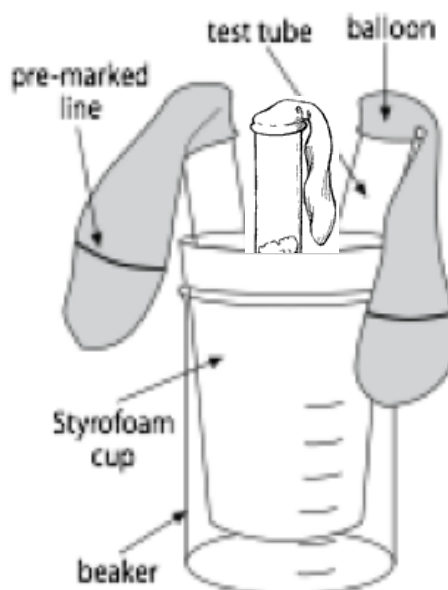


## Effects of chlorine on germs

To be safe for swimmers, swimming pools must be disinfected. Chlorine is a typical disinfectant used in pools. In this activity, you'll observe the effects of chlorine on yeast growth, which simulates the bacterial activity that can occur in pools.

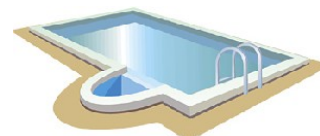
### Equipment you'll need:

1 Large Styrofoam cup  
250ml beaker  
3 X test tubes with stoppers  
3 X 30cm diameter balloons  
Permanent marker  
1.25ml (1/4 teaspoon) measuring spoon  
15ml (1 tablespoon) measuring spoon  
Warm water  
Sugar  
Rapid-rise active dry yeast  
Measuring tape or string and ruler  
Chlorine bleach  
Table salt  
Antibacterial hand sanitizer  
Liquid soap



### What to do:

1. Prepare a water bath by filling the Styrofoam cup halfway with warm water. Place the cup into the empty beaker to prevent the cup from tipping.
2. Inflate three balloons about half way. Use a permanent marker to draw a line around each balloon at its widest point. Deflate, reinflate, and deflate the balloons several times to stretch the latex.
3. Label one test tube "control" and the other two with the name of your test substances. Add 15ml (1 tablespoon) warm water, 1.25ml (1/4 teaspoon) sugar, and 1.25ml (1/4 teaspoon) yeast to each test tube. Stopper the test tubes and shake for about 20 seconds to mix the contents. Remove the stopper and place the test tubes in the water bath.
4. Add 2.5ml (1/2 teaspoon) of the test substance to the appropriate test tubes, replace the stopper, and shake for about 20 seconds. Remove the stopper and place the test tube back into the water bath.
5. Add a small puff of air into each balloon (just enough to get the wrinkles out). Secure a balloon over the opening of each test tube. Use a measuring tape (or a piece of string) to measure the circumference of each balloon at the pre-marked line. Compare the relative size and quantity of bubbles in the test tubes. Return the test tubes to the water bath.
6. Observe the test tubes and balloons, noting the bubbling action. After 30 minutes, measure the circumference of each balloon. Fill out the appropriate information in the data table.
7. Share your results with other groups. Discuss your observations, noting any differences between groups who used different substances.



## Results



Test Substance	Balloon circumference after 30minutes
Control	
Chlorine	
Table salt	
Hand sanitizer	
Liquid soap	

## Discussion

1. What do your results tell you?
2. Which test substance had the most significant effect on the growth of yeast?
3. What is yeast? Is it alive? How can you tell?
4. Why is it important to add sugar in with the yeast?
5. Were there any difficulties you experienced with your experiment? If so, how could you minimise these for next time?

