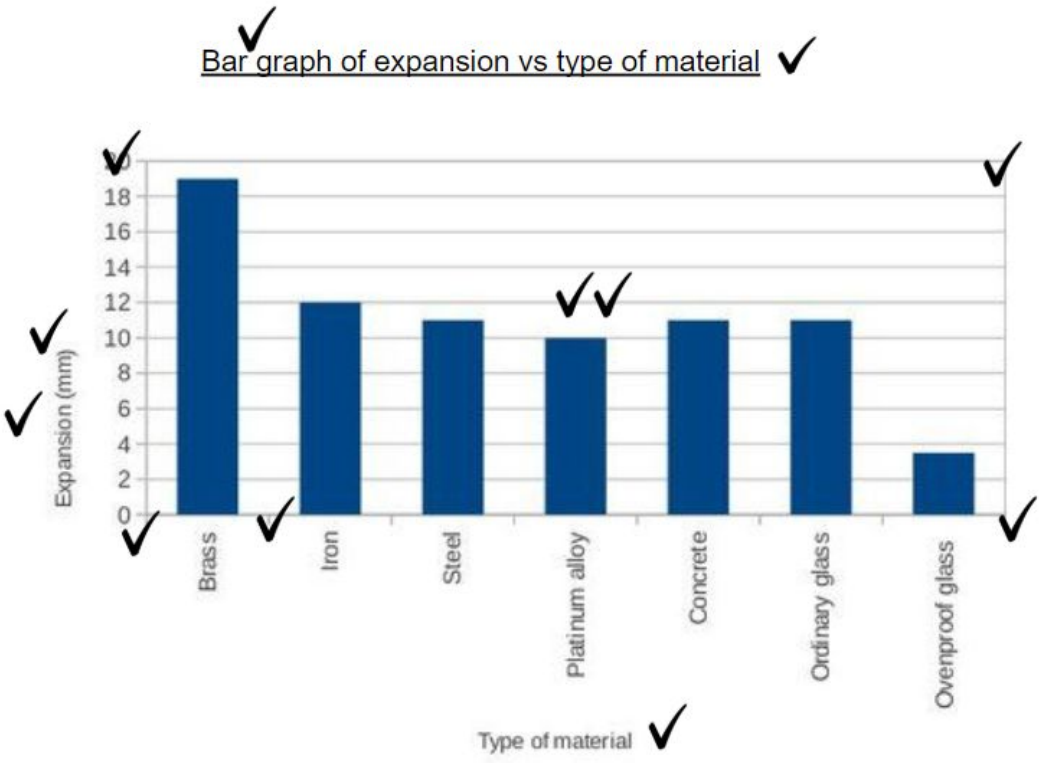
WorksheetCloud: MEMORANDUM
Grade 8
Subject: Natural Sciences
Topic: Expansion and contraction of substances

Activity 1

In this activity we will compare the expansion of different solid materials by drawing a graph. You will need the following information for your graph:

Material	**How far a 100 metre length of the material will expand when the temperature increases by 10°C**
Brass	19 mm
Iron	12 mm
Steel	11 mm
Platinum alloy	10 mm
Concrete	11 mm
Ordinary glass	11 mm
Ovenproof glass	3,5 mm

1. Draw a bar graph with 'Expansion' on the y-axis and 'Materials' as categories on the x-axis. Choose an appropriate title for your graph.



2. Which material expands the least?

Brass

3. Which material expands the least?

Ovenproof glass

3. Which solid would be the best material to reinforce concrete? (Hint: the reinforcing material should expand as much as the concrete, otherwise it will damage the concrete during expansion.)

Steel - it expands the same as concrete

4. A man builds a house with large windows set in beautiful frames made of brass. The house is in a region where it gets very hot during summer. Imagine that the owner of the house has a problem: the windows of the house look beautiful in their shiny brass frames but they keep falling out during the summer months. As a scientist, how would you explain this and what would your advice to the owner of the house be? Should the frames be replaced? If so, with which material? What other solutions can you suggest?

From the graph and the data in the table, we can see that brass expands much more than ordinary glass. When the weather is really hot, the brass expands so much that the window glass does not fit properly anymore and falls out. You could advise the owner to try the following:

- **Replace the brass frames with steel. Steels expands by the same amount as glass so the glass should stay in place.**
- **Replace the large windows with smaller windows. Smaller items expand less**

because there is less matter that can expand.

Note: In addition to the type of material, the amount of expansion also depends on how much material there is. This is why expansion is difficult to see in relatively small items. e.g. cooking pots. A key will still fit in a lock, even if the key has been lying in the hot sun, because expansion is not that noticeable in small items.