

## Fill the bucket!

*Children estimate then measure the capacity of a bucket, and play a game filling it.*

## Skills practised:

- Estimating and measuring capacity in cupfuls
- Subtracting a small number

**Conjecture:** *It is impossible to fill a bucket as part of a water race without spilling some water!*

### What to do:

*Children work in a group of three pairs, outside with an adult.*

*Each pair needs a small bucket (e.g. one used for sandcastles, all three buckets need to be the same) and a plastic cup (all three need to be the same size). The group need a large container which holds at least four buckets of water (e.g. water tray or large plastic storage box). The adult needs a scoreboard, e.g. a chalkboard and easel.*

Say that children are going to have a water race! There are **three challenges** which include playing a game filling a bucket with cups of water, and later working out how much water they spilt!

Draw a table on the scoreboard.

Challenge	Names of first pair	Names of second pair	Names of third pair
Challenge 1			
Challenge 2			
Challenge 3			
TOTAL			

Ask children to complete all three challenges.

See separate instructions below.

Ask each pair to add up their three scores. Which pair won overall?

### Aims:

- To consolidate understanding of capacity
- To begin to understand the concept of difference in context
- To solve a problem arising a practical context

### Minimum number of calculations expected

2

## Teacher instructions

Have the score board displayed in a prominent place.

### Challenge 1

1. Place each bucket a set distance, e.g. 5 metres from the large container.
2. When you say 'go,' the first child from each pair fills their cup with water from the large container, runs to their bucket and empties the cup of water into it. They then run back and hand the empty cup to the other child who does the same. Repeat until their bucket is full.
3. As each child empties their cup into the bucket, draw a tally on the bottom of the scoreboard. Keep these tallies for Challenge 2.
4. The first pair to fill their bucket earn 3 points. The second pair earn 2 points and the third earn 1 point. Add these points to the scoreboard.
5. Each pair add up their tallies to find out how many times they filled their cup in order to fill the bucket.

Now children move on to Challenge 2 – which is quicker and less energetic than Challenge 1.

### Challenge 2

You need a separate board to record the children's estimates.

1. Each pair estimate how many cups of water will fill the bucket. Record their estimates.
2. Once all three pairs have each made an estimate, each pair then measure the capacity of their bucket using the cup. Which pair's estimate was closest?
3. Give the winning pair 3 points, the second pair 2 points and the least score 1 point. Children empty the water from the buckets back into the large container.

Was the same number of cups that the bucket holds the same number of cups that they used to fill the bucket in Challenge 1? If not, why not?

### Challenge 3

1. The children's challenge now is to work out how much water they must have spilt! For example, if the bucket holds 10 cups and they filled 13 cups, they must have spilt 3 cups of water. Children can use a bead string or number line to help them to work out the answer. Help them to find the difference between the number of cups the bucket holds and the numbers of times they filled the cup.
2. The pair who spilt least water win this challenge and score 3 points. The next pair score 2 points and the third pair score 1 point.

# Fill the bucket

You are going to have a water race!

Here are your **three challenges**:

## Challenge 1

When the teacher says 'Go!' the game starts.

1. Fill a cup with water from the large container.
2. Run to your bucket.
3. Empty the cup of water into it.
4. Run back and hand the empty cup to the next child.
5. They do the same.
6. Keep going like this until the bucket is full.
7. As each cup is emptied into the bucket, draw a tally on the bottom of the scoreboard.
8. Keep these tallies for Challenge 2.
9. Add up your tallies to see how many cups filled the bucket.

*Move on to Challenge 2*

## Challenge 2

1. Estimate how many cups of water you both think will fill the bucket.
2. Tell your teacher so she can write down your estimate.
3. Measure the capacity of your bucket using the cup.
4. Compare your estimate with other pairs.

The winning pair gets 3 points.

The second pair gets 2 points.

The third pair score 1 point.

Empty the water from the buckets back into the large container.

*Move on to Challenge 3*

## Challenge 3

How much water did you spill?

Work this out.

1. How many times did you run up with a cup to fill your bucket? (In Challenge 1)
2. How many cups did your bucket hold? (In Challenge 2)

Use a bead string or number line to help you to work out how much more the answer to 1 is than the answer to 2.