

Skills and Strategies

- Planning and Conducting
- Processing and Analyzing Data
- Evaluating

Safety

- Wash your hands well before and after this Lab.
- Dispose of all materials as directed by your teacher.

What You Need

- Appendix A Care and Use of the Microscope

Part B:

- warm tap water
- test tube
- 1 g sugar
- 0.5 g yeast
- microscope, slide, cover slip, paper towel, and dropper

What You Need**Part C:**

- 80 mL tap water
- Erlenmeyer flask
- 5 g sugar
- 4 g yeast
- balloon
- masking tape
- string
- ruler
- water baths (ice water, 35°C, and 65°C)
- thermometer

Yeast Reproduction

Yeast get energy from food using fermentation, which converts sugar to carbon dioxide gas and other products. You will observe the effect of temperature on yeast reproduction by monitoring carbon dioxide production.

Question

How does temperature affect yeast reproduction?

PROCEDURE A: WET MOUNT SLIDE

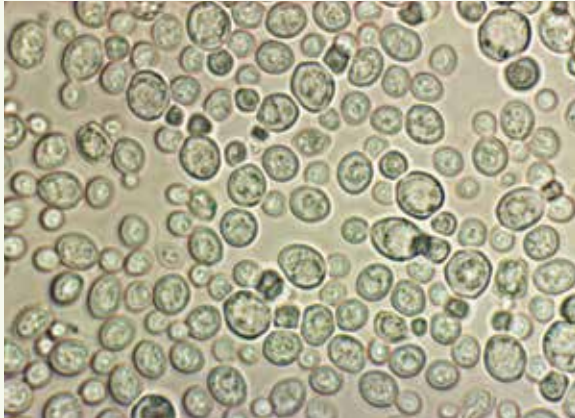
1. Read through Care and Use of the Microscope in Appendix A. Then carry out the exercise on how to view a wet mount slide that is given in that section.

PROCEDURE B: VIEWING YEAST

1. Add about 10 mL of warm tap water to the test tube.
2. Dissolve 1 g of sugar in the test tube.
3. Add 0.5 g of yeast to the test tube, and gently shake to mix.
4. Allow this mixture to sit on your bench for about 10 min. While you are waiting, set up a light microscope.
5. Place a drop of yeast mixture on the microscope slide (A). Hold a cover slip by the edges, on an angle. Lower it until one edge touches the slide surface at the edge of the drop (B). Slowly lower the rest of the cover slip over the drop. If bubbles form, ask your teacher for help. Gently blot away excess liquid with a paper towel (C).



6. Observe the yeast under high power. Use the diaphragm below the stage to adjust the amount of light if necessary. You should see many circle-shaped yeast cells. Look for small bumps, which are buds. Draw what you observe.



PROCEDURE C: EFFECTS OF TEMPERATURE

1. Predict how temperature will affect yeast reproduction.
2. Each group will test one of four temperatures: ice water, room temperature, 35°C, or 65°C. Your teacher will assign a temperature to your group. Your teacher also will set up stations where you will obtain water samples. Record the temperature of your sample and the classroom.
3. Design a table to collect and organize your data.
4. Determine the volume of carbon dioxide gas produced by a yeast population by measuring the circumference of a balloon that is placed over the top of a flask that contains the yeast. To do this:
 - Add 80 mL tap water to a flask
 - Dissolve 5 g of sugar in the water.
 - Place the flask at the temperature to be studied for 5 min.
 - Add 4 g of yeast to the flask and swirl the flask to mix the contents.
 - Place a balloon over the mouth of the flask. Secure it tightly with masking tape.
 - Every 2–3 min, swirl the flask to stir the contents. Record your observations.
 - After 15 min, measure the circumference of the balloon by wrapping a piece of string around the widest part. Measure the length of that section of string.
 - Remove the balloon very carefully to prevent foam from spilling over.
5. Report the circumference of the balloon to your teacher to share with the class.
6. Clean up your work station. Dispose of your sample as instructed by your teacher.

Analyze and Interpret

1. What is the relationship between the circumference of the balloon and the level of yeast reproduction in a population?
2. What are the dependent and independent variables in this investigation?
3. How did your data compare with other groups? Account for any differences. How could this investigation be improved?

Conclude and Communicate

4. What condition was the most favourable for yeast reproduction?

Applying

5. Plan and write a procedure to study the effects of the amount of a nutrient, such as sugar, on yeast reproduction. Predict what you expect to see. Use your prediction to write a hypothesis.