Angles 1

Stage 3 Outcome

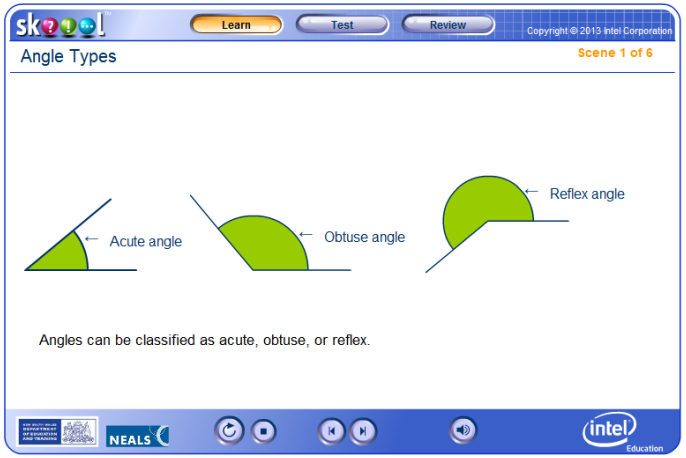
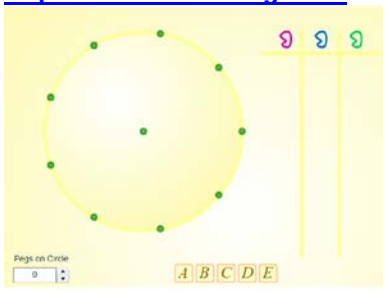
A student:
› describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions MA3-1WM
› measures and constructs angles, and applies angle relationships to find unknown angles MA3-16MG

Language: Students should be able to communicate using the following language: angle, arm, vertex, **protractor**, **degree**.

Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Date/ LAC Icons
Ignition Activities		
Protractors Students are shown how to use protractors to measure angles in degrees. The teacher ensures that students are aware of: • The scale around the edge • The point on the protractor to be aligned with the vertex of the angle to be measured • The reason for two sets of numbers • The largest angle that can be measured • The need to line up an arm of the angle being measured with the zero degree line on the protractor, not its bottom edge. In pairs, one student estimates the size of an angle and the other student checks the estimate by measuring with the protractor. *Extension:* Students replicate angles in the room using geo-strips. They then copy the angles onto paper and estimate and measure the angles.		
Constructing Angles In pairs, students draw ten different angles for each other. Students then measure, label and order their partner's drawings.		
Explicit Teaching		
Students learn about: • Identifying the arms and vertex of an angle where both arms are invisible, such as rotations and rebounds • Recognising the need for a formal unit for the measurement of angles		Literacy

• Using the symbol for degrees (º) • Using a protractor to construct an angle of a given size and to measure angles • Estimating and measuring angles in degrees • Classifying angles as right, acute, obtuse, reflex, straight or a revolution		Critical and creative thinking
Whole Class Teaching and Learning Activities		
Ball Games Students roll a wet tennis ball along the ground at an angle to the wall. Students observe the ball rolling to and rebounding from the wall. The wet lines form the arms of the angle and the point where the ball hits the wall is the vertex of the angle. Possible questions include: • Where is the ball rolled from to create the smallest angle? • Where is the ball rolled from to create the largest angle? • What is the smallest angle that can be made? • What is the largest angle that can be made? *Extension:* Students record results by measuring the angles produced.		Literacy
Kicking a Goal A small goal is created on an asphalt area using witches' hats. Students place a ball in front of the goal. They draw the angle created in chalk on the asphalt, using the ball as the vertex and the goal posts as the ends of the arms. They then measure and record the angle created, using the teacher's protractor. Students try to score a goal from that position. Students repeat the activity from other positions in front of the goal, drawing, measuring and recording the angle created in each new position. Possible questions include: • Where were the angles smaller? Why? • How did the size of the angle affect the ease of scoring a goal? Why? • If you moved the ball closer or further away from the goal line, did it change the size of the angle? How? Why? • How would the presence of a goal-keeper affect the angles created? Results could be recorded in a table using a computer.		Literacy Information and communication technology capability
<u>Guided and Independent Activities</u> **Measuring Angles in Two-dimensional Shapes** Students are provided with a variety of two-dimensional shapes. Using a protractor, they measure the angles within the shapes.		

Possible questions include: • How did you measure the angles? • Using your knowledge of angle properties of two dimensional shapes, what do you expect your measurements to show? • How can you record your measurements? • How can you classify the angles you have found? • How can you classify the shapes according to their angles? • How can you compare the shapes by their angles?		Literacy Critical and creative thinking
Classifying Angles Students identify, record and classify angles in the environment using the terms 'right', 'acute', 'obtuse', 'straight', 'reflex' and 'revolution'. In pairs, students describe the angles they have classified eg the angles are all obtuse because they are greater than 90º but smaller than 180º. Students draw each type of angle and label the vertex and arms. This activity could be extended so that students could estimate the size of each angle in the environment and then check by measuring. Possible questions include: • Were some of your estimations closer than others? • Why do you think this was?		Literacy Critical and creative thinking
Angling In pairs, students take turns to nominate the size of an angle eg 50º. Both students estimate and draw an angle of the nominated size. Students use a protractor to measure their partner's angle. The student whose angle is closer to the nominated measurement is the winner. *Variation:* Students create two sets of cards, one with a range of angles drawn on them and the other with the measured size of the angles. They play a concentration game with the cards.		Critical and creative thinking
Angles in the Environment Students collect a variety of pictures that show various angles eg buildings, football fields, aerial views. They identify angles in the pictures, trace them onto overhead transparencies and then describe them. Possible questions include: • What strategies did you use to describe your angles? • Did you discover anything about the type of angles identified? *Variation:* Students measure the angles traced and record their findings.		Critical and creative thinking

Computer Learning Object **Links To NEALS Computer Activities** http://lrr.dlr.det.nsw.edu.au/Web/skoool/math/step/angle_types/index.html  http://lrr.dlr.det.nsw.edu.au/Web/skoool/math/sim/Angle%20Measure%201%20Acute%20and%20Obtuse/index.htm http://lrr.dlr.det.nsw.edu.au/Web/skoool/math/sim/Angle%20measure%202%20Reflex/index.htm		Information and communication technology capability
Right Angles **http://nrich.maths.org/2847**  Can you make a right-angled triangle on this peg-board by joining up three points round the edge? Can you work systematically to prove this?		Literacy Critical and creative thinking Information and communication technology capability