are learners able to:

- recognise the references to time on the cards (Cell 1)
- use appropriate reasoning to order the events in time (Cell 2)
- appreciate that there may be several possible sequences (Cell 2)?

Gathering information

When using the resource sheet and/or the fact sheet, are learners able to:

- recognise the need to use information from the fact sheet (Cell 1)
- understand and interpret the information on the resource sheet (Cell 2)
- read and understand the information on the fact sheet (Cell 2)
- choose appropriate data from the fact sheet in order to solve a particular problem (Cell 3)?

Using a variety of methods

When solving the problems on the worksheet, are learners able to:

- use a variety of mental strategies to add and subtract small numbers (Cell 2)
- use mental, written and calculator methods for their calculations, as appropriate (Cell 3)
- approximate values and estimate answers (Cell 3)
- check their results make sense by referring to the size of the numbers or the context (Cell 3)
- check the accuracy of their answers using mental estimation, approximation and inverse operations to decide whether or not they make sense (Cell 4)?

I go to bed at half past six.

I start work at four o'clock.

I go down the pit in a basket and I have to hold on tight. I go down about 105 feet (about 35 metres) in the basket.

When I get home, I have a wash, eat my dinner and then have a rest. If I am not too tired, I usually play with my brothers and sisters between five o'clock and bed time.

I move the full drams to a man called the hitcher who sends the coal up to the surface. Every day, I move about 20 trains of coal to the hitcher.

I have been working for about 10 months and I get paid one shilling and thrupence ($6\frac{1}{4}$ pence) a day. I work six days a week and go to chapel on Sundays.

I work until four in the afternoon.

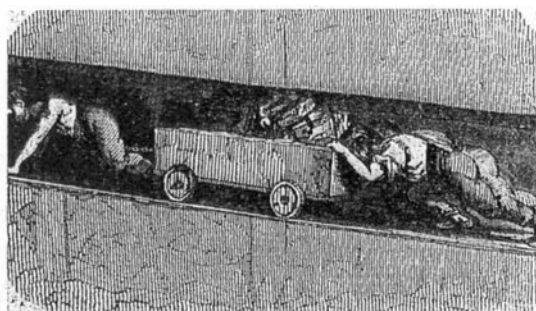
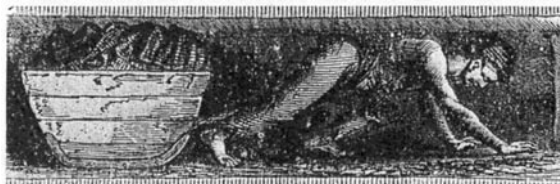
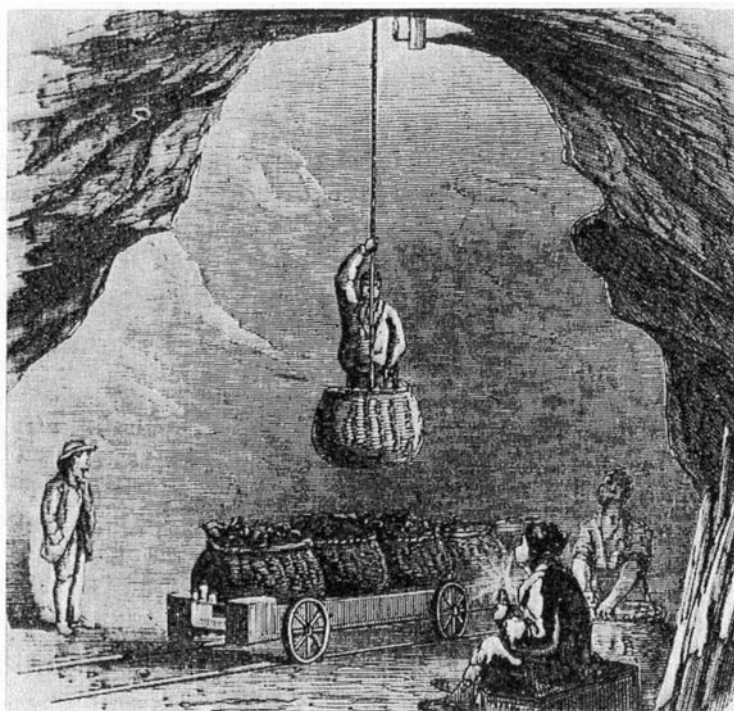
I was born in 1829 and I am nearly 11 years old.

On working mornings, I get up at half past three. I have a wash, get dressed and eat my breakfast.

My name is Joseph Evans and I work in Llanbedr Colliery, Wales.

Between 11 o'clock and midday I have a rest and eat my food of bread and cheese. Sometimes, I have to go hungry because the rats have stolen my food.

My first job is to light the candles. Next I fasten my pony up to a train of two drams. Drams are small wagons that carry baskets of coal. Each dram carries three big baskets of coal.



My name is Joseph Evans and I work in Llanbedr Colliery, Wales.



I was born in 1829 and I am nearly 11 years old.
I have been working for about 10 months and I get paid one shilling and thrupence ($6\frac{1}{4}$ pence) a day.
I work six days a week and go to chapel on Sundays.

On working mornings, I get up at half past three.
I have a wash, get dressed and eat my breakfast.

I start work at four o'clock. I go down the pit in a basket and I have to hold on tight.
I go down about 105 feet (about 35 metres) in the basket.

My first job is to light the candles. Next I fasten my pony up to a train of two drams.
Drams are small wagons that carry baskets of coal. Each dram carries three big baskets of coal.

I move the full drams to a man called the hitcher who sends the coal up to the surface. Every day, I move about 20 trains of coal to the hitcher.

I work until four in the afternoon. Between 11 o'clock and midday I have a rest and eat my food of bread and cheese. Sometimes, I have to go hungry because the rats have stolen my food.

When I get home, I have a wash, eat my dinner and then have a rest. If I am not too tired, I usually play with my brothers and sisters between five o'clock and bed time.

I go to bed at half past six.

Name(s):

Problem	Number facts I can use	Working out	Answer
How old do you think Joseph was when he started work?	Joseph is nearly years old. He has been working for about months.		 years
In what year do you think Joseph was telling his story?	Joseph was born in He is nearly years old.		
How long ago was Joseph born?	Joseph was born in The year is now 20 _ _.		 years
How many pence does Joseph earn in one week?	Joseph is paid p a day. He works days a week.		p
About how much money has Joseph earned since he started to work?	Joseph earns p a week. He has been working for about months.		£.....
About how many baskets of coal does Joseph move each day?	Each dram carries baskets. Each train is made up of drams. Each day Joseph moves about trains.		

Activity 2: Work and play



Links to the skills framework

In order to make evidence gathering more manageable, it is suggested that you concentrate initially on each of the principles shown as a main focus in the table below.

Use mathematical information

- Using numbers
- Measuring
- Gathering information

Calculate

- Using the number system
- Using a variety of methods

Interpret and present findings

- Talking about and explaining work
- Comparing data
- Recording and interpreting data and presenting findings

Key

- Main focus ● Incidental focus
- No intentional focus

Context

This activity is in two parts. Consequently, you may wish to spread it over two or more sessions.

In the first part of the activity, learners gather information on a day in the life of Joseph Evans and use it to complete tables and construct an appropriate chart. Learners are then given the opportunity to interpret their results and to talk about their findings.

In the second part of the activity, learners gather information on their own school day and represent it using tables and a chart. Learners then compare the charts they have constructed, identifying similarities and differences between the ways in which they and Joseph Evans spend their working day.

Resources

For the first part of the activity, each group or pair of learners will require a copy of the worksheet provided and a copy of the fact sheet from Activity 1.

For the second part of the activity, each group will require a copy of the activity sheet provided. Each learner will also need plain or graph paper on which to construct their tables and charts.

The **What to look for** section at the end of this activity provides an indication of some of the evidence that you might expect and the cells with which this evidence might be matched. However, it is important to appreciate that a range of other evidence may also be generated and that this may be more validly associated with other principles and/or cells.

Activity 2 | Work and play

Developing the activity (part 1)

- Distribute a copy of the fact sheet used in Activity 1 and a copy of the first page of the worksheet to each group of learners.
- Stimulate whole-class discussion and thinking by asking questions such as:
 - What time did Joseph get up on a work day morning?
 - Which activities take up most of Joseph's time?
 - How much time did Joseph have for play?
- As learners provide feedback, encourage other learners to comment and/or ask further questions.
- After the general introduction, ask learners to use the information on the fact sheet to complete the tables showing 'What Joseph did'.
- Tell learners that they are going to represent their results in a chart. You may wish to provide the second page of the worksheet to support learners in doing this.
- Alternatively, you could leave the task 'open'. This will allow learners to decide upon the type of chart to construct and/or the scale to use.
- Careful observation of learners as they work will provide opportunities for gathering evidence relating to thinking, communication and number skills.
- Allow adequate time for groups to engage with the task before bringing them back together to share and compare their findings.
- Selecting particular learners to report back will provide further opportunities for you to gather specific evidence about individuals.

Then and now

Activity 2: Work and play

Worksheet

Name(s):

Joseph Evans lived in Victorian Times.

He was 10 years old when he started work in a coal mine.

1. Use the fact sheet to complete this table.

Time	What Joseph did
	Get up and get ready for work
04:00 to 11:00	
11:00 to midday	
	Work
	Go home, wash, eat dinner and rest
17:00 to 18:30	
	Sleep

2. Complete this table to show how Joseph spent his working day.

What Joseph did	Number of hours
Working	
Playing	
Sleeping	
Other	

An example of classroom practice

After being reminded of some of the important facts about Joseph's day, the groups were keen to tackle the worksheet.

The teacher explained that each different section of Joseph's day should have a start time and a finish time and that all of Joseph's activities must add up to 24 hours.

One group decided to read through the fact sheet again, using a highlighter pen to note any times that were mentioned. They then began to transfer these times to the appropriate spaces on the table.

However, after completing part of the sheet, Amanda noticed that the times on the fact sheet used the 12-hour clock whilst the worksheet used the 24-hour clock. This caused a great deal of discussion as the learners couldn't decide which clock times to use. As the second method would mean having to change the times already given on the sheet and 'making a mess of it', the group decided to make further entries using the 24-hour clock format. However, they also agreed to add a.m. and p.m. to their times 'just in case we forget which is which'.

Each member of the group then used a copy of the second page of the worksheet to draw their own bar chart illustrating Joseph's day.

The teacher asked the group to explain what was shown on their charts to the rest of the class. The learners spoke confidently, using the second table on the worksheet to justify how each activity was represented on the bar chart. David commented, 'The graph shows you really clearly what a lot of time Joseph spent working and not much time playing'.

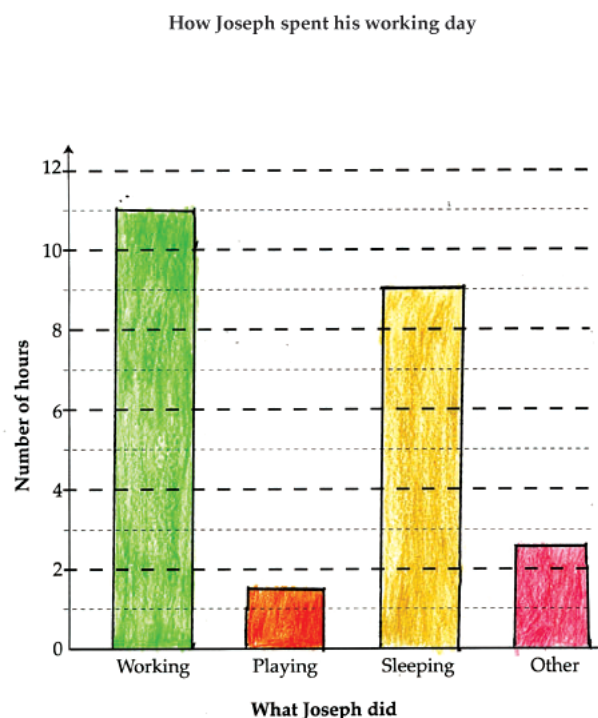
1. Use the fact sheet to complete this table.

Time	What Joseph did
3:30 am - 4:00 am	Get up and get ready for work
04:00 to 11:00	I go down in a basket to work
11:00 to midday	Have a break and dinner
Mid day to 4:00 pm	Work
16:00 - 17:00 pm	Go home, wash, eat dinner and rest
17:00 to 18:30	Play with brothers and sisters
18:30 pm - 03:30 am	Sleep

2. Complete this table to show how Joseph spent his working day.

What Joseph did	Number of hours
Working	11:00 hours
Playing	1:30 hours
Sleeping	9:00 hours
Other	2:30 hours

3. Draw a bar chart to show how Joseph spent his working day.



Activity 2 | Work and play

Developing the activity (part 2)

- Display a copy of the activity sheet on the whiteboard and/or distribute a copy to each group of learners. Individual learners will also need plain or graph paper.
- Stimulate whole-class discussion and thinking by asking questions such as:
 - What things do you spend most/least time doing during the day?
 - What time do you get up/go to bed?
 - How much time do you spend sleeping?
- As learners provide feedback, encourage other learners to comment and/or ask further questions.
- Explain to learners that they are going to construct tables and a chart similar to those they completed earlier. This time, however, they will use information about their own working (school) day.
- Ensure learners understand that, although they may discuss the activity within their group, they will need to use their own information to create the tables and chart.
- Careful observation of learners as they work will provide opportunities for gathering evidence relating to thinking, communication and number skills.
- Allow adequate time for groups to engage with the task, before bringing them back together to share and compare their results.
- During the reporting back session, encourage learners to identify and discuss similarities and differences between their day and Joseph's day.

Then and now	Activity 2: Work and play	Activity sheet																
1. Make a table, like the one below, to show what you do on a school day. Include important things you do. <table border="1"><thead><tr><th>Time</th><th>What I do</th></tr></thead><tbody><tr><td></td><td>Get up and get ready for school</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></tbody></table> 2. Make a table, like the one below, to show how you spend your school day. Approximate each time to the nearest half hour. Make sure the total number of hours adds up to 24. <table border="1"><thead><tr><th>What I do</th><th>Number of hours</th></tr></thead><tbody><tr><td>Working in school</td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></tbody></table> 3. Draw a chart to show how you spend your school day. 4. Compare your school day with Joseph's working day. What things are the same and what are different?			Time	What I do		Get up and get ready for school					What I do	Number of hours	Working in school					
Time	What I do																	
	Get up and get ready for school																	
What I do	Number of hours																	
Working in school																		

- Selecting particular learners and asking appropriate questions, e.g. 'Do the number of hours you have recorded add up to 24?' or 'How did you approximate the times?' will allow you to gather further evidence.
- Following the reporting back session, you may wish to allow further time for learners to follow up the ideas discussed.

Some examples of classroom practice

Having completed the charts relating to Joseph's day during an earlier session, the learners were excited to find that they would now be asked to complete tables and draw a chart illustrating a typical day in their own lives.

The teacher introduced the session by displaying some key questions on the whiteboard for the learners to share:

- What time do you get up?
- How many hours do you spend in school?
- What other things take up your time?
- How long do you spend doing these things?
- What time do you go to bed?

This led to some animated discussion and the learners then set to work on drawing up their tables. Some found it difficult to approximate their times to the nearest half-hour, but most were able to come up with a workable timetable for their activities.

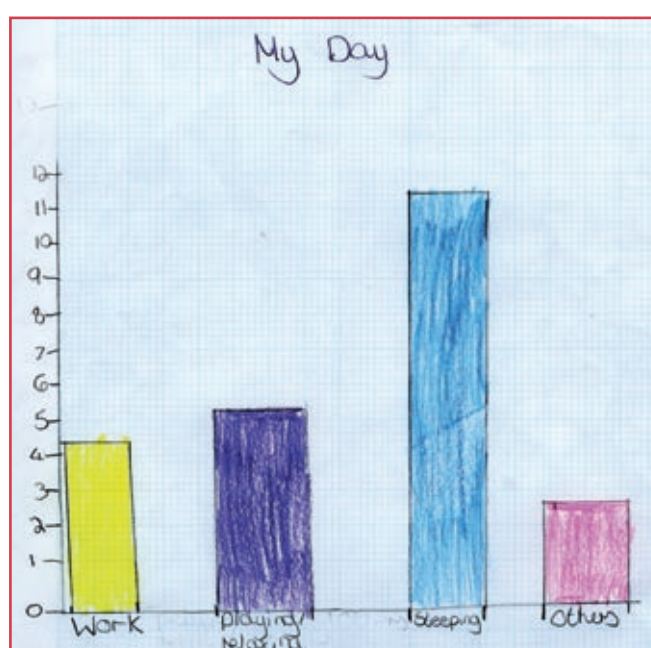
The learners then drew bar charts to illustrate the information on their second table.

Most charts were fairly accurate, but not everyone remembered to write a title and label the axes.

However, the discussion at the end of the session was invaluable and illustrated how much the learners had gained from the two sessions. Learners were able to compare and contrast their own day with Joseph's day and also showed understanding of the historical aspects of the work they had undertaken. They enjoyed using number in a different context and expressed interest in learning more about how life changed for children.

Time	What I do
8:00 - 9:00	Get ready for school.
9:00 - 10:30	1 st Lesson
10:30 - 11:00	Playtime
11:00 - 12:00	Lesson
12:00 - 1:00pm	Dinner and Playtime
1:00 - 2:00	Lesson
2:00 - 2:30	Play time
2:30 - 3:30	Lesson
3:30 - 6:00	homework, playing, Dinner.
6:00 - 8:00	watch T.V
8:00 - 8:30	get ready for bed
8:30 - 8:00am	Sleep!

Work	4 $\frac{1}{2}$ hours
Playtime playing/relaxing	5 $\frac{1}{2}$ hours
Sleeping	11 $\frac{1}{2}$ hours
Others	2 $\frac{1}{2}$ hours



Activity 2 | Work and play

In another classroom, learners worked in groups of three to gather information about Joseph from the fact sheet. Seb, Elen and Rhys read the information carefully and then listed the data chronologically, before using it to complete the table and bar chart illustrating Joseph's day.

What Joseph did	Number of hours
Working	11 hours
Playing	1 hour and a half
Sleeping	9 hours
Other <i>Getting ready</i>	2½ hours

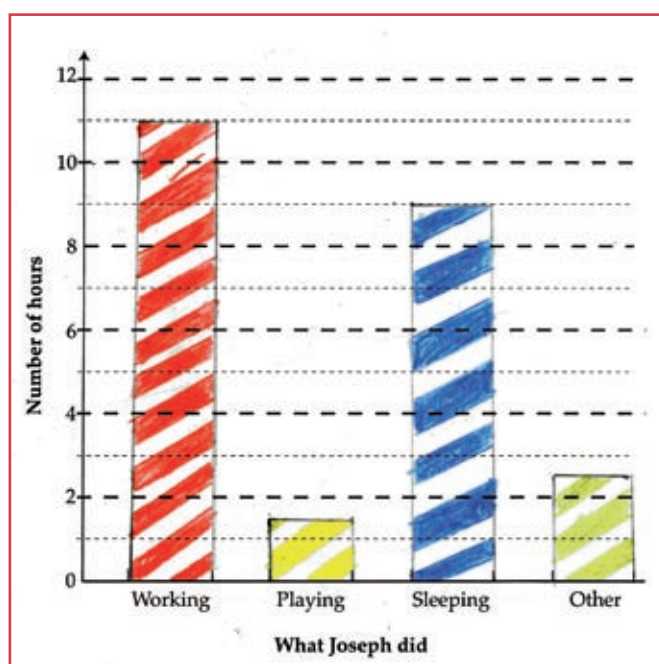
As the learners moved on to the second part of the activity, the teacher was able to observe their work closely, giving support where necessary and questioning learners in order to clarify their reasoning and approaches. Although Seb, Elen and Rhys used information on their own 'day' in order to produce their tables and graphs, they collaborated on common elements such as rounding timings and checking calculations. For example, 'We get 20 minutes play in the morning and 15 minutes in the afternoon. That's 35 minutes so we'll have to round it down to 30 minutes,' and 'Your day has to add up to 24 hours, but you have only 23 and a half on your table'.

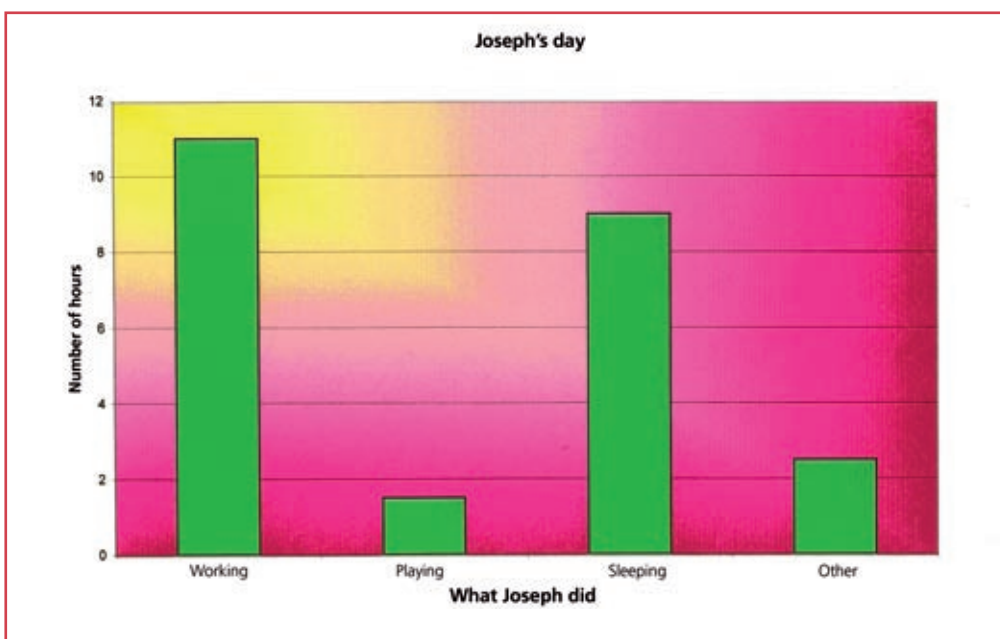
Seb, Elen and Rhys then used the computer to produce individual graphs showing how they spent their day. The teacher suggested that they might also like to reproduce the graph of Joseph's day on the computer, so that they would be able to make a direct comparison between 'their' graphs and the graph showing how Joseph spent his day.

The finished graphs (shown on the facing page) were presented to the whole class and the other learners were particularly interested in Seb's day as he spent long hours working on the family farm. Some learners thought this was similar to Joseph!

Seb pointed out that the computer had chosen different scales for the graphs. Consequently it appeared that he slept for longer than Joseph, although, in fact, the opposite was true. Elen said it would be better if the graphs did use the same scale, 'Because then you could tell differences just by looking'.

Time	What Joseph did
3:30 am to 4:00 am	Get up and get ready for work
04:00 to 11:00	Goes down to the pit in the basket
11:00 to midday	Has a rest and eats his food
12:00 am-4:00 pm	Work
4:00 pm-5:00 pm	Go home, wash, eat dinner and rest
17:00 to 18:30	He plays with his brothers + sisters
6:30 pm-3:30 am	Sleep

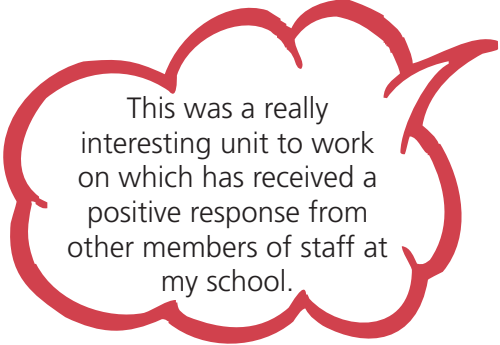




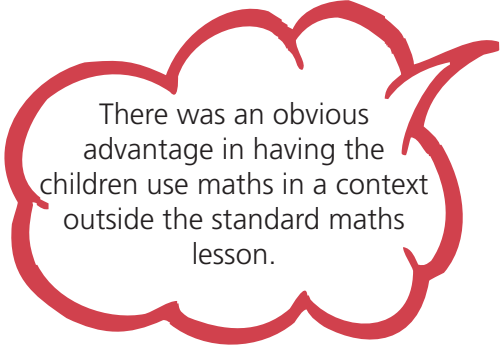
During the reporting back session, the teacher asked questions which allowed her to gather further evidence of the learners' ability to use number skills. For example, 'How did you find the number of hours you spend sleeping?', 'Which activity did Joseph spend least time doing?' and 'Can you explain how you worked out the number of hours spent on school work?'.

Responses from learners provided evidence of their ability to use the language of data and measures, as well as their use of mathematical language to compare results.

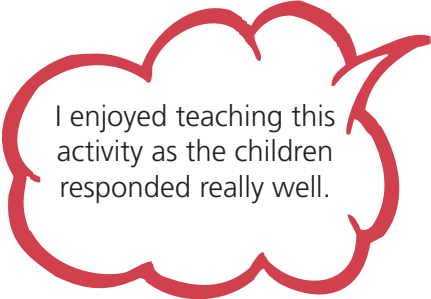
What some teachers said about the activity



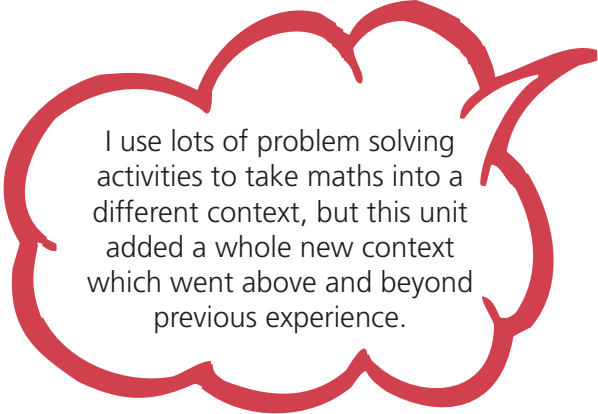
This was a really interesting unit to work on which has received a positive response from other members of staff at my school.



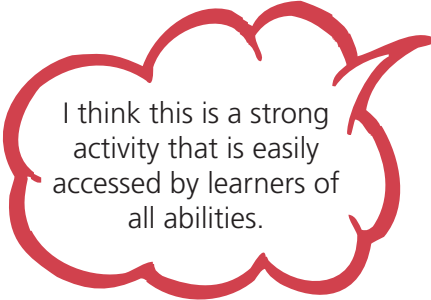
There was an obvious advantage in having the children use maths in a context outside the standard maths lesson.



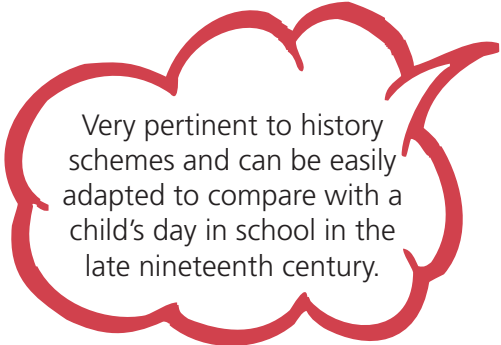
I enjoyed teaching this activity as the children responded really well.



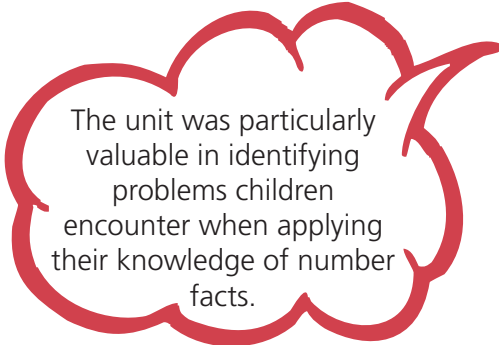
I use lots of problem solving activities to take maths into a different context, but this unit added a whole new context which went above and beyond previous experience.



I think this is a strong activity that is easily accessed by learners of all abilities.



Very pertinent to history schemes and can be easily adapted to compare with a child's day in school in the late nineteenth century.



The unit was particularly valuable in identifying problems children encounter when applying their knowledge of number facts.

What to look for

Recording and interpreting data and presenting findings

When completing tables and drawing appropriate charts, are learners able to:

- list the data chronologically (Cell 2)
- interpret the data shown in the tables (Cell 2)
- complete the bar chart on Joseph's day accurately (Cell 2)
- present personal data in appropriate tables (Cell 3)
- construct an accurate chart showing how learners spend their own day, labelling the graph and axes appropriately (Cell 3)
- choose from, construct and interpret a variety of methods for presenting data (Cell 4)?

Talking about and explaining work

When talking about their tables and/or their charts, are learners able to:

- use the language of number and comparatives when comparing Joseph's day with their own day (Cell 2)
- use the language of number when describing their results (Cell 2)
- use the language of position, data and measures when talking about work (Cell 3)
- use correct mathematical language, symbols and notation when presenting work (Cell 4)?

Name(s):

Joseph Evans lived in Victorian Times.

He was 10 years old when he started work in a coal mine.

1. Use the fact sheet to complete this table.

Time	What Joseph did
	Get up and get ready for work
04:00 to 11:00	
11:00 to midday	
	Work
	Go home, wash, eat dinner and rest
17:00 to 18:30	
	Sleep

2. Complete this table to show how Joseph spent his working day.

What Joseph did	Number of hours
Working	
Playing	
Sleeping	
Other	

3. Draw a bar chart to show how Joseph spent his working day.

How Joseph spent his day



1. Make a table, like the one below, to show what you do on a school day.

Include important things you do.

Time	What I do
	Get up and get ready for school

2. Make a table, like the one below, to show how you spend your school day.

Approximate each time to the nearest half hour.

Make sure the total number of hours adds up to 24.

What I do	Number of hours
Working in school	

3. Draw a chart to show how you spend your school day.

4. Compare your school day with Joseph's working day.

What things are the same and what are different?

