**Introduction**

Fever is one of the early symptoms of many infectious diseases. It is a general response to infection that forms part of the immune system's second line of defence. Fever works by slowing down, or even killing, pathogens. Some pathogens can't function well at higher temperatures.

We can investigate the effect of fever on pathogens by using a model. In science, a model is a representation that can be used to explain a real phenomenon. In this case, yeast will represent a pathogen. A beaker of water will represent the body. By increasing the temperature of the water, we can model the effect of fever on the "pathogen".

However, there will be some differences between the model and what really happens in the human body. For example, a fever for humans is when the core body temperature is above 38°C. Our body temperature rarely rises above 40°C and it can be very dangerous if it does. But the ideal temperature range for yeast is between 35 and 55°C. So "fever" for yeast needs to be much higher than what it is for humans.

Yeast is a unicellular fungus. Some species can be pathogens but most are not. Healthy yeast cells carry out a chemical reaction called fermentation. This process converts sugar and oxygen into alcohol and carbon dioxide gas. The gas produced by fermentation is what makes bread rise and beer fizzy. When temperature conditions are ideal, yeast produces lots of gas and a thick layer of foam.

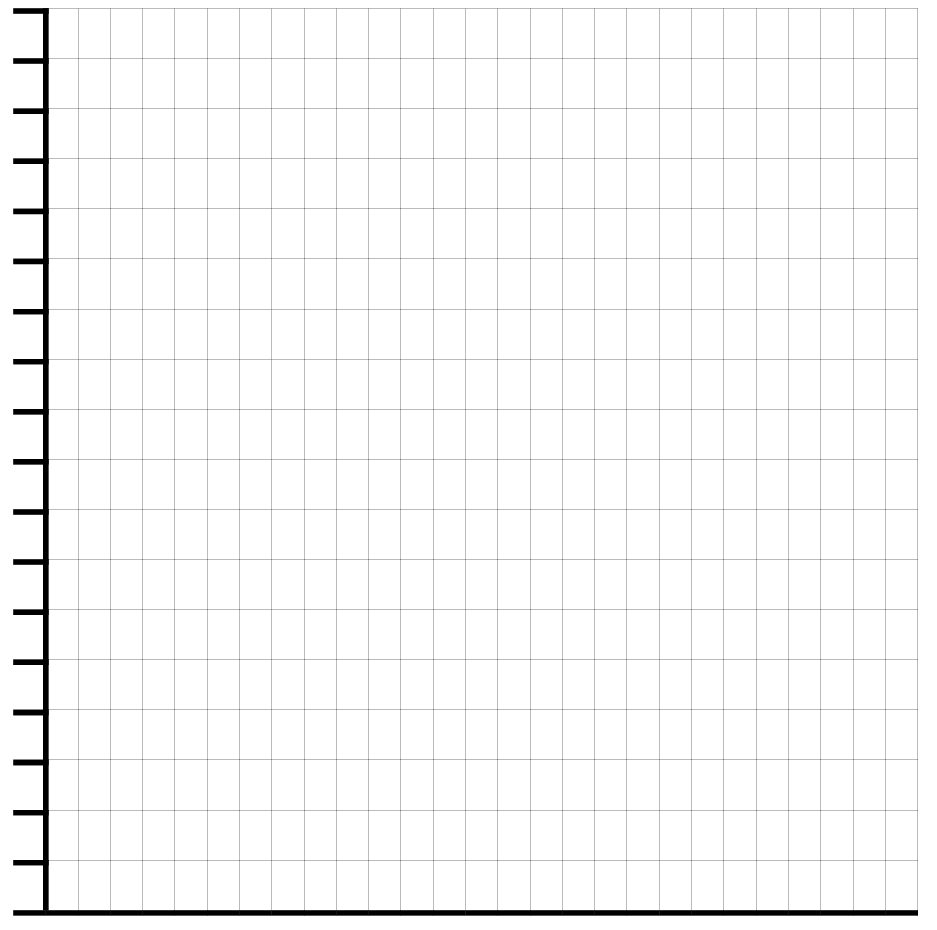
**Aim:** To observe how yeast fermentation is affected by temperature

**Method:**

1. Place the beaker on the heatproof mat.
2. Add a combination of hot and cold water to the beaker to prepare 150 mL water that is between 35–55°C.  
   Note: You may need to add more than 150 mL first to get the right temperature, then pour away the excess.
3. Add 1 level tablespoon (15 g) of sugar to the beaker. Gently stir with the stirring rod until the sugar has dissolved.
4. Add 7 g of baker's yeast to the beaker. Stir briefly.
5. Start the stopwatch and measure the temperature inside the beaker. Record this as the initial temperature.  
   Note: Try not to move the thermometer after placing it in the beaker as this can pop the fermentation bubbles and affect your results.
6. Use a marker to draw a small line on the outside of the beaker in line with the liquid level. This will make it easier to measure the thickness of foam produced.
7. After 5 minutes, mark another small line on the outside of the beaker in line with the top of the foam. Use the ruler to measure the thickness of the foam layer. Record this measurement to the nearest millimetre (e.g. 2.4 cm).
8. After 10 minutes, mark another line at the top of the foam. Measure the thickness of the foam layer and record it in the table.

**Results:**

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| --- | --- | --- |
| **Initial temperature (oC)** | **Thickness of foam after 5 minutes (cm)** | **Thickness of foam after 10 minutes (cm)** |
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**Graph:**

**Discussion:** (what happened when you increased the temperature? How does this help us predict pathogen behaviour with increased temperature?)

**Conclusion:**