# Controlled variable investigation: Find the mistakes

***Education in Chemistry***May 2021
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A student is investigating how long sugar takes to dissolve in water. They have written up their work, but unfortunately there are a few mistakes.

1. Identify the mistakes in the investigation below and correct them.
2. **Extension:** What else could be added to the method to improve it?

How does changing the type of sugar used affect the time it takes to dissolve?

Independent variable: The time that is taken for all of the sugar to dissolve.

Dependent variable: If we use caster sugar or icing sugar, the type of sugar.

Control variables: The mass of sugar used; the temperature of the water; the amount of water.

Method:

1. Use a spoon to measure out 5 g of the sugar.
2. Use a 100 cm3 measuring cylinder to measure 20 cm of water. Ensure the water is at exactly 27.00°C.
3. Put the water into a beaker and then add the sugar, stir it until it dissolves.
4. When the sugar is added, start the timer and record the time (m) it takes to dissolve.
5. Repeat with different types of sugar.
6. Repeat each sugar three times to make sure it is a fair test.

Results:

|  |  |
| --- | --- |
| Type of sugar | Time it takes for sugar to dissolve |
| Test 1 | Test 2 | Test 3 | Average |
| Caster | 1m 4s | 15s | 1m 20s | 53s |
| Icing | 23s | 31s | 42s | 32s |
| Demerara  | 2m 15s | 2m 2s | 1m 59s | 2m 5s |