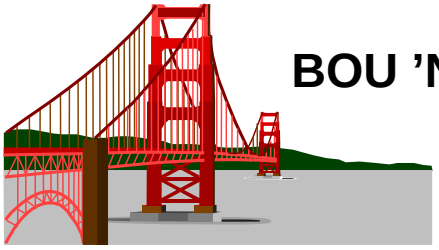
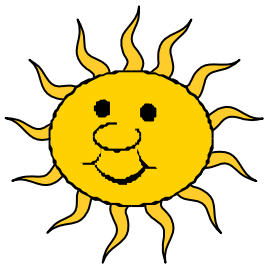
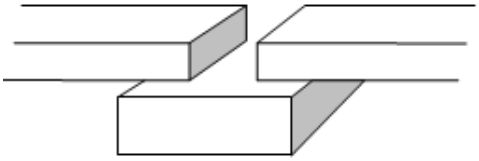


BOU ’N BRUG



Wanneer ingenieurs ’n brug of spoorlyn bou, moet hulle klein openings tussen seksies laat om te voorsien vir hitte-uitsettting. Die gaping moet nie te klein wees nie (hoekom nie?), maar ook nie te groot nie (hoekom nie?)

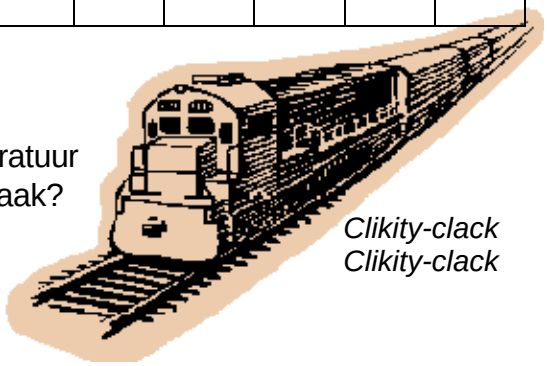
Vir ’n nuwe brug bereken die ingenieurs dat die grootte van die gapings tussen seksies 2 cm by ’n temperatuur van 0 °C moet wees. Hulle weet dat vir elke 1 °C wat die temperatuur styg, word die gaping 0,05 cm kleiner.



1. Voltooi hierdie tabel van die grootte van die gaping by verskillende temperature. Verduidelik jou *metode*.

Temperatuur (in °C)	0	1	2	3	4	5	10	20	30
Grootte van gaping (in cm)									

2. Op die dag dat die brug gebou word is die temperatuur 24 °C. Hoe groot moet die ingenieurs die gaping maak?



Clikity-clack
Clikity-clack

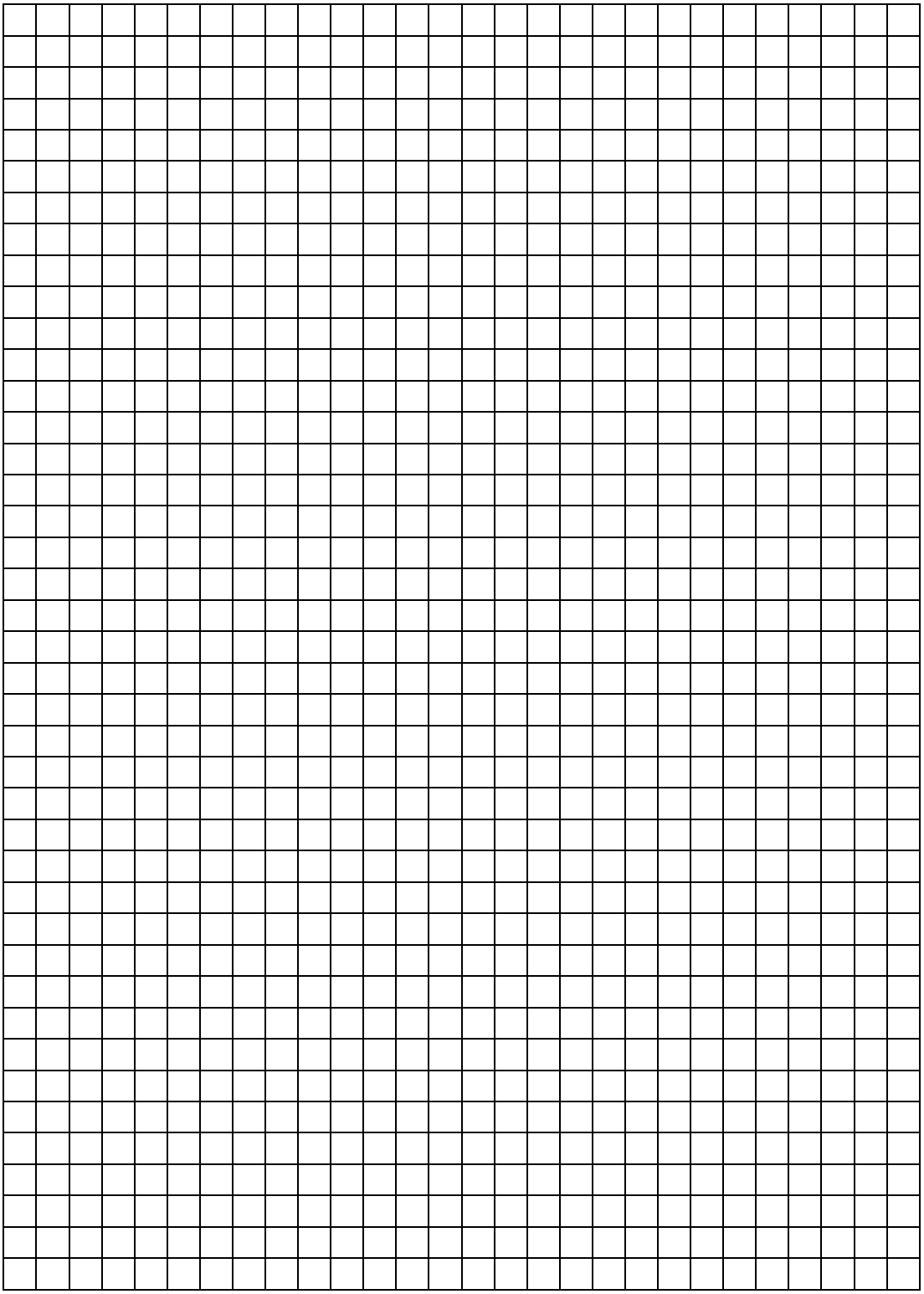
3. By watter temperatuur sal die grootte van die gaping 1,14 cm wees?

4. Wat gebeur met die grootte van die gaping soos dit kouer word? Wat as dit *baie* koud word? Wat sal die grootte van die gaping wees by ’n temperatuur van $^{-}5$ °C?

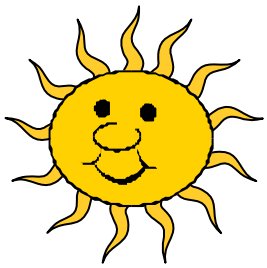
5. Wat gebeur met die grootte van die gaping soos dit warmer word? Wat as dit *baie* warm word? Wat sal die grootte van die gaping wees by ’n temperatuur van 50 °C?

6. As hulle ’n soortgelyke brug in die woestyn sou bou, het hulle ’n groot probleem, want die temperatuur kan wissel van $^{-}10$ °C to 55 °C! *Wat is die problem?*
Adviseer die ingenieurs wat om te doen! Wees spesifiek, motiveer jou advies met getalle!

7. Trek ’n grafiek van die gaping grootte teenoor temperatuur.
   Interpreteer die situases in vrae 1-6 in die grafiek.

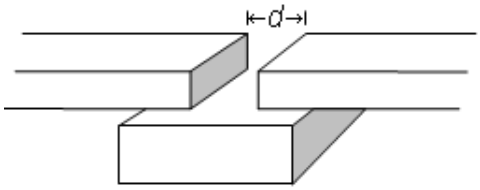


Building bridges



When building a bridge or railway line, engineers have to leave small gaps between sections to allow for heat expansion. This gap should not be too small (why not?), but also not too large (why not?).

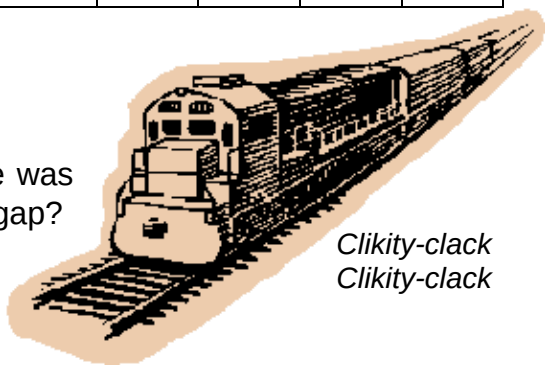
For a certain bridge the size of the gap is 2 cm at a temperature of 0°C. For each 1°C that the temperature rises, the gap becomes smaller by 0,05 cm.



1. Complete the following table showing the size of the gap at different temperatures. Explain your *method*.

Temperature (t °C)	0	1	2	3	4	5	10	20	30
Gap size (d cm)									

2. On the day they built the bridge the temperature was 24°C. What size should the engineers make the gap?



Clikity-clack
Clikity-clack

3. At what temperature will the size of the gap be 1,14 cm?

4. What happens to the size of the gap as it becomes colder? What if it becomes *very* cold? What will the size of the gap be at a temperature of ⁻5°C?

5. What happens to the size of the gap as it becomes hotter? What if it becomes *very* hot? What will the size of the gap be at a temperature of 50°C?

6. If they have to build a similar bridge in the desert they have a major problem, because the temperature can range from ⁻10°C to 55°C! *Why is it a problem?*
   Advise the engineers what to do! Be specific, substantiate your advice with numbers!