

An Introduction to Soroban

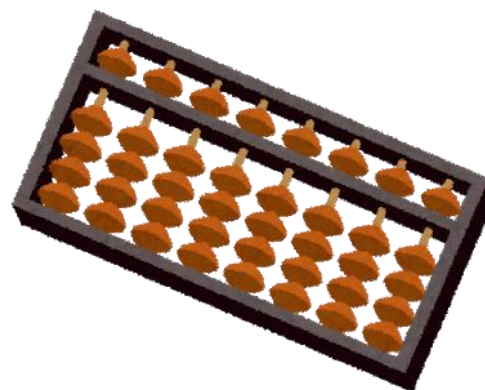
The Japan Society with Tomoko Hault (2019)

算盤 Key Questions

1. What is Soroban?

Soroban is an abacus which was first introduced to Japan from China in the 16th century. By the mid-17th century it was an important tool in commerce and finance. The rods on a soroban can represent decimals, ones, tens, hundreds, thousands and beyond, allowing the user to carry out fairly complex calculations quickly.

Soroban are still used in contemporary Japan and soroban arithmetic is taught in Japanese primary schools as part of the national curriculum.



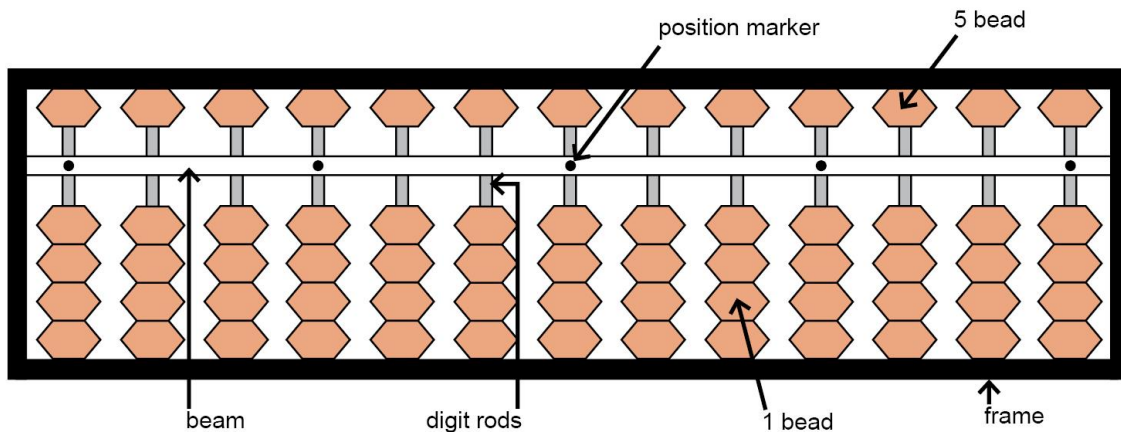
2. What are the benefits?

- A **great visual tool** providing students with a **concrete representation of numbers**
- A tangible object which students can manipulate, making it especially **good for visual and kinaesthetic learners**
- Helps students visualise the size of numbers and **strengthens understanding of place value**
- **Encourages children not to count in single units** as they might with counting blocks
- Allows students to **practise and reinforce knowledge of number bonds**

3. How can I use it?

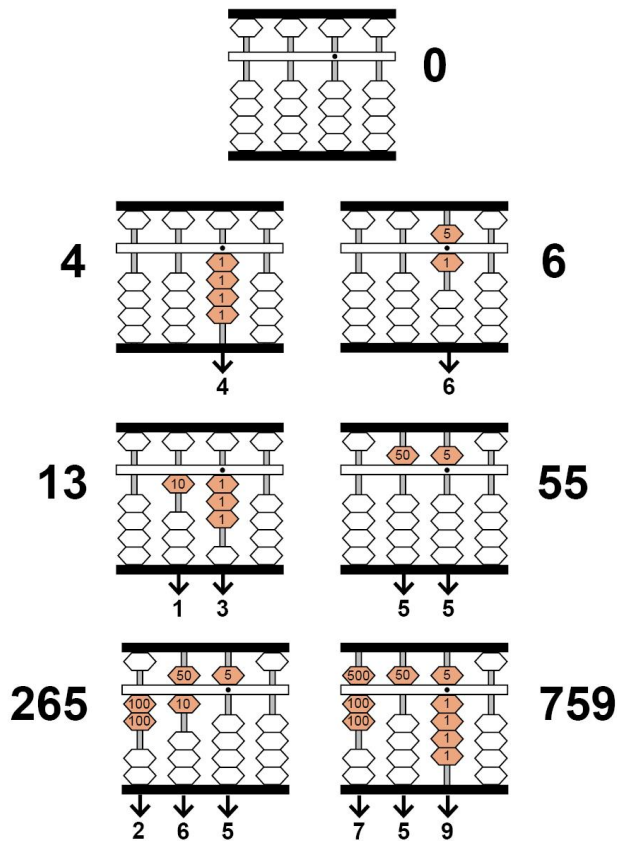
Once the basic concept and foundation phases have been taught, you can use soroban as a tool to complement the teaching of place value, decimals, subtraction, and addition. It is also suitable for short warm ups at the beginning of lessons or as a start of the day activity (SODA). The accompanying worksheets can be completed by students individually, or for pair work.

Parts of the Soroban



Each rod has a total of four 1 beads and one 5 bead. After deciding which position marker you would like to use on the soroban, the digit rod which passes through it will represent the ones. We recommend teaching students to use the position marker in the middle of the soroban.

How to Read the Soroban



No beads are touching the beam.
The value represented is zero.

Ones

The 5 bead represents five
Each 1 bead represents one.

Note the location of the position marker

Tens

The 5 bead represents 50
Each 1 bead represents 10.

Hundreds

The 5 bead represents 500
Each 1 bead represents 100.

Only the value of the beads touching the beam are counted.

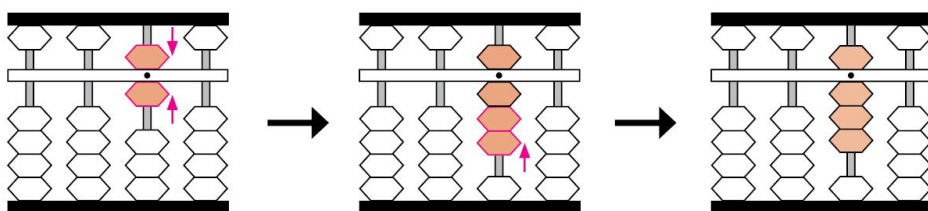
A Key Point to Keep in Mind

Once the basics of the 1 beads, 5 beads and 6-9 have been taught, students will be able to read any number represented on the soroban and perform some addition and subtraction sums. However, some sums will not be possible until students learn to 'carry', 'borrow' and the 'breaking down 5' technique. In the introductory lessons, please use the accompanying 'Example Sheet' for sums that do not include these techniques.

Please see below for examples of borrowing, carrying and the breaking down technique. **Video resources to explain and demonstrate these techniques are currently in development.**

Addition with no carrying

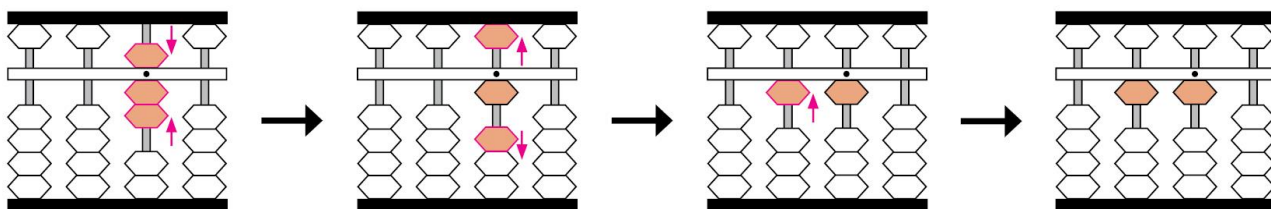
$$6 + 2 = 8$$



This sum is possible without carrying. When 6 is represented on the soroban, there are enough 1 beads on the ones rod to add 2 more beads to make 8.

Addition with carrying - breaking down 10

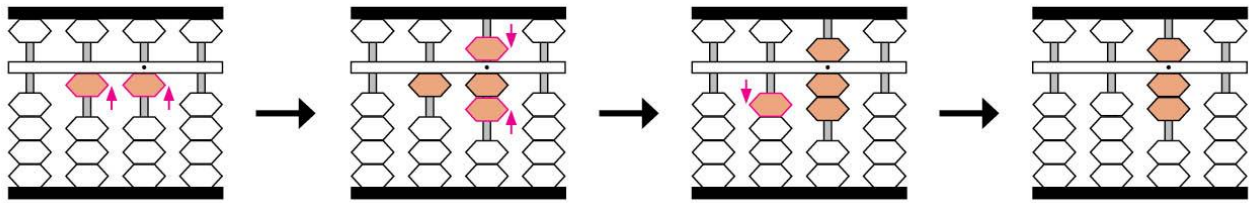
$$7 + 4 = 11$$



When 7 is represented on the soroban, there are not enough 1 beads on the ones rod to add 4; it is necessary to 'carry' to the tens rod on the left. To do this sum, students must know 4's 'friend' which helps it make 10 (in this case, 6) which they will remove from the ones rod. Then they should move one 1 bead up towards the beam on the tens rod to get the correct answer.

Subtraction with borrowing – breaking down 10

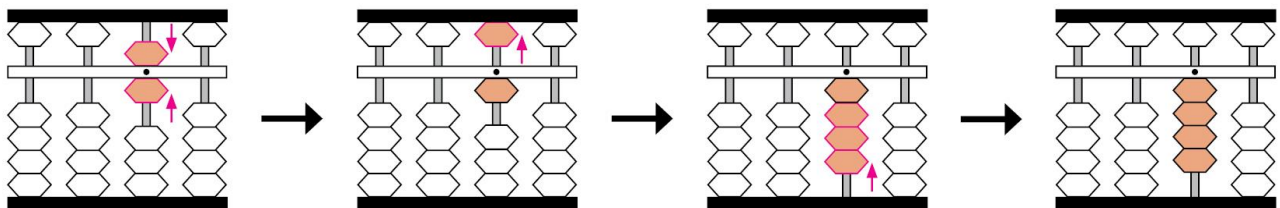
$$11 - 4 = 7$$



When 11 is represented on the soroban, there are not enough 1 beads on the ones rod to take away 4. It is necessary to use the 'breaking down 10' technique. To do this, students need to understand number bond and know that 4's 'friend' which helps it to make 10 is 6. They need to add 6 to the ones rod and remove one bead from the 10s rod to get the answer.

Subtraction with breaking down 5 technique

$$6 - 2 = 4$$



When 6 is represented on the soroban, there are not enough 1 beads on the ones rod to take away 2; it is necessary to use the 'breaking down 5' technique. To do this sum, students need to know 2's 'friend' which helps it to make 5 (in this case, 3). They need to move the 5 bead away from the beam and move three 1 beads towards the beam to get the correct answer.