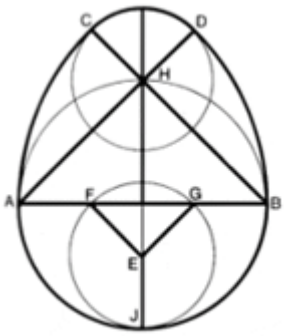
MAGIC EGG TANGRAM

We know birds come from eggs.

You can make many birds from the 9 pieces of Tangram egg.

Break the egg and re-assemble the 9 pieces to hatch one of many varieties of birds.

Construction

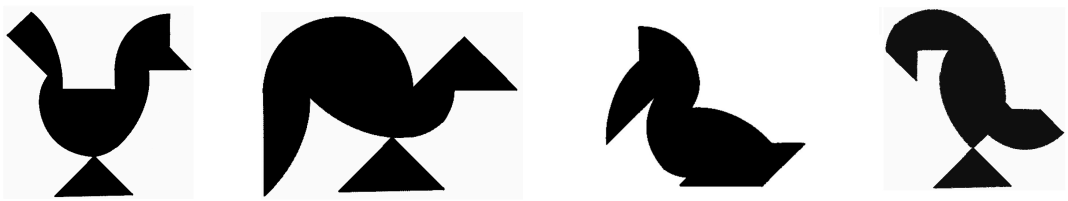


1. Draw a circle with radius 60 mm and mark diameters AB and HJ at right angles.
2. Extend the line from A to H and beyond.
3. Extend the line from B to H and beyond.
4. Draw a circle centre A, radius 120 mm, to find D on AH extended.
5. Draw a circle centre B, radius 120 mm, to find C on BH extended

6. Draw the arc CD as part of the circle centre H radius 35 mm.
7. Mark E so that JE = 35mm and draw the circle centre E radius 35mm.
8. Cut into 9 pieces as in the coloured diagram (making 4 green pieces).

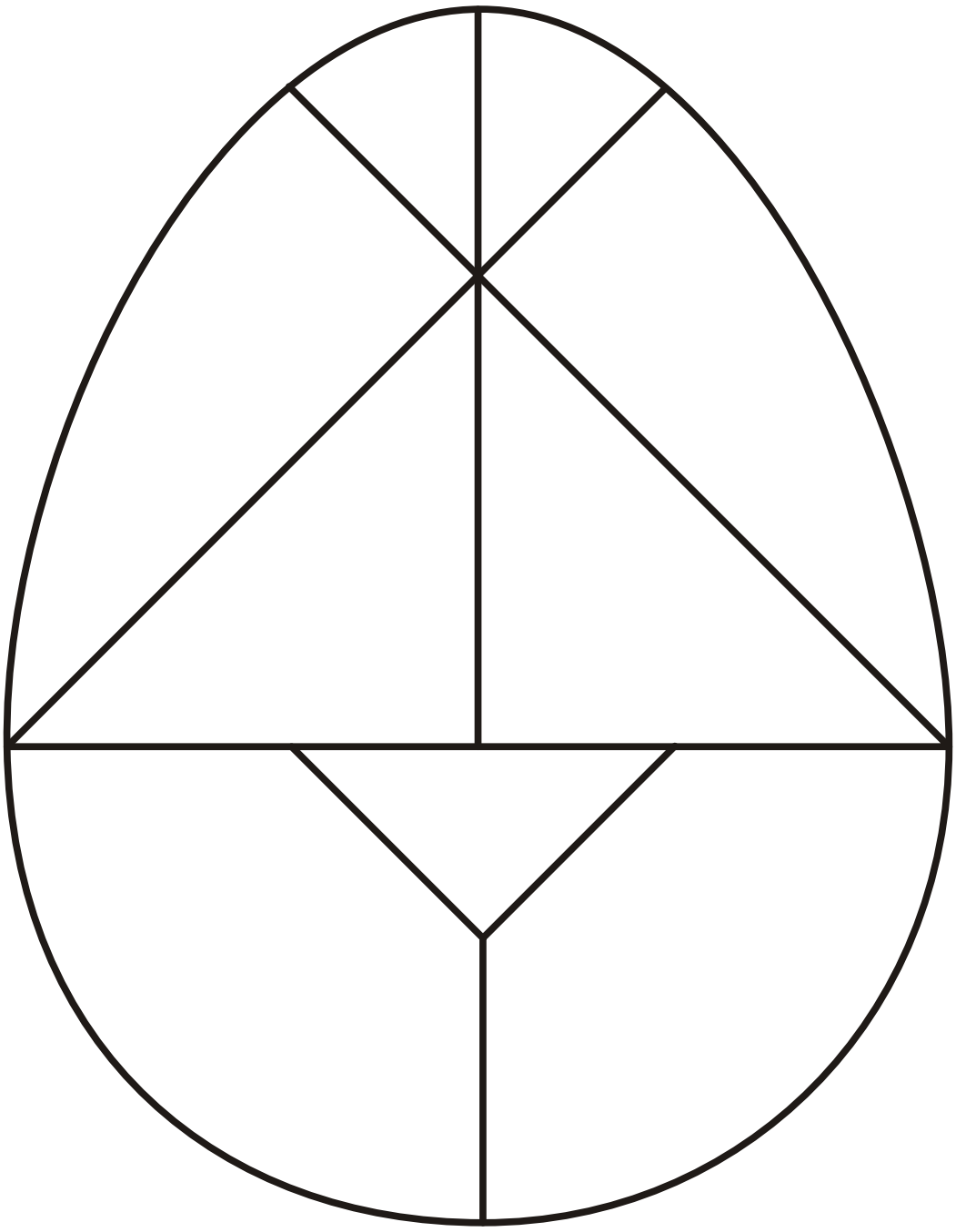
Making the puzzle

You can use cardboard and perhaps laminate it before cutting out the pieces. Alternatively use scrap plastic or wood. Working in wood requires skilled craft work and careful sanding.



HELP

Cut out these pieces to make your Magic Egg Puzzle.



NEXT

More birds to make

Resources: Scrap card to make the tangram, pair of compasses, scissors.

NOTES FOR TEACHERS

SOLUTION

The Underlying Mathematics
For this construction we need

120 = BA = BC = BH + HC.

By Pythagoras Theorem, BH = $60\sqrt{2}$,

so we need HC = 120 - $60\sqrt{2}$ = 35.16 (to 2 d.p)

DIAGNOSTIC ASSESSMENT This should take about 5–10 minutes. Two quiz questions

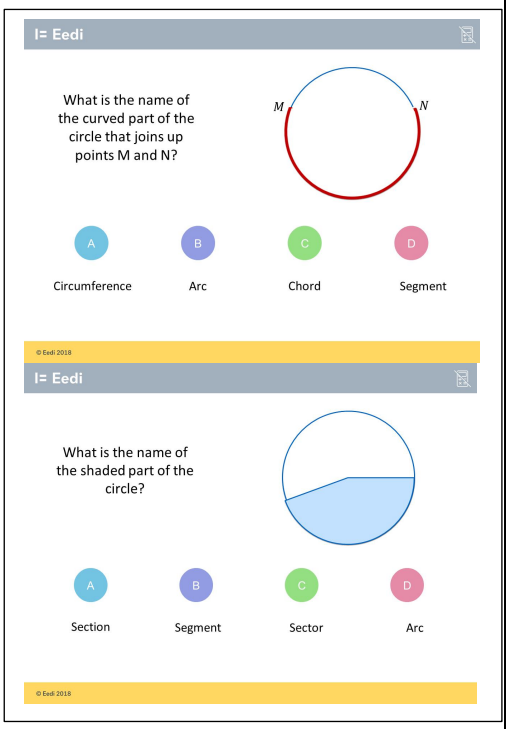
Write the question on the board, say to the class:
"Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 for D".

1. Notice how the learners respond. Ask a learner who gave answer A to explain why he or she gave that answer. DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
2. It is important for learners to explain the reasons for their answers. Putting thoughts into words may help them to gain better understanding and improve their communication skills.
3. 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 to vote for the right answer again by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.
5. Explain the right answer or give a remedial task.

The correct answer is: Quiz 1. B. Arc Quiz 2. C. Sector

Quiz 3: Ask learners to draw a segment of a circle on a showboard or piece of paper and to hold it up to show you.

Misconceptions: This is all about mathematical language.



https://diagnosticquestions.com

Why do this activity?

This can be a 'just for fun' puzzle for younger learners. It provides a purpose for carefully doing an accurate construction giving learners practice in measurement and using compasses. Learners can be asked to work out lengths and angles in the diagram.

Learning objectives

In doing this activity students will have an opportunity to:

- practise doing accurate geometric constructions
- learn the mathematical vocabulary connected with circles

Generic competences

In doing this activity students will have an opportunity to develop visualization skills.

Suggestions for teaching

Start with the diagnostic quizzes.
Either: Provide a printed copy of the tangram egg from page 2 so that learners can cut it out and do the puzzles on page 3,
Or: give each learner a copy of the worksheet on page 1 and a piece of card. Make sure that they all have compasses, rulers and scissors. Guide them step by step through the construction.

Key questions

- Is your construction sufficiently accurate so the 3 (or 4) lines go exactly through that point?
- Have you used the correct centre for the arc of that circle?
- Are you following the instructions?

Follow up

Create some of your own birds with the 9 pieces?
Create some birds from standard tangram pieces.

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and school years up to Secondary 5 in East Africa.
New material will be added for Secondary 6.
For resources for teaching A level mathematics (Years 12 and 13) see https://nrich.maths.org/12339
Mathematics taught in Year 13 (UK) & Secondary 6 (East Africa) is beyond the SA CAPS curriculum for Grade 12

	Lower Primary Approx. Age 5 to 8	Upper Primary Age 8 to 11	Lower Secondary Age 11 to 15	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13