Name _____ Date _____ Period _____

ZornScience
zornscience.org

Does Window Glass Protect DNA?

Biology

Work with your group. Record every measurement with its unit. Answer questions in complete sentences.

Draft lab. This lab has not been tested in a classroom yet. Your teacher may change some steps, times or amounts.

The Puzzle

Ultraviolet (UV) light in sunlight can damage DNA. Most cells can repair some of that damage. The yeast in this lab cannot, because their DNA repair genes do not work. If UV reaches them, many die and cannot grow into colonies. That makes them a living UV detector. Is sitting next to a window a DNA risk?

Question

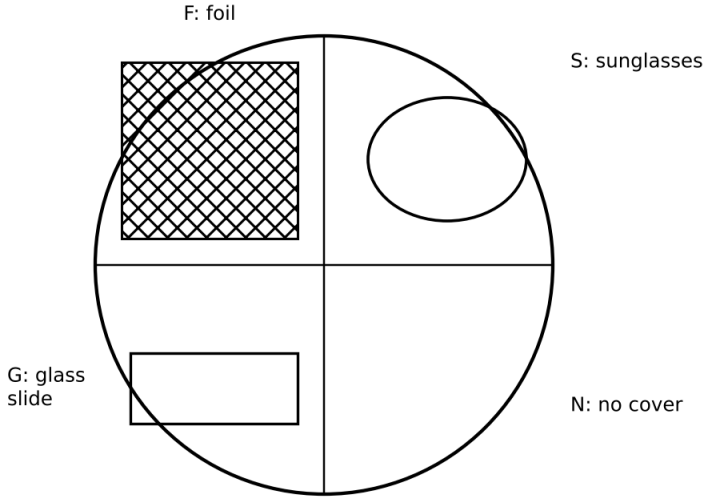
How well do window glass and other everyday materials block the UV light that damages DNA?

Safety

- Never look at the sun. Keep sun exposure to the time your teacher sets.
- Handle glass slides by the edges. Tell your teacher about any chips or cracks.
- Keep plate lids closed except during exposure. Your teacher will bleach the plates before disposal.

Materials (per group)

- 2 agar plates spread with UV-sensitive yeast (prepared by your teacher)
- Plastic wrap, marker, timer
- Covers: a glass microscope slide, a sunglasses lens (labeled UV protection), and a foil square



Each plate is divided into four sections, each under a different cover.

CC BY-NC-SA 4.0 | zornscience.org

Before the Lab

1. Predict the percent of yeast that will survive under each cover, compared with foil. Explain your reasoning for glass.

Procedure

1. Draw lines on the bottom of each plate to divide it into four sections. Label them F (foil), S (sunglasses), G (glass), and N (no cover).
2. Take the lid off and stretch one layer of plastic wrap over the plate.
3. Place the foil, sunglasses lens, and glass slide over their sections. Leave section N uncovered.
4. Carry the plates outside (or to a sunny window that opens) and set them flat in direct sun for the time your teacher gives, about 20 to 60 seconds.
5. Remove the covers and plastic wrap, replace the lids, and store the plates upside down at room temperature.
6. After 2 to 3 days, count the colonies in each section.

Data

Table 1. Colony counts

Cover	Colonies, plate 1	Colonies, plate 2	Average	Percent survival
Foil (dark control)				100%
Sunglasses lens				
Glass slide				
No cover (plastic wrap only)				

Percent survival = average colonies in a section ÷ average colonies under foil × 100

Analysis

2. Why do we need the foil section?

3. Show your percent survival calculation for the glass slide.

4. What happened to the DNA of yeast in section N that did not grow?

5. Some yeast in section N did grow. Could their DNA still be changed? How would you know?

CC BY-NC-SA 4.0 | zornscience.org

6. Glass blocks most of the UV that causes sunburn (UVB) but lets through some longer-wavelength UV (UVA). Is sitting by a window completely safe for your skin's DNA? Explain.

7. Claim, evidence, reasoning: Can an environmental factor cause mutations that are passed to new cells?

Claim

Evidence

Reasoning

CC BY-NC-SA 4.0 | zornscience.org