

Unit 5 Length

Five daily lessons

National
Numeracy Strategy

Year 4
Autumn term

Unit Objectives

Year 4

- Suggest suitable units and measuring equipment to estimate or measure length.
- Use read and write standard metric units (km, m, cm, mm) and imperial (mile).
- Convert up to 1000cm to metres and vice versa.
- **Choose and use appropriate number operations and appropriate ways of calculating to solve problems.**

Page 92

Page 90

Page 90

Page 86

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- Resource sheet 5.1
- Resource sheet 5.2
- Resource sheet 5.3
- Activity sheet 5.1
- Activity sheet 5.2
- OHT 5.1
- OHT 5.2
- Counting stick
- Rulers (with mm markings)
- Metre stick
- Tape measure

Year 3

Link Objectives

Year 5

- Read and begin to write the vocabulary related to length.
- Measure and compare using standard units (km, m, cm) including using a ruler to draw and measure lines to the nearest half centimetre.
- Know the relationship between kilometres and metres, metres and centimetres.
- Suggest suitable units and measuring equipment to estimate or measure length.
- **Choose and use appropriate operations to solve problems.**

- Use, read and write standard metric units (km, m, cm, mm) including their abbreviations and relationships between them.
- Suggest suitable units and measuring equipment to estimate or measure length.
- Measure and draw lines to the nearest millimetre.

(Key objectives in bold)

Planning sheet	Day One	Unit 5 <i>Length</i>	Term: <i>Autumn</i>	Year Group: <i>4</i>
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To know and use the relationships between units km, m, cm and mm.</p> <p>To count on or back in 10s, 100s from any two- or three-digit number.</p> <p>VOCABULARY division multiple millimetre centimetre metre kilometre</p> <p>RESOURCES Counting stick</p>	<ul style="list-style-type: none"> Use the counting stick to represent 1000. <p>Q What will each division represent?</p> <p>Count in 100s backwards and forwards to 1000.</p> <p>Q What fraction of 1000 does each division represent?</p> <p>Ask questions relating to the divisions on the counting stick.</p> <ul style="list-style-type: none"> Use the counting stick to represent: 1 metre – 10 divisions each representing 10cm. <p>Q If the counting stick represents 1m what does each division represent?</p> <p>Point to different divisions on the counting stick.</p> <p>Q How many cm does this represent?</p> <p>Introduce mm – repeat as above.</p>	<p>To suggest suitable units and equipment to estimate or measure length.</p> <p>To use, read, write cm and mm.</p> <p>To convert up to 1000mm to cm and vice versa.</p> <p>VOCABULARY millimetre, mm centimetre, cm metre, m kilometre, km unit estimate</p> <p>RESOURCES Counting stick Ruler (with mm markings) Metre stick Tape measure</p>	<ul style="list-style-type: none"> Discuss 'kilometre' and its relationship with a metre. <p>Q Where have you seen / heard of this measure?</p> <p>Discuss responses.</p> <p>Q Does anyone know how many metre sticks make up a kilometre when they are placed end to end?</p> <p>Tell the children that the kilometre is used to measure longer distances and the millimetre used to measure the shortest distances.</p> <p>Q Do you know of any unit other than the kilometre that is used to measure longer distances?</p> <p>Discuss journeys and their distances, made by children, assessing their understanding of the term 'mile'.</p> <p>Explain to the children that a mile is longer than 1km but less than 2km.</p> <p>Q Ask the children what other units can be used to measure length?</p> <p>Discuss answers and the relationships between m, cm and mm.</p> <p>Model how long each unit of measure is, using appropriate measuring equipment – a ruler (with mm markings) a metre stick, tape measure.</p> <p>Ask the children to order the units covered in the objective from the longest to the shortest and write each term in full and its abbreviated form on the board.</p> <p>Make a list on the board and ask the children to work in pairs and record equivalent answers to the following:</p> <p style="text-align: center;"> 30cm = _____ mm 40cm = _____ cm 1000cm = _____ m 2000cm = _____ m 80cm = _____ cm 2km = _____ m </p> <p>Use further examples.</p> <p>Draw the class together and discuss answers.</p> <p>Ask the children to reflect on knowing how digits move when multiplied or divided by 10/100 helps us to convert these measurements. e.g. 2000cm ÷ 100 = 20m</p> <p>Ask the children to suggest lengths of items around them and distances around the school that might be roughly the same length as each of the above, and suggest suitable measuring equipment.</p>	<p>Q Which unit would you use to measure the length of the black\whiteboard</p> <p>Q How long do you think it is?</p> <p>Collect suggestions and discuss.</p> <p>Q Are any of these suggestions impossible? Why?</p> <ul style="list-style-type: none"> Measure using suitable unit and compare with children's answers. Working in pairs ask each child to make a list of five things that could be measured using one of the units without writing down the unit of measurement. <p>Swap lists with partners to write the most appropriate unit and equipment to use to measure against everything listed.</p> <p>Collect children's responses, select examples and ask class to estimate how long each of the examples might be. Discuss whether the estimates are sensible.</p> <p>HOMEWORK – Learn these facts: 1km = 1000m 1m = 100cm or 1000mm 1cm = 10mm</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Recognise and use the relationship between km, m, cm and mm; Recognise the mile as a unit for measuring distance; Recognise the fact that a mile is longer than 1km but is less than 2km. Suggest things that would be measured in kilometres, metres, centimetres and millimetres; Suggest suitable equipment for measuring. <p>(Refer to supplement of examples, section 6, pages 90-92.)</p>

Planning sheet	Day Two	Unit 5 <i>Length</i>	Term: <i>Autumn</i>	Year Group: <i>4</i>
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To recognise the equivalence of simple fractions.</p> <p>VOCABULARY fractions halves quarters tenths</p> <p>RESOURCES Counting stick</p>	<ul style="list-style-type: none"> Assess prior knowledge of simple fractions. Use a counting stick held vertically to represent 1 at the top and 0 at the bottom. Point to the centre. <p>Q What fraction does this represent?</p> <p>Repeat for $\frac{1}{4}$, $\frac{3}{4}$.</p> <p>Point to the $\frac{1}{10}$ division.</p> <p>Q What fraction does this represent?</p> <p>Repeat for other tenths.</p> <p>Q How many tenths are equivalent to $\frac{1}{2}$?</p> <p>Ask children to record each fraction on the board.</p> <p>Record the equivalent fractions.</p> <p>$\frac{5}{10}$ is equivalent to ____.</p>	<p>To record metres and centimetres using decimals, and other measurements using mixed units.</p> <p>To record cm as a fraction or decimal part of a metre.</p> <p>VOCABULARY kilometre km metre m centimetre cm millimetre mm half quarter tenth</p> <p>RESOURCES OHT 5.1 Resource sheet 5.1 OHT 5.2 Activity sheet 5.1</p>	<ul style="list-style-type: none"> Tell the children that in this lesson they are going to calculate one tenth of 1 kilometre in m, and one tenth of 1 metre in cm or mm. <p>Remind children of what they had been previously asked to learn for homework:</p> <p style="text-align: center;">1km = 1000m 1m = 100cm or 1000mm 1cm = 10mm</p> <p>Now use the counting stick to represent 1m. Point to the centre.</p> <p>Q What fraction of 1m is this?</p> <p>Elicit from pupils another way of writing $\frac{1}{2}$ ($\frac{5}{10}$).</p> <p>Q How many cm is it?</p> <p>Ask individual children to record responses on the board.</p> <p>Example: One half of 1m is 50cm which is 0.5 of a metre. 25cm is one quarter of 1m which is 0.25 metre.</p> <ul style="list-style-type: none"> Give the children Resource sheet 5.1 to assist calculation. Model with whole class fraction and decimal parts using OHT 5.1. <p>Make a list on the board and ask the children to work in pairs to calculate and record the following:</p> <p style="text-align: center;">One quarter of 1m is ____ cm 75cm is _____ of 1m 20cm is _____ of 1m Four tenths of 1m is ____ cm 80cm is _____ tenths of 1m</p> <p>Discuss answers and transfer on to OHT 5.2 making explicit the decimal notation for each example. Give children Activity sheet 5.1 and ask them to complete it.</p>	<ul style="list-style-type: none"> Discuss some of children's answers on Activity sheet 5.2. Repeat the previous activity with the counting stick representing 1km or 1000m. <p>Q What is half of 1km?</p> <p>Record in m (500m). Record in decimal equivalent (0.5km). Repeat for one tenth of 1m.</p> <p>Q What different ways can we record lengths?</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Write the equivalent of one half, one quarter, three quarters and one tenth of 1km and 1m; Record measures using decimal notation and mixed units. <p>(Refer to supplement of examples, section 6, page 90.)</p> <p>RESOURCES Counting stick</p>

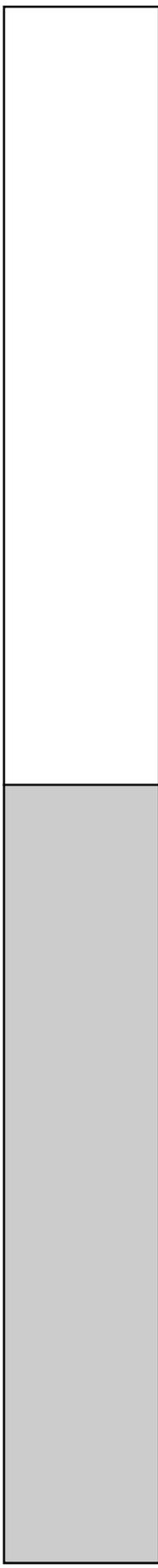
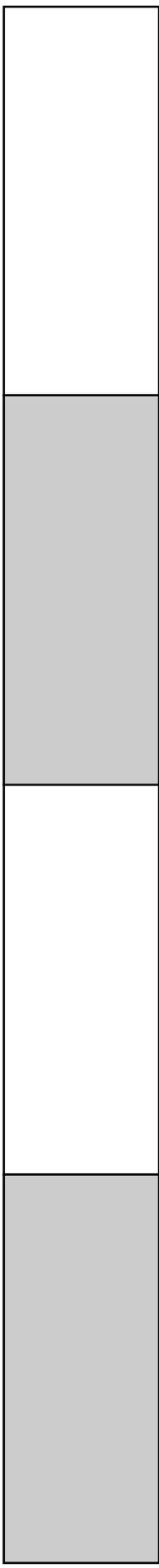
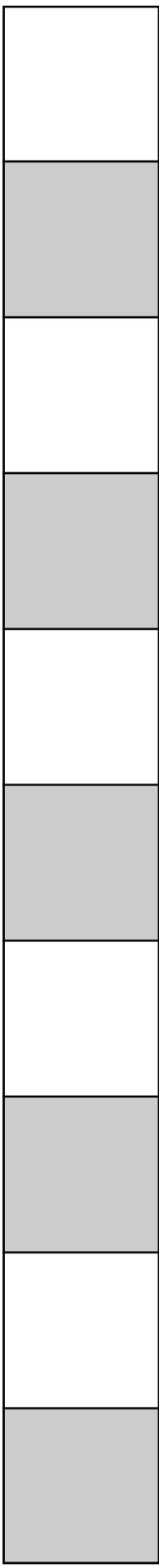
Planning sheet	Day Three	Unit 5 <i>Length</i>	Term: <i>Autumn</i>	Year Group: <i>4</i>									
Oral and Mental		Main Teaching		Plenary									
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions									
<p>To know and use the relationships between units km, m, cm and mm.</p> <p>VOCABULARY kilometre, km metre, m centimetre, cm millimetre, mm</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Ask children to draw a 2 x 2 grid on their whiteboard. <p>On the board draw the grid:</p> <table border="1" data-bbox="450 405 613 480"> <tr> <td>17cm</td> <td>36cm</td> </tr> <tr> <td>80cm</td> <td>62cm</td> </tr> </table> <p>Ask the children to complete their grid by converting each measurement to mm in the corresponding space.</p> <p>Check answers.</p> <p>Repeat for</p> <p>m → cm km → m m → mm</p> <p>then using multiples of 10/100/1000:</p> <p>cm → m m → km mm → cm mm → m</p>	17cm	36cm	80cm	62cm	<p>To record m and cm using decimals and other measurements using mixed units.</p> <p>To convert up to 1000cm to metres and vice versa.</p> <p>To use, read and write m, cm, mm.</p> <p>To estimate using standard units of length.</p> <p>VOCABULARY decimal notation standard unit metric unit kilometre, km metre, m centimetre, cm millimetre, mm estimate</p> <p>RESOURCES Resource sheet 5.2</p>	<ul style="list-style-type: none"> Remind the children about the homework from day one. <p>Write on the board 150cm.</p> <table border="1" data-bbox="1111 376 1800 469"> <tr> <td>Q How else can we write this?</td> <td>1m 50cm 1.5m 1½m</td> </tr> </table> <p>Repeat with other examples.</p> <p>Use Resource sheet 5.2.</p> <p>Ask the children to work in pairs and record each length in two other ways.</p> <p>Draw the class together and discuss answers.</p> <ul style="list-style-type: none"> Ask the children to choose at least five lengths on Resource sheet 5.2 and suggest items around them and distances around the school, that might be that length. 	Q How else can we write this?	1m 50cm 1.5m 1½m	<ul style="list-style-type: none"> Collect a selection of items chosen by the children and invite the class to match each to one length on Resource sheet 5.2. <table border="1" data-bbox="1825 405 2181 469"> <tr> <td>Q Why do you think it is that length?</td> </tr> </table> <table border="1" data-bbox="1825 491 2181 555"> <tr> <td>Q What did you think about to help you estimate?</td> </tr> </table> <table border="1" data-bbox="1825 609 2181 938"> <tr> <td> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Record measures using decimal and mixed unit notation; Estimate using standard units of length. <p>(Refer to supplement of examples, section 6, pages 90 and 92.)</p> </td> </tr> </table>	Q Why do you think it is that length?	Q What did you think about to help you estimate?	<p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Record measures using decimal and mixed unit notation; Estimate using standard units of length. <p>(Refer to supplement of examples, section 6, pages 90 and 92.)</p>
17cm	36cm												
80cm	62cm												
Q How else can we write this?	1m 50cm 1.5m 1½m												
Q Why do you think it is that length?													
Q What did you think about to help you estimate?													
<p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Record measures using decimal and mixed unit notation; Estimate using standard units of length. <p>(Refer to supplement of examples, section 6, pages 90 and 92.)</p>													

Planning sheet	Day Four	Unit 5 <i>Length</i>	Term: <i>Autumn</i>	Year Group: <i>4</i>
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To know and use the relationships between cm and mm.</p> <p>To count on or back in 10s, 100s from any two- or three-digit number.</p> <p>VOCABULARY centimetre millimetre</p> <p>RESOURCES Counting stick</p>	<ul style="list-style-type: none"> Use the counting stick to represent: 10cm – 10 divisions each representing 10mm. <p>Point to different divisions on the counting stick.</p> <p>e.g. point to half way between the 1cm and 2cm division markers.</p> <div data-bbox="320 523 741 568" style="border: 1px solid black; padding: 2px;">Q How many mm does this represent?</div> <div data-bbox="320 584 741 651" style="border: 1px solid black; padding: 2px;">Q How else might we say this? e.g. 20mm = 2cm</div> <p>Repeat with other points on the counting stick.</p> <p>Point to half way between the 4cm and 5cm division markers.</p> <div data-bbox="320 815 741 882" style="border: 1px solid black; padding: 2px;">Q Can you record this on the board? (45mm)</div> <div data-bbox="320 898 741 965" style="border: 1px solid black; padding: 2px;">Q How else can we write this? (4cm, 5mm)</div> <p>Use some other examples.</p>	<p>To measure lines accurately in mm.</p> <p>To solve mathematical problems and explain reasoning.</p> <p>VOCABULARY kilometre, km metre, m centimetre, cm millimetre, mm</p> <p>RESOURCES Activity sheet 5.2</p>	<ul style="list-style-type: none"> Remind pupils about how to measure accurately when using a ruler (Align the end of the line with zero on the ruler). Give pupils Activity sheet 5.2 to complete. Introduce the following game giving children practice at measuring and drawing lengths in mm. Player 1 draws a line of any length up to 15mm long. Player 2 adds a line of any length up to 15mm long using a different colour. This continues until the line is 100mm long. The winner is the player who makes the line exactly 100mm. Children record measurements as they work. The game can be extended by making a line 200 or 300mm long. 	<ul style="list-style-type: none"> Remind children of the principles needed to measure accurately. Ask which children won a game in the main lesson. <div data-bbox="1827 427 2181 491" style="border: 1px solid black; padding: 2px;">Q Did anyone have a plan that helped them to win?</div> <p>Collect ideas and discuss.</p> <p>Select a strategy and play a class game on board.</p> <div data-bbox="1827 627 2181 659" style="border: 1px solid black; padding: 2px;">Q Did the strategy work this time?</div> <p>Try another strategy.</p> <p>Discuss.</p> <ul style="list-style-type: none"> Finish with some questions to assess children's understanding of conversions between units. <div data-bbox="1827 911 2181 1278" style="border: 1px solid black; padding: 5px;"> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Use, measure, read and write cm and mm; Convert km to m, m to cm and cm to mm; Solve a mathematical problem and explain reasoning. <p>(Refer to supplement of examples, section 6, pages 90, 92 and 86.)</p> </div>

Planning sheet	Day Five	Unit 5 <i>Length</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To know and use relationships, converting between units.</p> <p>Recall facts: 1km = 1 000m 1m = 100cm or 1 000mm 1cm = 10mm</p> <p>VOCABULARY kilometre metre centimetre millimetre mile measurement</p>	<ul style="list-style-type: none"> Give the children a range of questions revising work covered in the previous four lessons. <div data-bbox="338 376 725 695" style="border: 1px solid black; padding: 5px;"> <p>How many m in a km? How many m in _ km? How many cm in a m? How many cm in _ m? How many cm in 3m? How many mm in 4cm? 30cm = ___ mm? 50mm = ___ cm? 2000m = ___ km? 2000mm = ___ m? 50m = ___ cm? 2km = ___ m?</p> </div> <p>Record answers on the board in standard units, mixed units and where possible with decimal notation.</p>	<p>To choose appropriate number operations and calculation methods to solve measurement word problems.</p> <p>VOCABULARY kilometre metre centimetre millimetre mile measurement</p> <p>RESOURCES Resource sheet 5.3 Rulers (with mm markings)</p>	<ul style="list-style-type: none"> Discuss the following word problem, asking the children to set it in context: A family sets off to drive 524 miles. After 267 miles, how much further do they have to go? Model using an empty number line as one possible calculation strategy. <div data-bbox="1111 488 1789 528" style="border: 1px solid black; padding: 2px;">Q What are the important words?</div> <div data-bbox="1111 549 1789 588" style="border: 1px solid black; padding: 2px;">Q What calculation is needed?</div> <div data-bbox="1111 609 1789 649" style="border: 1px solid black; padding: 2px;">Q What strategies will you use?</div> <div data-bbox="1111 670 1789 710" style="border: 1px solid black; padding: 2px;">Q How will you record your answer?</div> <ul style="list-style-type: none"> Repeat with the following problem drawing children's attention to the need to change to the same units: Tell the children you have three carpets, one is 45cm long, one is 1m 60cm long and the other is 1.25cm long. You want to put them along a wall in a room. How long are the carpets put together? Give pupils Resource sheet 5.3 to complete. 	<ul style="list-style-type: none"> Share answers and methods and discuss strategies, check for any misinterpretations and correct them. <div data-bbox="1825 400 2177 491" style="border: 1px solid black; padding: 5px;"> <p>Q When solving problems with measurements what are the important things to remember?</p> </div> <p>Reinforce the importance of place value when converting measurements into similar units.</p> <div data-bbox="1825 639 2177 932" style="border: 1px solid black; padding: 5px;"> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Solve 'story' problems involving kilometres, metres, centimetres and millimetres; Explain and record how the problem was solved. <p>(Refer to supplement of examples, section 6, page 86.)</p> </div>

Unit 5 Year 4 (Autumn Term)

Resource sheet 5.1/OHT 5.1

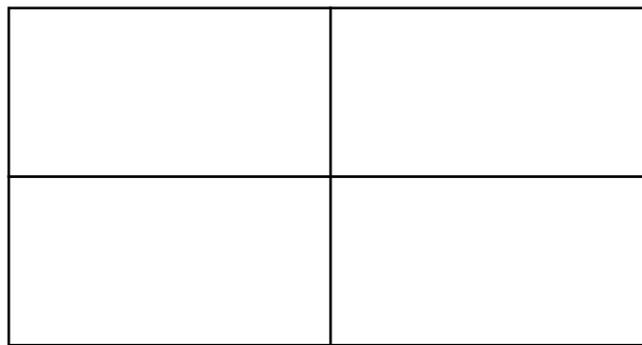


Conversion sheet

250cm	1m 75cm	1.4m
320cm	1m 40cm	1.35m
125cm	1m 90cm	1.65m
570cm	1m 50cm	1.58m
690cm	0m 85cm	20.35m
1250cm	3m 10cm	0.5m
24cm	11m 55cm	8.05m

1. David measures a rectangular table. It is 45cm wide, and 85cm long. What is the distance around the edge of the table?

Sam puts four tables together to make a bigger table:



How wide and how long is this new table?

2. Mr. Patel's garage is 4m 50cm long. His car is 3.75m long and his motor bike is 55cm wide. What space is left when Mr. Patel puts his car and bike in the garage?
3. Lucy wants to make scarves for her toys. She uses a 1m length of material. She cuts off 35cm for one toy and 0.4m for another. How much material has she left?
4. Tara says: "The distance to school from my house is about 650m. I walk to school every day and on Saturday I walk to the shops and back with my mum. This is about 0.8km." How far does Tara walk each week?
5. Can you work out how far you walk each day, each week, each year?

cm	fraction of a metre	decimal fraction of a metre
10		
20	$\frac{2}{10}$ m	0.2m
25	$\frac{1}{4}$ m	0.25m
30		
40	$\frac{4}{10}$ m	0.4m
50		
60		
70		
75	$\frac{3}{4}$ m	0.75m
80	$\frac{8}{10}$ m	0.8m
90		
100		

Measure these lengths in mm

How long is the shortest line?

How long is the longest line?

How much longer is the bottom line than the top line?

Putting them in order, how long is the line with the middle length?

End to end, will all the lines be longer or shorter than 1 metre?

cm	fraction of a metre	decimal fraction of a metre
10		
20		
25		
30		
40		
50		
60		
70		
75		
80		
90		
100		