Unit 10
Measures including problems

Five daily lessons

Year 5
Autumn term

This Unit Plan is designed to guide your teaching.
You will need to adapt it to meet the needs of your class.

Unit Objectives

Year 5

• Suggest suitable units and measuring equipment to estimate or measure length, mass or capacity. Record estimates and readings from scales to a suitable degree of accuracy.	Pages 93-95
• Use units of time; read the time on a 24-hour clock, and use 24-hour clock notation such as 19:53.	Pages 99-101
• **Use all four operations to solve simple word problems, involving numbers and quantities** based on 'real-life', money and measures **(including time),** using one or more steps.	Pages 87-89
• **Explain methods and reasoning.**	Pages 82-89

Link Objectives

Year 4

- Suggest suitable units and measuring equipment to estimate or measure length, mass or capacity. Record estimates and readings from scales to a suitable degree of accuracy.
- Use all four operations to solve word problems involving numbers in 'real-life' money and measures (including time), using one or more steps.
- Read time from an analogue clock to the nearest minute and from a 12-hour digital clock. Use am and pm and notation 9:53.

Year 6

- Suggest suitable units and measuring equipment to estimate or measure length, mass or capacity. Record estimates and readings from scales to a suitable degree of accuracy.
- **Identify and use appropriate operations (including combinations of operations) to solve word problems involving numbers and quantities** based on 'real-life', money or measures (including time), using one or more steps. **Explain methods and reasoning.**
- Appreciate different times around the world.

(Key objectives in bold)

Resources needed to teach this unit:

- Activity sheet 10.1
- Activity sheet 10.2
- Activity sheet 10.3
- Calculators
- Demonstration clocks
- OHP calculator

Planning sheet	Day One	Unit 10 *Measures including problems*	Term: *Autumn*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Multiply and divide whole numbers up to 10 000 by 100 or 10.	• Write 1400 on the board. Q Which numbers give the answer 1400 when multiplied or divided by 10 or 100? Discuss and record the four numbers. Q Can you tell me a quick way of multiplying by 10 and 100? Q Can you tell me a quick way of dividing by 10 and 100? Draw out the importance of moving the digits to the left or right. Q Why do 140 x 10 and 14 x 100 give us the same answer? Explore whether the children understand that multiplying a number by 10 and then multiplying the answer by 10 is the same as multiplying by 100. Q What about 14 000 ÷ 10 and 140 000 ÷ 1000 ? Discuss and ensure children understand that dividing a number by 10 then dividing the answer by 10 is the same as dividing by 100. • Ask children to choose any four-digit multiple of 100. They write four number statements involving x or ÷ by 10 or 100 which they have that answer.	Solve problems involving numbers based on measures using one or more steps. Explain methods or reasoning. Choose and use number operations to solve problems. VOCABULARY miles mileage RESOURCES Activity sheet 10.1 Activity sheet 10.2	• Show the children Activity sheet 10.1. Q What information can we extract from this table? Discuss suggestions. If children do not realise it is a distance chart in miles, then explain. Q How can we work out the distance between London and Bristol? Discuss ideas. Establish how to read mileages between places on the chart. Ask children to demonstrate the use of the chart for reading distances between various places. Q Why are some of the boxes empty? Establish that the empty boxes occur where the rows and columns from the same town intersect. Discuss the symmetries within the table. • Show Activity sheet 10.2 and ask children to suggest similarities and differences between the two tables. Ensure that they understand how to read distances in this table. Ask children to demonstrate the use of the chart for reading distances between various places. • Explain to the children that they are to become a tourist. They are in England for five days and want to visit as many places as possible. They are driving and wish to travel no further than 200 miles in one day. They start in London on Day 1 and go touring for five days ending back in London on Day 5. Their aim is to visit as may different places on the chart as possible. • Children should work in pairs to plan the route showing the itinerary for each day, including the places for overnight stays and mileage travelled each day.	• Ask children to explain the routes they have planned and the distances travelled. • Ask children to calculate the total distance travelled over the five-day route and the number of towns visited. Take feedback asking children to explain how they tried to maximise the number of towns visited. Establish which pair travelled the furthest distance and which pair visited the most places. Q Have the pair who have travelled the furthest distance visited the most towns? Discuss. **By the end of this lesson the children should be able to:** • **Solve a problem involving mileage;** • **Explain how the problem was solved.** (Refer to supplement of examples, section 6, pages 87 and 89.)

Planning sheet	Day Two	Unit 10 *Measures including problems*	Term: *Autumn*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**

Oral and Mental — Objectives and Vocabulary	Oral and Mental — Teaching Activities	Main Teaching — Objectives and Vocabulary	Main Teaching — Teaching Activities	Plenary — Teaching Activities/Focus Questions
Estimate or measure using suitable units (of time).	• Children respond to questions either orally or in written form such as: **Q** Suggest something that you may estimate or measure in weeks?… months?…years?… decades?… centuries? • Children respond to questions such as: **Q** How long do you spend each week sleeping?… eating?…talking?… at school? Discuss in pairs before taking feedback.	Read the time on a 24-hour clock.	• Ask the children to look at the classroom clock and read the time. Show a time on the demonstration clock and ask children to read it. Write the time on the board, e.g. half past six. Repeat several times. • Set the clock to 3 o' clock and ask the children to read it. **Q** Is it the morning or the afternoon? Discuss and establish that there is no indication of am or pm times. Remind them of the convention for am and pm times. Ask the children to give the time so that it is an afternoon time. • Ask the children to give the time using a different notation. Establish that it would be shown as 3:00pm on a digital clock. Repeat for several different times ensuring that the children are confident about converting between analogue and digital. • Write the following on the board: Film Times 16:00 17:00 19:00 20:00 **Q** What do these times mean? Children to discuss in pairs. Take feedback. Establish that these are 24-hour clock times and explain that in the 24-hour clock system the counting of hours continues on from 12 midday so that it is obvious from the numbers whether it is am or pm. • Demonstrate the passing of time using the analogue clock, but saying the times digitally in the 24-hour clock. • Draw the following chart on the board and ask the children to complete the table | Analogue time	Digital Time	24-hour clock
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5 o'clock		
	3:30 am	
		17:30 | • Explain that children will be recording their timetable for yesterday at school. They should record the times in both analogue and 24-hour digital notation in a chart such as: | Activity	12 hour time	24 hour time
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Got up	7:00 am	07:00
				• Review the children's timetables. Ask questions such as 'Did anyone get up before 06:45?' • Tell the children that last night you went to bed at 12 midnight. **Q** How would we write that in the 24-hour clock notation ? Take feedback and ask children to write some of their ideas on the board. Establish that 24:00 or 00:00 would be possible. However, if working with a digital clock it would be likely to go to 00:00. HOMEWORK Give out Activity Sheet 10.3 with a brief explanation of the requirements. **By the end of the lesson, the children should be able to:** • **Understand am and pm notation;** • **Read the time on an analogue clock and convert to digital time;** • **Convert digital or analogue times to 24-hour clock notation and vice versa.** (Refer to supplement of examples, section 6, page 101.)
VOCABULARY decade decades century centuries		VOCABULARY digital analogue 12-hour clock 24-hour clock am/pm RESOURCES Demonstration Analogue clock Activity sheet 10.3		

NNS Unit Plans

Planning sheet		Day Three	Unit 10 *Measures including problems*		Term: *Autumn*		Year Group: *5*

Oral and Mental		Main Teaching				Plenary	
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**			**Teaching Activities/Focus Questions**	
Understand 24-hour clock times and convert between digital am and pm times and 24-hour clock times.	• Play 'Time Bingo'. Write twelve 24-hour clock times on the board. The children have to draw a 2x3 grid and choose six of the times to write in. Teacher selects times from the board but says them in 12-hour clock time e.g. three thirty pm. Children convert them to 24-hour clock times cross them out on their grid if that is one of the times they have chosen. The first child to complete the grid wins.	Read the time on a 24-hour clock. Choose and use number operations to solve problems. Use all four operations to solve simple word problems, involving numbers and quantities based on time using one or more steps. Explain methods and reasoning.	• Review homework. Q What times did you write for midday? Establish that for am and pm times this can be confusing, but that 12:00 am is midnight and 12:00pm is midday. However, it is probably safer to write 12:00 midday. • Set the children problems like: If I got up at 7:15 and left the house at 8:05, how long did it take me to get washed and dressed and have breakfast? • Demonstrate how drawing an empty number line can help to solve questions of this type. Encourage the children to use jottings such as: 7.15 to 8.00 = 45 minutes 8.00 to 8.05 = 5 minutes 7.15 to 8.05 = 50 minutes • Set further questions of this type. If I got home at 17:30 and went to bed at 21:30, how long was I at home before I went to bed? I had my dinner at 18:05 but I started cooking it 45 min before I ate it. What time did I start cooking? It normally takes me 35 minutes to drive to school, but yesterday it took me three times as long because of the snow. How long did it take me to drive to school yesterday? • After each question ask the children to discuss in pairs. Take feedback asking children to explain their reasoning. • Ask the children to make up and record three problems of their own involving time. When they have completed them exchange problems for their partners to solve.			• Review the questions the children set choosing a couple for the whole class to solve. Q How did you know which operation to use? Ask children to say their methods and explain their reasoning. Q What are the important things to remember when solving word problems involving time? • Draw out from the children the significance of 60 minutes in an hour and 60 seconds in a minute for calculations involving time. **By the end of the lesson, the children should be able to:** • **Convert between am and pm times and 24-hour clock times;** • **Write and solve simple word problems involving time.** (Refer to supplement of examples, section 6, pages 89 and 101.)	
		VOCABULARY digital analogue 12-hour clock 24-hour clock					

Planning sheet	Day Four	Unit 10 *Measures including problems*	Term: *Autumn*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Add or subtract any pair of two- digit numbers including crossing 100.	• Record six two-digit numbers on the board e.g. 37, 84, 28, 53, 76, 65. Give a number which is the sum of two of the numbers on the board e.g. 104. Ask children to record the pair of two-digit numbers which have that sum on their whiteboards. Repeat with one or two more totals. • In pairs children take turns to give totals, their partner identifying the pair of numbers chosen.	Suggest suitable units and measuring equipment to estimate or measure length.	• Split the class into groups of about six children. Each child has pencil and paper. The children need to write down the unit of measurement they would use to estimate or measure a given distance. Within their group, the children compare their answers and decide upon a 'group' answer. The following are examples of the type of question you may like to ask. Q What unit of length would you use to measure the width of the classroom? Q What unit would you use to measure the height of a chair? Q What unit would you use to measure the length of a pin? Q What unit would you use to measure the distance around the world? • Discuss the reasoning behind their answers and accept metric and imperial units. Discuss the appropriateness of the units – e.g. in England we tend to use miles rather than kilometres to measure distances between towns, but either is correct. • Ask some similar questions, this time asking for the type of measuring equipment they would use to measure the distance and why. • Ask pairs of children to make a chart of things they would measure in km, m, cm, mm. • Ask the children to make up questions such as 'Which unit of length would you use to measure the height of the door?' for their partner to answer.	• Repeat the group activity but with more challenging questions such as: How would you measure the distance between Earth and Mars? How would you measure the height of Mount Everest? How would you measure the width of a needle? • Finish the lesson by asking the children to go away and think of something they think is very difficult to measure. **By the end of the lesson, the children should be able to:** • **Suggest things you would measure in m, cm, or mm;** • **Suggest a metric unit to measure, for example, the distance from Bradford to Coventry.** (Refer to supplement of examples, section 6, pages 93 and 95.)
		VOCABULARY unit (e.g. of length)		

NNS Unit Plans

Planning sheet	Day Five	Unit 10 *Measures including problems*	Term: *Autumn*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Recall facts in the 2, 3, 4, 5, 6 and 10 times tables.	• Play Guess my Number. The teacher thinks of a number and tells the children which times table it is in. The children ask questions to which the teacher can only answer 'yes' or 'no'. Encourage the children to ask questions which will narrow down the possible answers. **Q** Is it odd? **Q** Is it in another table? **Q** Is it less than 30? • Repeat with a child or pair of children taking the teacher's role. • Rehearse a times table that still needs consolidation and the related division facts e.g. 7 x table. **Q** If someone has forgotten the 7 times table, what tips would you give them to help them remember or to work the answers out?	Record estimates and measurements from scales to a suitable degree of accuracy. VOCABULARY roughly approximately scale RESOURCES 1kg weight for each group. Sets of assorted weighing scales Full packets of goods, e.g. rice, cereals etc. with weights concealed Counting stick	• The children need to be in groups of five or six. **Q** How many grams are there in a kilogram? • Prepare the children for reading scales on the weighing scales. • Use a counting stick both vertically and horizontally. Label one end 0 and the other end 1 kg. Ask the children how many grams each division of the counting stick would represent. Point to various points on the stick and ask the children what weight that represents. Repeat, changing the scale on the counting stick to 0 and 5 kg, then 0 and 500 g. Emphasise the importance of looking at the scale on a weighing machine to decide what each division is worth. • Discuss the different scales on the weighing scales in the classroom. • Ask the children in their group to pick up their kilogram weight to give them an idea of how heavy 1 kg is. Pass around a packet and ask them to estimate the weight. Agree the estimate as a group and show the estimate on whiteboards. Repeat for two more packets. Children to weigh the packets on the table and record the actual weights of the packets. Groups move to another table when they have finished weighing their packets.	**Q** What problems did you encounter with certain scales on certain packets? • Draw out from the children that often if a packet is large they think it is heavier – e.g. packet of cornflakes. • Discuss the appropriateness of the weighing scales. There is little point in trying to weigh items over 3 kg on scales which only weigh up to 1 kg. **Q** Which scales were the most difficult to read? Why? • Establish that rounding to the nearest 100 g would be inappropriate if you were weighing an item of 30 g, or an item of 100 kg. However, it may well be appropriate if weighing an item of 5 kg. **By the end of the lesson, children should be able to :** • **Read measuring scales between divisions.** (Refer to supplement of examples, section 6, page 95.)

NNS Unit Plans

Unit 10   Year 5   (Autumn Term)

	Birmingham	Brighton	Bristol	Cambridge	Exeter	Hull	Liverpool	London	Manchester	Penzance	Plymouth	Preston
Birmingham		171	90	87	164	134	102	120	89	274	205	110
Brighton	171		169	120	175	200	277	59	264	287	218	286
Bristol	90	169		173	84	231	184	120	172	194	125	183
Cambridge	87	120	173		251	139	193	120	160	361	292	202
Exeter	164	175	84	251		305	258	200	245	110	44	267
Hull	134	200	231	139	305		128	187	97	414	345	122
Liverpool	102	277	184	193	258	128		215	35	367	298	36
London	120	59	120	120	200	187	215		202	310	241	223
Manchester	89	264	172	160	245	97	35	202		355	286	33
Penzance	274	287	194	361	110	414	367	310	355		77	377
Plymouth	205	218	125	292	44	345	298	241	286	77		308
Preston	110	286	183	202	267	122	36	223	33	377	308	

Birmingham	Brighton	Bristol	Cambridge	Exeter	Hull	Liverpool	London	Manchester	Penzance	Plymouth	
171											Birmingham
90	169										Brighton
87	120	173									Bristol
164	175	84	251								Cambridge
134	200	231	139	305							Exeter
102	277	184	193	258	128						Hull
120	59	120	120	200	187	215					Liverpool
89	264	172	160	245	97	35	202				London
274	287	194	361	110	414	367	310	355			Manchester
205	218	125	292	44	345	298	241	286	77		Penzance
110	286	183	202	267	122	36	223	33	377	308	Plymouth
											Preston

NNS Unit Plans

Analogue Time	Digital Time	24-hour clock time
midnight		
	3:45 pm	
		17:55
3 o' clock in the morning		
	2:35 am	
midday		
	12:45 pm	
		00:25
five past two in the afternoon		
	2:30 pm	