

Y7	UNIT 5 Angles Lesson Plan 1	Angles and Turns
<p><b>Activity</b></p> <p><b>1A</b></p> <p><b>1B</b></p> <p><b>1C</b></p> <p>(continued)</p>	<p><b>Angles and turns</b></p> <p>T: Today we are going to look at angles and turns and the connections between them.</p> <p>T: Now position your straws so that they both point upwards from the starting point. You will move only one of them, keeping the other one in this position.</p> <p>T: Are you ready? <i>(Yes!)</i></p> <p>T: Now let's make two complete turns with the straw. 1 turn ..., and a half turn ... a quarter turn ... . Right.</p> <p>T: Let's see if you can work in fractions.</p> <p>Turn the straw through <math>\frac{1}{3}</math> turn, <math>\frac{3}{4}</math> turn, <math>1\frac{1}{4}</math> turns, <math>2\frac{1}{3}</math> turns.</p> <p>Well done.</p> <p>T: The units we use to measure the size of a turn are 'degrees'. Degrees are written as <math>^{\circ}</math> (T on BB). Can anyone tell us how many degrees are in one complete turn?</p> <p>P: <math>360^{\circ}</math></p> <p>T: That's right. There are <math>360^{\circ}</math> in one complete turn.</p> <p>T: How many cm are there in 1 m? (100) How many gm are there in 1 kg? (1000) As we use a number system based on 10, why do you think we use <math>360^{\circ}</math> for this measurement?</p> <p>P: But 1 hour is 60 minutes.</p> <p>T: You are right. And there is another number that can have a connection with the number 360. (?)</p> <p>T: How many days are there in one year?</p> <p>Ps: 365 (366)</p> <p>T: Right. Before the next lesson, see if you can find some information about the possible connection between the <math>360^{\circ}</math> of the complete turn and another number system and/or the number of days in a year.</p> <p>T: Let's go back to the turns again. Still keeping one straw upright, move the other one through <math>180^{\circ}</math>. How many turns is that?</p> <p>P: A half.</p> <p>T: Correct. Now move the straw back to the starting position and then turn it through <math>90^{\circ}</math>. That is ....?</p> <p>P: Quarter turn.</p> <p>T: That's right. The point where the two lines meet at the starting point is called an angle. With your straws, show me an angle of <math>45^{\circ}</math>.</p>	<p><b>Notes</b></p> <p>T gives each P two plastic drinking straws, a pin and a cork or a piece of Blu-tack.</p> <p>Ps join their straws by putting the pin through one end of each straw, and then putting on the cork or Blu-tack.</p> <p>After discussion, they agree that pin marks the halfway point on the line formed by the two straws. The joining point will be the starting point for what follows.</p> <p>Whole class activity.</p> <p>T asks and Ps make the turns with their straws. T watches Ps closely and corrects when necessary.</p> <p>If Ps seem hesitant, T should demonstrate and then give them further practice.</p> <p>Quick questions, T pointing to Ps to answer.</p> <p>Correcting where necessary. Praising.</p>

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<p><b>1C</b> (continued)</p>	<p>T: Now show me an angle of <math>270^\circ</math> ... which of the angles do you mean? Ps indicate point to the larger angle.</p> <p>T: Show me an angle of <math>360^\circ</math>, ... <math>720^\circ</math>. (?)</p> <p>T: Yes; this angle can't be shown using these half lines.</p> <p style="text-align: right;">20 mins</p>	<p>Correcting where necessary. Praising.</p>
<p><b>2</b></p>	<p><b>OS 5.2</b></p> <p>At Q2, T can introduce the concept of turning clockwise or anticlockwise. e.g.</p> <p>P: Q2 (a) Emma turns through <math>90^\circ</math> (shows this on OHP). <i>T shakes head to indicate disagreement.</i></p> <p>T: I don't agree. I have written down the answer <math>270^\circ</math>.</p> <p style="text-align: right;">28 mins</p>	<p>Whole class activity. Task appears on OHP. T asks questions. Ps come to OHP and show turns and answer questions. Other Ps agree/disagree. Discussion. Praising.</p> <p>Ps protest and try to convince T that they are right. Finally they agree that Emma could turn either clockwise or anticlockwise, so both answers are correct. Similarly for (b) and (c). The need for clarification of direction of turns is stressed by T.</p>
<p><b>3</b></p>	<p><b>PB 5.1, Q1 (b), (c)</b></p> <p style="text-align: right;">38 mins</p>	<p>Individual work, monitored, helped.</p> <p>Ps read the tasks in their PBs, work out the answers and write them in their Ex.Bs.</p> <p>When most pupils have finished, T points to Ps in turn for answers and reasons. Agreement. Feedback. Self-correction. Praising.</p>
<p><b>4</b></p> <p><b>4A</b></p> <p>(continued)</p>	<p><b>Clock hands</b></p> <p>T: Can anyone tell me what Big Ben is and where he can be seen?</p> <p>T: Have you seen Big Ben?</p> <p>T: Think of a clockface, or a watch with hands (called an analogue watch).</p> <p>T: (a) What angle does the hour hand (the small hand) turn through from noon to 3 p.m.? (<math>90^\circ</math>)</p> <p>(b) " from noon to 1 p.m.? (<math>30^\circ</math>)</p> <p>(c) " from 4 p.m. to 6 p.m.? (<math>60^\circ</math>)</p>	<p>Ps answer: clock on St Stephen's Tower on Houses of Parliament in London.</p> <p>Whole class activity.</p> <p>T reads out questions, one by one. For question (a), T asks a stronger pupil to draw a clockface on the BB and show the answer on it. Subsequent Ps can draw on this clockface to show their answers.</p>

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<p><b>Activity</b></p> <p><b>4A</b> <i>(continued)</i></p> <p><b>4B</b></p>	<p>T: (d) What angle does the hour hand turn through from noon to midnight? (360°)</p> <p>(e) " in 60 minutes? (30°)</p> <p>(f) from 6 a.m. to 3 p.m? (270°)</p> <p>(g) in one day? (720°)</p> <p>T: What angle does the minute (longer) hand of Big Ben turn through:</p> <p>(a) from noon to half past twelve? (180°)</p> <p>(b) from 3 o'clock to a quarter to 4 ? (270°)</p> <p>(c) from half past 6 to 8 o'clock? (540°)</p> <p>(d) from 2 o'clock to 5 o'clock? (1080°)</p> <p>(e) while the hour hand turns through 60° ? (720°)</p> <p style="text-align: right;"><i>45 mins</i></p>	<p style="text-align: center;"><b>Notes</b></p> <p>Agreement. Praising</p> <p>Individual work, monitored, helped. Task appears on OHP or copy given to each P.</p> <p>Checking. Tasks might be difficult for slower Ps; in this case, stronger Ps come to BB to show and explain the answers. Agreement. Feedback. Self-correction. Praising</p>
<p><b>5</b></p>	<p><b>Homework</b></p> <p><b>A: PB 5.1, Q2</b></p> <p><b>B: Compass rose</b> Study the compass rose on p 63 of PB Y7A. Make a copy of it on the paper provided. (<i>T gives each P a piece of tracing paper to use for this task.</i>)</p> <p><b>C: PB 5.1, Q1 (a)</b> You might find it useful to use your compass rose for this.</p>	<p>T tells Ps that they will each need a protractor, a pair of compasses, a ruler and a sharp pencil for the next few lessons.</p>



<b>Y7</b>	<b>UNIT 5 Angles</b> Lesson Plan 2	<i>Compass Directions</i>
<p><b>Activity</b></p> <p><b>4A</b></p> <p><b>4B</b></p> <p><b>4C</b></p>	<p><b>PB 5.1, Q6</b> - question changed to read:            "Nigel stands on a low hill. He can see various things around him. Draw a suitable set of axes in your PB and plot Nigel's position and the positions of the things he can see.            The coordinates are:            Nigel (9, 7)            Factory (9, 15)            Radio Mast (16, 14)            Old Fort (16, 0)            Lighthouse (- 1, 7)            Ship (0, - 2)            Crane (9, - 0.5)            Church Tower (17.5, 7)"</p> <p><b>T:</b> Close your Practice Book, please. Let the factory be north of Nigel.  <b>PB 5.1, Q6 (a), (b), (c), (d) (i), (ii), (e), (i), (iv)</b></p> <p><b>T:</b> Now answer this question in your Ex.Bs.  <b>PB 5.1, Q6 (d) (iii)</b></p>	<p><b>Notes</b></p> <p>To make Ps use the information learned in 'Plotting Points' (Unit 3, Lesson Plan 3), T does not show the diagram in PB to Ps, but, instead, gives them the relevant coordinates.</p> <p>In Ex.Bs, Ps mark positions on their own set of axes.</p> <p>Checking: T gets Ps to open PBs on p66 and tells them how to draw a set of axes on the diagram. They can do this, neatly, in the PBs. Ps can then compare this with the one drawn in their Ex.Bs, and can check and correct. Feedback. Praising.</p> <p>Whole class activity.</p> <p>The diagram appears on OHP. T asks questions; P chosen to come to OHP shows, answers, reasons. Other Ps listen, and check answer in their Ex.Bs using their compass rose (fitting it onto diagram shown in PB). Agreement. Praising.</p> <p>Individual work, then checking at OHP. Agreement. Feedback. Self-correction. Praising.</p>
<p><b>5</b></p>	<p style="text-align: center;"><i>45 mins</i></p> <p><b>Set homework</b></p> <p><b>PB 5.1, Q3 (e) - (i)</b>  <b>PB 5.1, Q4 (a), (b)</b>  <b>PB 5.1, Q5, (b), (e), (f)</b>  <b>PB 5.1, Q7</b></p>	<p>T reminds Ps to bring their protractors to the next lesson.</p>

<p><b>Y7</b></p>	<p><b>UNIT 5 Angles</b>                      Lesson Plan 3</p>	<p><i>Measuring, Drawing and Classifying Angles</i></p>
<p><b>Activity 1</b></p>	<p><b>Checking homework.</b>  <b>PB 5.1, Q3 (e) - (i)</b>  <b>PB 5.1, Q4 (a), (b)</b>  <b>PB 5.1, Q5, (b), (e), (f)</b>  <b>PB 5.1, Q7</b></p>	<p><b>Notes</b></p> <p>At start of lesson, T chooses P to write answers on BB. This should be done quickly.  P: (writes) e.g.  PB 5.1, Q3 (e) 135°  Q3 (f) 45°  .....  Q7 (g) NW  Q7 (h) No</p> <p>T asks Ps if they agree with the answers, question by question. Discussion if necessary. If there are many mistakes, T asks Ps for their answers and then asks one P to explain their reasoning, showing it on the OHP.  For Q3, Q4 and Q5, OS 5.3 can be used (without text) for Ps to show and reason their answers, using a labelled compass rose.  For Q7, T can sketch figure onto BB and Ps can give their reasoning using this.</p>
<p><b>2A</b></p>	<p><b>Angles</b></p> <p>T: Now I'm going to ask you some quick questions. Try to work out the answers in your head. If you can't, you can use your Ex.Bs. We'll do this as quickly as possible .... ready?</p> <p>What is the angle around a complete circle?                      (360°)  How many degrees are around a point on a straight line? (180°)  How many degrees are there in a right angle?                      (90°)  How many degrees are there in half a right angle?                      (45°)  How many degrees are there in one third of a right angle? (30°)  360° – 210° = ?                      (150°)  320° + ? = 360°                      (40°)  ? + 185° = 360°                      (175°)  Which direction is opposite north?                      (south)  Which direction is opposite east?                      (west)  What is the opposite of SW?                      (NE)</p> <p><b>2B</b></p> <p>T: Now hold up your half lines and show me:  a right angle  an angle of 90° (<i>trick</i>)</p> <p>30°                      120°  180°                      210°  60°                      270°  300°</p>	<p>Mental work, aloud, to warm up.  T asks questions, points to P, who answers.  Agreement. Praising.</p> <p>T now gives out the half lines (drinking straws) Ps used in Lesson 1 to show turns.  T asks questions, Ps show, and T checks that they are correct.</p> <p>Agreement. Correction.  Praising</p>
<p>8 mins</p>		
<p>16 mins</p>		





<b>Y7</b>	<b>UNIT 5 Angles</b> Lesson Plan 4	<i>Finding Angles on a Line and at a Point</i>
<p><b>Activity</b></p> <p><b>1A/B</b></p> <p><b>1C</b></p> <p><b>1D</b></p>	<p><b>PB 5.2, Q1 (a), (d), (f)</b> <b>PB 5.2, Q2 (a), (d)</b></p> <p><b>PB 5.2, Q4 (a), (d), (f), (g)</b></p> <p><b>PB 5.3, Q2 (a)</b></p> <p style="text-align: right;"><i>8 mins</i></p>	<p style="text-align: center;"><b>Notes</b></p> <p>T asks the size of each angle; Ps answer and agree. If there are problems, Ps can measure with protractors and T see any problems. Care needed with Q2, as Ps might not give reflex angles. T might need to repeat process for reflex angles.</p> <p>Ps open Ex.Bs; T walks around Ps checking that angles are approximately correct. If not, T repeats method at BB, using board equipment.</p> <p>Quick checking; recap meanings of 'acute', 'obtuse' and reflex' angles.</p>
<p><b>2</b></p> <p><b>2A</b></p> <p><b>2B</b></p> <p><b>2C</b></p>	<p><b>Mental work</b></p> <p><b>M 5.2, Q1 - Q8</b></p> <p>Extra questions</p> <p>Q9 An angle round a point on a straight line has size <math>140^\circ</math>. What is the size of the other angle at the point? (<math>40^\circ</math>)</p> <p>Q10 How many degrees are there around a point? (<math>360^\circ</math>)</p> <p>Q11 An angle round a point has size <math>210^\circ</math>. What is the size of the other angle? (<math>150^\circ</math>)</p> <p>Continuing mental work: <b>PB 5.4, Q1 (a)</b> <b>PB 5.4, Q1 (c)</b> <b>PB 5.4, Q2 (c)</b></p> <p style="text-align: right;"><i>26 mins</i></p>	<p>Mental work.</p> <p>These questions are good for reviewing turns and compass directions. Ps can use their compass roses.</p> <p>T asks questions, Ps volunteer to answer.</p> <p>Agreement. Praising.</p> <p>Further mental work.</p> <p>T sketches the diagrams on BB, one-by-one, and Ps calculate answers mentally, indicating when they are ready. T chooses P to answer. Agreement. Praising.</p> <p>Ps should find the mental work easy.</p> <p>For the last two questions, T calls Ps to BB for them to explain how they calculated their answers.</p> <p>Slower pupils can use paper for the final 3 questions if necessary.</p> <p>The main topic for the lesson follows on naturally from this mental work.</p>



<b>Y7</b>	<b>UNIT 5 Angles</b> Lesson Plan 5	<i>Constructing Triangles</i>
<i>Activity</i>		<i>Notes</i>
<p><b>1A</b></p>	<p><b>Checking homework</b>  <b>PB 5.4, Q1 (f)</b>  <b>PB 5.4, Q2 (f)</b>  <b>PB 5.4, Q3</b>  <b>PB 5.4, Q4</b></p> <p style="text-align: right;"><i>3 mins</i></p>	<p>Ps give answers to these simple questions. Agreement. Feedback. Self-correction. Praising.</p>
<p><b>2A</b></p> <p><b>2B</b></p> <p><b>3</b></p> <p><b>3A</b></p> <p><b>3B</b></p> <p><i>(continued)</i></p>	<p><b>PB 5.3, Q3</b></p> <p>T: Can you imagine what a triangle looks like? <i>(Yes)</i></p> <p>T: (a) Can you imagine a triangle with one obtuse angle? Sketch one in your Ex.B. Who would like to draw it on the BB?</p> <p>(b) Draw a triangle with two obtuse angles.  (c) Draw a triangle with no obtuse angles.  (d) Draw a triangle with at most one right angle.  (e) Draw a triangle with at least one right angle.</p> <p style="text-align: right;"><i>10 mins</i></p> <p><b>Constructing triangles</b></p> <p>(a) Draw a line and plot a point on it. Place each of your rice grains on the line more than 3 cm from the point.</p> <p>(b) Mark a point in your Ex.B. Place your rice grains on your Ex.B. so that they are each less than 3 cm from the point. What can you say about the position of the grains?</p> <p>(c) Mark another point in your Ex.B. Place your rice grains on your Ex.B. so that they are each 3 cm from the point. What geometrical figure do the point form? Could you draw one? What will you need to help you?</p> <p>T: John is searching for hidden treasure. He has half of the secret letter which gives directions to the place where it is buried. He reads, "Walk 2 m north from the centre of the island; turn west and walk 3 m. There is a palm tree at this spot. The treasure is 5 m from the palm ...."</p> <p>T: Could we draw a map? <i>(Yes!)</i></p>	<p>Whole class activity.</p> <p>Ps volunteer; T chooses P to come to board and sketch triangle. Other Ps agree/disagree. T asks another P to show which is the obtuse angle, and then to name the types of the other angles in the triangle. At the same time, T walks among Ps, checking and correcting triangles they have drawn in Ex. Bs. Pupils discuss meaning of the expressions 'at most' and 'at least'. Also discuss why a triangle can have neither two obtuse angles nor two right angles.</p> <p>Whole class activity.</p> <p>To construct triangle, T gets Ps to find points with certain properties on the page of their Ex.B. To make this a practical exercise, T has brought a small bag of rice grains (or split peas). T gives each P about 15-20 grains, to use as instructed. T reads the instructions; Ps work; T walks among Ps watching and helping. T and Ps then discuss results and answer the questions. Agreement. Praising.</p> <p>This task is fairly long but it fits well with 3A and helps Ps consider how we find points on a plane, why we use our compasses and shows how we arrange geometrical figures (e.g. triangles).</p>

<p><b>Y7</b></p>	<p><b>UNIT 5 Angles</b></p> <p style="text-align: right;"><b>Lesson Plan 5</b></p>	<p style="text-align: center;"><i>Constructing Triangles</i></p>
<p><b>Activity</b></p> <p><b>3B</b> <i>(continued)</i></p>	<p>OK. Let's draw a set of axes in your Ex.Bs. How do you think we should label the axes?</p> <p>P: The perpendicular axis should be labelled north and the horizontal one east.</p> <p>T: Fine. What units shall we use?</p> <p>Ps: Metres.</p> <p>T: So, we'll find the palm tree first. What are its coordinates?</p> <p>P: (-3, 2)</p> <p>T: Right. Where is the treasure?</p> <p>P: Five units from the palm.</p> <p>T: In what direction?</p> <p>P: We don't know.</p> <p>T: So - where is the treasure buried?</p> <p>P: It's somewhere in the circle around the palm.</p> <p>T: Let's construct the places it can be. From now on use your compasses.</p> <p>T: Can you give me the coordinates of some positions where the treasure might be buried?</p> <p>Ps: (2, 2), (-3, -3), (-3, 7), (-8, 2). (1, 5), (-6, 6), ...</p> <p>T: Would it help if we knew something else about the treasure? For example, where would you look if you knew that it was somewhere on the perpendicular axis?</p> <p>P: I would dig at the point (0, 6) or (0, -2).</p> <p>T: But John has no other information ...</p> <p>T: I have to disclose that the other half of the secret letter is in my pocket ... It says, "Walk 9 m east from the centre of the island, then turn north and walk 2 m. There you will find a spring. The treasure is buried 13 m from the spring."</p> <p>T: Who can show me the position of the spring?</p> <p>T: What are its coordinates?</p> <p>P: (9, 2)</p> <p>T: Right. Where does the second half of the letter say the treasure can be?</p> <p>T: Shall we tell John where to dig?</p> <p>Ps: Yes! At the point (-3, -3) or (-3, 7).</p> <p>T: And if we knew that the treasure was exactly NW or SW of the centre of the island? .....</p>	<p style="text-align: center;"><b>Notes</b></p> <p>Ps can recall their knowledge about graphs, writing and reading coordinates, and can combine this with their understanding of compass directions. The two parts of the 'letter' appear on OHP. T leads Ps to the solution. At each step, T asks Ps to suggest what to do next. Then Ps do it in Ex.Bs and T on BB (using board equipment). T also walks among Ps, watching, and helping if necessary, as they do the same.</p> <p>T lets Ps volunteer to answer with points, to give them practice with coordinates.</p> <div data-bbox="900 1182 1465 1659" data-label="Figure"> </div> <p>P comes out to show on BB.</p> <p>Finally Ps find the position of the buried treasure. T praises them.</p>
<p>26 mins</p>		

<p><b>Y7</b></p>	<p><b>UNIT 5 Angles</b>                      Lesson Plan 5</p>	<p><i>Constructing Triangles</i></p>
<p><b>Activity</b></p> <p><b>4A</b></p> <p><b>4B</b></p>	<p><b>Right angles in triangles</b></p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Somewhere in the country of Lilliput there is a little palm tree and a little spring. The distance between them is 12 cm. Gulliver is lying on the ground. His right thumb is 5 cm from the palm tree and 13 cm from the spring.</p> </div> <p>Draw a sketch (without ruler and compasses) to show how we could find the position of Gulliver's thumb.</p> <p>T: What kind of figure do you see here?  Ps: A triangle.  T: What can you say about its dimensions?  Ps: It has sides of length 12 cm, 5 cm and 13 cm.  T: .... about its angles?  Ps: ?  T: OK. We'll see.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Construct a triangle of length 12 cm, 5 cm and 13 cm. First draw a sketch, then plan your construction on it.</p> </div> <p>T: Now we can answer the question about the angles. So?  Ps: The triangle has a right angle and two acute angles.  T: Are you sure that it is exactly a right angle?  Ps: Yes!  T: Measure it with your protractor.  P<sub>1</sub>: Mine is only 89°.  P<sub>2</sub>: Mine is 90.5°.  T: We'll look at right angled triangles in more detail later on.</p> <p style="text-align: right;">34 mins</p>	<p><b>Notes</b></p> <p>Whole class activity which will link Activities 3B and 4B.</p> <p>Task appears on OHP. Here we use a sketch in preparation for constructing the triangle.</p> <p>Mathematical expressions can be introduced and discussed leading to the method used in the 'Solution' on p81 of PB.</p> <p>Ps instruct T, who makes a sketch on BB; Ps in Ex.Bs. (They can agree to use only one of the two possible triangles.)</p> <p>Task appears on OHP.</p> <p>Individual work, but T and Ps agree that as this is almost the same problem as 4A, so they can use the same sketch and plan.</p> <p>Ps sketch triangle in Ex.Bs. T monitors Ps and helps them to use their equipment (ruler, compasses).</p> <p>When <i>everyone</i> is ready, T shows the construction on BB using equipment. Feedback. Praising.</p>
<p><b>5</b></p>	<p><b>PB 5.5, Q1 (c)</b></p> <p style="text-align: right;">40 mins</p>	<p>Whole class activity.</p> <p>T leads Ps in planning the steps needed to construct the triangle (see p80 of PB), T writing them on BB. When plan is complete, Ps construct triangle in Ex.Bs. T walks among Ps, monitoring and helping where necessary. T then looks at all Ps work to see if it is correct.</p>

<b>Y7</b>	<b>UNIT 5 Angles</b>	<b>Lesson Plan 5</b>	<i>Constructing Triangles</i>
<b>Activity</b>  <b>6</b>	<b>PB 5.5, Q1 (d)</b>	<p style="text-align: center;"><b>Notes</b></p> <p>Individual work, monitored, helped.</p> <p>T reminds Ps to make a sketch an plan first.</p> <p>This is a construction that Ps have not met before, so many will struggle. When T notices that many Ps are having problems, T calls a stronger P to sketch plan on BB. Ps then continue with their individual work.</p> <p>T checks Ps by walking among them. Then T asks Ps to measure angles of triangle and discuss if there are any connections between the length of the sides and the size of the angles.</p>	
	<p style="text-align: center;">45 mins</p> <p><b>Set homework</b></p> <p>(1) Draw the triangles in  <b>PB 5.5, Q5</b>  <b>PB 5.5, Q4 (c), (d)</b></p> <p>(2) Measure the angles of the triangles you constructed during the lesson and in homework (1).            What do you notice about the sum of the angles in each of the triangles?</p>		

<b>Y7</b>	<b>UNIT 5 Angles</b>	<b>Lesson Plan 6</b> <i>Angles in a Triangle, Classifying Triangles</i>
<b>Activity</b>		<b>Notes</b>
<b>1A</b>	<b>Checking homework</b>	<p>T asks Ps if they managed to construct each of the triangles. Discussion follows as to why Q4 (c) cannot be drawn. T leads argument from "because the two arcs don't cross" to "if the sum of any two sides of a triangle is smaller than the third, the triangle cannot be constructed".</p> <p>Then T checks triangles in Q5 and Q4 (d) by walking among Ps and looking at their Ex.Bs.</p>
<b>1B</b>	<b>Measuring, adding, noticing</b>	<p>T asks different Ps the angles of the triangles in PB 5.5, Q1 (c), (d); Q5; Q4 (d), and the sum of the angles in each of these triangles. Others agree (or not). Agreement, self-correction, with everyone finding the sum <math>180^\circ</math>.</p> <p>Having established the conditions for the sides of a triangle, T and Ps go on to the next stage. For the moment, Ps have to accept that these statements are true without seeing any proofs.</p>
<b>2A</b>	<b>PB 5.6, Q1 (a), (b)</b>	<p>Whole class activity.</p> <p>For (a), T asks Ps how to proceed. T writes on BB and Ps in Ex.Bs. A (slower) P is called to BB and asked to do the same for (b). T may help.</p> <p>If this P seems to understand the problem, individual work can follow; if not, further practice and discussion should take place.</p>
<b>2B</b>	<b>PB 5.6, Q1 (c), (d)</b>	<p>Individual work, monitored, helped.</p> <p>Checking at BB: T sketches the triangle, chooses a P volunteer to come out and write the solution, giving reasons.</p> <p>Agreement, feedback, self-correction. Praising.</p>





<b>Y7</b>	<b>UNIT 5 Angles</b> Lesson Plan 7	<i>Angles in Quadrilaterals and Some Review Work</i>
<p><b>Activity</b></p> <p><b>1</b></p> <p><b>1A</b></p> <p><b>1B</b></p> <p><b>1C</b></p> <p><b>1D</b></p>	<p><b>Checking homework</b></p> <p><b>PB 5.6, Q1 (e), (f)</b></p> <p><b>PB 5.6, Q3 (c)</b></p> <p><b>PB 5.6, Q4 (d)</b></p> <p><b>PB 5.6, Q6 (for stronger pupils)</b></p>	<p><b>Notes</b></p> <p>T asks for just the answers, maybe for reasons in some cases. Agreement, feedback, self-correction. Praising.</p> <p>When they have given answers, T can ask Ps what they know about isosceles triangles.</p> <p>T asks P to give reasons for answer. T and Ps review interior and exterior angles. Agreement. Feedback. Self-correction. Praising.</p> <p>T calls stronger P to BB to outline the task and give answer with reasons. Then T asks if Ps found an answer that was true for all triangles, and if anyone could prove this. If no-one volunteers, T can guide the class to the proof: e.g. What is the sum of an exterior angle and the interior angle next to it in a triangle? How many pairs of interior/ exterior angles are in a triangle? What is the sum total of these angles? What is the total of the interior angles? So is the total of the interior angles? Who can think of a way of putting this that we will remember?</p>
<p><b>2</b></p> <p><i>(continued)</i></p>	<p><b>PB 5.3, Q4</b> plus:</p> <p>(c) only acute angles,</p> <p>(d) exactly one right angle,</p> <p>(e) two neighbouring right angles (the others are different),</p> <p>(f) exactly three right angles,</p> <p>(g) four right angles.</p>	<p>8 mins</p> <p>Whole class activity.</p> <p>This task not only sets up the first topic of this lesson, but also helps Ps to recall and review another of the topics, classifying angles.</p> <p>Task appears on OHP.</p> <p>Ps try to sketch in their Ex.Bs, one of them working at BB. Others agree/disagree.</p> <p>4-sided shapes have four angles,</p>

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<b>Activity 2</b> <i>(continued)</i>		<p style="text-align: center;"><b>Notes</b></p> <p>the sum of which is <math>360^\circ</math> (task (g); quadrilateral (f) does not exist (if it has three right angles, the fourth angle has to be a right angle); with (e) we can see that one of 'the others' is acute, one is obtuse ... After seeing all these examples, Ps can guess why (c) does not exist and if the different quadrilaterals might have the same total for their four interior angles.</p>
<b>3</b>	<b>Activity 5.6</b>	<p style="text-align: right;"><i>16 mins</i></p> <p>Individual work, monitored helped. Each P is given a copy of Activity 5.6 and works on it. Ps also recap on measuring angles, covered earlier in this unit. T walks among Ps, watching and correcting where necessary. (It is not necessary to measure the angles of the rectangle, just those of the other quadrilaterals on the sheet.) While Ps are working, T can check and, if necessary correct, their method of measuring. The <i>Extension</i> can be given to stronger Ps as homework. (No proof is given at this stage.)</p>
<b>4</b>	<b>M 5.3</b>	<p style="text-align: right;"><i>26 mins</i></p> <p>Mental work. T encourages Ps to work out answers in their heads, but slower Ps can use Ex.Bs where necessary. T asks questions, Ps think (some writes), volunteer, T chooses P to answer with reasons (maybe at BB). T and Ps are recapping topics from the whole unit. Agreement. Praising.</p>
<b>5</b>	<b>PB 5.1, Q8</b>	<p style="text-align: right;"><i>40 mins</i></p> <p>Whole class activity. Ps recall compass directions (may use compass roses). Then T asks questions, Ps look at map in question, volunteer and answer (reviewing the topic).</p> <p style="text-align: right;"><i>45 mins</i></p>

<p><b>Y7</b></p>	<p><b>UNIT 5 Angles</b>                      Lesson Plan 7</p>	<p><i>Angles in Quadrilaterals and Some Review Work</i></p>
<p><i>Activity</i></p>	<p><b>Set homework</b>  <b>M 5.4</b>  <b>PB 5.5, Q1 (a)</b>  <b>Activity 5.6 Extension</b> (for stronger Ps)</p>	<p><i>Notes</i></p>