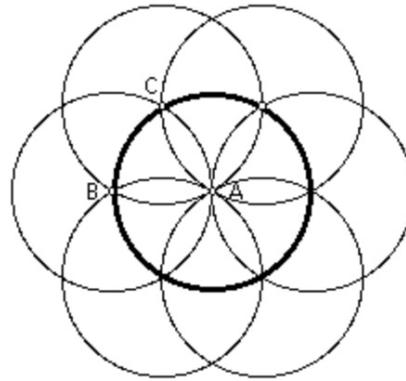
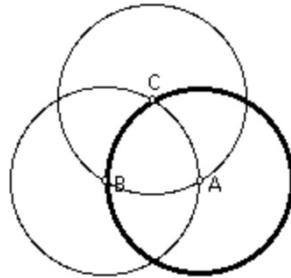
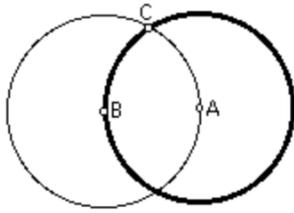


## CONSTRUCT WITH CIRCLES



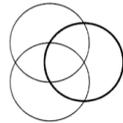
- Draw 2 circles with equal radii, intersecting at C, so that each goes through the centre of the other.
  - Draw a third circle of the same radius with centre C.
  - Draw 4 more circles with centres on the circle centre A and passing through A.
- Follow this sequence of steps.



1.



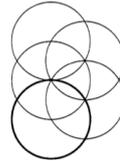
2.



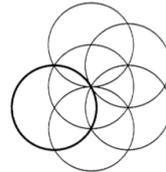
3.



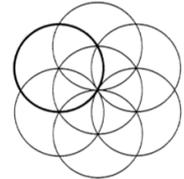
4.



5.



6.



7.

**You can use a paperclip instead of a pair of compasses.**

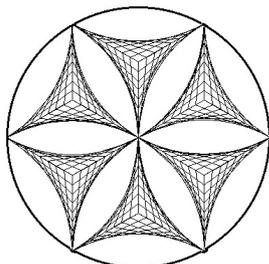
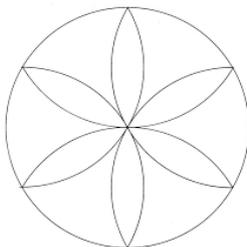
See <https://www.facebook.com/jain108academy/videos/620865948683694>

## HELP

For guidance on using geometrical instruments to measure lengths and angles, and to draw circles, see the worksheet: <https://aiminghigh.aimssec.ac.za/wp-content/uploads/2016/11/Learners-worksheet.pdf>

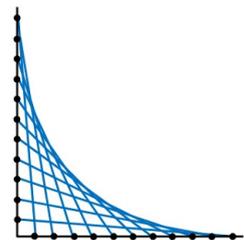
## NEXT

Draw straight lines in your pattern. Choose points to join carefully. For a challenge see below.



Work out how to draw the slightly simpler design on the left. Then extend it to the design beside it.

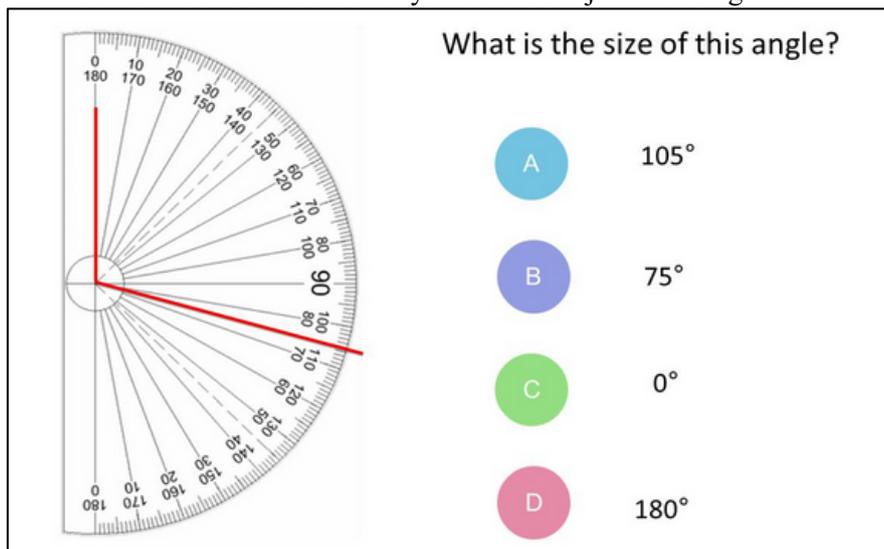
It is a clever combination of the methods of constructions with circles and constructions with lines.



## NOTES FOR TEACHERS

**Diagnostic Assessment** This should take about 5–10 minutes.

1. Write the question on the board, say to the class:  
“Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D”.
2. Notice how the learners respond. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
3. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
4. Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers. It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.



What is the size of this angle?

A 105°

B 75°

C 0°

D 180°

5. The concept is needed for the lesson to follow. Explain the right answer or give a remedial task

A. is the correct answer.

**Common Misconceptions**

**B.** Does not recognise that the angle is obtuse. Reads the acute angle on the scale.

**C.** Reads from the red line, no understanding of angle measurement.

**D.** Reads from the red line, no understanding of angle measurement.

<https://diagnosticquestions.com>

### Why do this activity?

This activity gives learners practice in using a ruler, protractors and compasses to draw accurate geometrical constructions. To make the patterns learners need to measure lengths and angles, to draw circles, to follow instructions and to draw accurately. The activity involves talking about the geometrical properties of shapes.

Teachers can plan for learners of different attainment levels by giving learners different patterns to draw. The activity encourages creativity and may improve learners' attitude to mathematics by appealing to some learners who dislike mathematics and to others who find it difficult. Learners will enjoy experimenting with different ways to adapt the designs to make their own patterns.

### Learning objectives

- **Measuring Angles** Accurately use a protractor to measure and classify angles:  $< 90^\circ$  (acute angles); Right-angles; angles  $> 90^\circ$  (obtuse angles); Straight angles;  $> 180^\circ$  (reflex angles);
- **Constructions** Use a compass, ruler and protractor appropriately to construct geometric figures accurately, including: angles, to one degree of accuracy and circles.

## Generic competences

*We need to prepare children for a job market where existing knowledge and skills have limited value unless they can be applied in novel ways to produce new knowledge that solves today's complex problems to improve the quality of life for all.*

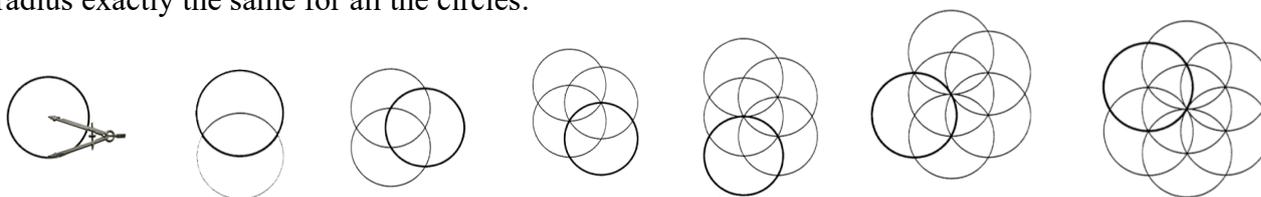
In doing this activity students will have an opportunity to:

- develop the skill of interpreting and creating visual images;
- engage in independent learning to develop manual dexterity in handling instruments.

## Suggestions for teaching

Start with the whole class and show them some pictures. Tell them that they are going to copy some of the designs and then to create some of their own. Give out geometrical instruments.

Guide the learners to follow this sequence of steps reminding them that it is essential that they keep the radius exactly the same for all the circles:



1.

2.

3.

4.

5.

6.

7.

When they have copied the simple design ask them what geometrical properties they can see in the design. Show them some other designs and tell the learners to design their own pattern.

## EARLY YEARS

See <https://www.facebook.com/TheCarolineAinslie/videos/4026958580662627>

## Follow up

Constructions with lines: <https://aiminghigh.aimssec.ac.za/years-7-9-constructions-with-lines/>

Construct circle and line patterns:

<https://aiminghigh.aimssec.ac.za/years-7-9-construct-circle-and-line-patterns/>

Flower of Life <https://aiminghigh.aimssec.ac.za/years-6-10-flower-of-life/>