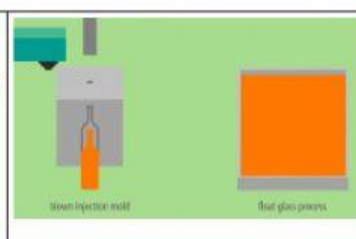
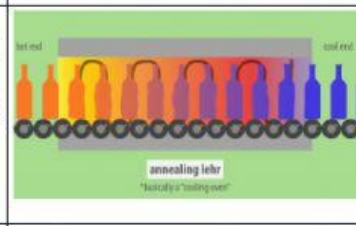
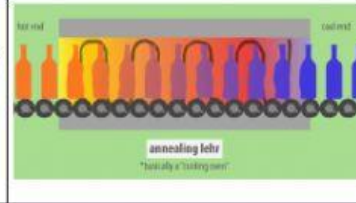


## How is glass made?

### 1. Watch the videos and fill the gaps.

|                                                                                                                                                                                              |                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p><b>1st.</b> Sand is the main ingredient for _____ glass. Containing mostly <i>silicon dioxide</i>, sand _____ at 2300° Celcius.</p>                                                       |    |
| <p><b>2nd.</b> Common commercial glass is made with sand _____ with _____ glass, <i>soda ash</i> (<math>\text{Na}_2\text{CO}_3</math>, ceniza) and _____ (<math>\text{CaO}</math>, cal).</p> |    |
| <p><b>3rd.</b> The <i>soda ash</i> (<math>\text{Na}_2\text{CO}_3</math>, ceniza) lowers the sand's _____ point, making it more energy efficient to _____.</p>                                |    |
| <p><b>4th.</b> While the _____ (<math>\text{CaO}</math>, cal) counters (contrarresta) the soda-ash's effect of making glass _____ in water.</p>                                              |  |
| <p><b>5th.</b> Other _____ can be added to color the glass or give it other _____.</p>                                                                                                       |  |
| <p><b>6th.</b> The _____ is now molten (= melted) into a _____.</p>                                                                                                                          |  |
| <p><b>7th.</b> Then the molten glass is homogenised and more chemicals can be _____.</p>                                                                                                     |  |

|                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>8th.</b> At this point the <b>glass is</b> _____ in its required <b>form</b>, for example as a _____ or <b>pane</b><sup>1</sup>.</p>                                                                  |  <p>The diagram shows two methods of glass production. On the left, a 'blown injection mold' process where a molten glass droplet is injected into a mold. On the right, a 'float glass process' where a continuous ribbon of molten glass floats on a bath of molten tin.</p>                    |
| <p><b>9th.a</b> The final <b>step is</b> a controlled _____ of the still <b>hot glass object</b> in a specialised ... _____ called an <b>annealing lehr</b> (horno de recocido).</p>                        |  <p>The diagram illustrates an 'annealing lehr', which is a controlled cooling furnace. It shows a series of glass bottles moving through a temperature gradient from 'hot end' (red) to 'cool end' (blue). The text below the diagram states: 'annealing lehr "basically a 'soaking oven"'.</p> |
| <p><b>9th.b</b> _____ <b>annealing</b> (recocer) <b>glass</b> is significantly <b>weaker</b> (más débil).</p>                                                                                               |  <p>This diagram is identical to the one in the previous row, showing the 'annealing lehr' process with bottles moving from hot to cool ends.</p>                                                                                                                                                |
| <p><b>10th.</b> To <b>increase strength</b> (fortaleza) even more, <b>glass can be toughened</b> (endurecido) or <b>tempered</b> (templado) using _____ and ... _____ <b>treatments</b> (tratamientos).</p> |  <p>The diagram shows a window with four panes, a smartphone, and a cup of coffee with steam rising from it, representing the final products and their use.</p>                                                                                                                                 |

<sup>1</sup> A **flat** piece of glass.