

LESSON PLAN 3: MAKING A COMPUTER FROM STONES

Objective: learning about early forms of computers and making calculations

Age range: 6-12

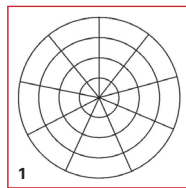
YOU WILL NEED

- ▶ Paper and pen/pencils
- ▶ Small stones (or something similar that can be used as markers)
- ▶ Abacus (optional)

Ask your students to put their calculators away and tell them they are going to make a computer from stones – and use it for calculations. They can work individually or with partners.

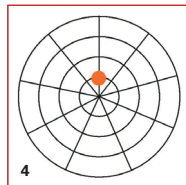
METHOD

1. Instruct them to draw four concentric circles (freehand or with the help of a compass). Then get them to add nine dividing lines going from the centre to the outer circle, with one line pointing straight up to the top.



2. Explain that the circles represent factors of 10, so the first is the 1s, the second the 10s, the third the 100s, and the fourth the 1000s. The lines represent the numbers one to nine.

3. Get each student (or group) to put a stone (or whatever small marker you have chosen) at the intersection of the innermost circle and the vertical line.



Q. What number does this represent?

A. One

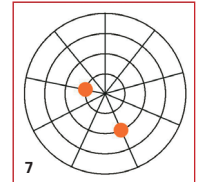
4. Explain that by moving clockwise to successive lines around the same circle, counts up to nine. Point to an intersection and ask the number.

5. When they reach nine, show them that they need to move the stone out to the intersection with the second circle.

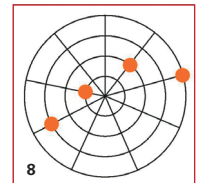
Q. What number does this represent?

A. 10

6. Explain that by leaving the stone at 10 and putting another in the 1 position, they make the number 11. Then, by moving the second pebble clockwise around the innermost circle, they can count to 19.



7. On the second circle, show that by moving the original stone clockwise, it counts 20, then 30, and so on.



Q. How can the number 58 be represented?

8. Ask the students to work out how to continue counting, gradually moving out to the outer circle. Give them increasingly larger numbers to represent on their pebble calculators. They can go up to 9999.

Q. How can the number 3728 be represented?

9. Once they have the hang of it, get them to do additions and subtractions by moving the stones. Also, challenge them to figure out how to go beyond the 1000s place – then see if they can use the stone calculator to represent fractions, 0.1, .001, .0001, and so on.

Older students should need less guidance. So just give them the basic idea, and have them work out most of it out for themselves.

TOPICS FOR DISCUSSION

- What is a computer?
- How have computers developed?
- In what ways have computers transformed our lives?
- How can computers be used in schools?
- What is artificial intelligence and what impact could it have?
- What is the Internet?
- Who owns and manages the information on the Internet?



ANCIENT COMPUTER EXPOS

INTRODUCE THE ABACUS

Tell the class that the stone calculator they made works in a similar way to an abacus (plurals abacuses or abaci), a calculating tool, often made from a wooden frame with beads sliding on wires. Explain how it is one of the earliest known forms of a computer, which people used (and still do) to calculate and store numbers centuries long before the adoption of the written numbers. If at all possible, have an abacus and show how it works.

NEXT ISSUE: DOING THE MATHS – WE’LL SHOW YOU HOW TO USE POWERPOINT PRESENTATIONS TO EXPLAIN AND GUIDE STUDENTS THROUGH COMPLEX MATHEMATICAL EQUATIONS AND THEORIES.



DROP US A LINE

If you have a lesson plan or idea you’d like to share with *INTERFACE* readers, drop us a line: comment@nz-interface.co.nz or www.nz-interface.co.nz