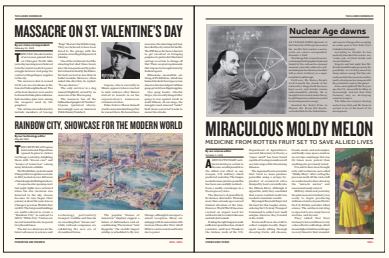
2 MOLDY MELON

K–5 6–12

"Moldy Mary" was so nicknamed for her contribution to the discovery of the miraculous mold removed from the rind of a cantaloupe, which was potent enough to mass produce penicillin, heralding the dawn of the age of antibiotics.


MASSACRE ON ST. VALENTINE'S DAY

RAINBOW CITY, SHOWCASE FOR THE MODERN WORLD

Nuclear Age dawns

MIRACULOUS MOLDY MELON

MEDICINE FROM ROTTEN FRUIT SET TO SAVE ALLIED LIVES

DATE: 1943
ARTICLE: "MIRACULOUS MOLDY MELON"

K–5

STANDARDS

SCIENCE STANDARDS

K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.

3-LS-1-1: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

SOCIAL SCIENCE STANDARDS

SS.H.1.1: Create a chronological sequence of multiple events.

SS.H.2.1: Describe individuals and groups who have shaped a significant historical change.

SS.H.1.3: Create and use a chronological sequence of events.

SS.H.1.5: Create and use a chronological sequence of related events to compare developments that happened at the same time.

SS.H.3.5: Explain probable causes and effects of events and developments in U.S. history.

ACTIVITIES

- Capture your students' imaginations with a controlled mold-growing experiment. Utilize existing lesson plans from reputable sources that use bread, fruit, and other readily-available materials. We recommend the EPA (Environmental Protection Agency) lesson plan called "Hold the Mold" for its coverage of this topic. The downloadable PDF guide they provide includes a "Student Mold Growth Observation Worksheet" to easily document student engagement.
- Research where in the natural world we find fungi, and the roles they play in food webs. Investigate why mushrooms so often appear near trees and on forest floors.

- Explore how fungi develop symbiotic and pathologic relationships with plants (mycorrhiza). How has this relationship affected life on earth, in particular, the colonization of life on land 400 million years ago?
- Analyze the potential good and the known harm molds cause as both hosts and toxins. What properties of fungus was the Department of Agriculture seeking as a catalyst for growing penicillin and how were samples procured and evaluated?
- Create a timeline of six key inventions or turning points that influenced the outcome of WWII, in addition to the development of antibiotics as a treatment for allied troops.
- Invite guest speakers to the classroom to explore modern careers related to how we grow and utilize fungi, as well as to explore initiatives in harnessing the power of fungi for potential problem-solving in health sciences and agriculture. Consider a cheesemaker, a mushroom farmer, or a mold remediation technician in addition to mycologists, toxicologists, and bacteriologists.

6–12

STANDARDS

SCIENCE STANDARDS

MS-LS1-1: Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells.

MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

HS-LS1-1: Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

HS-LS2-3: Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

SOCIAL SCIENCE STANDARDS

SS.G2.6–8.MC: Evaluate how cultural and economic decisions influence environments and the daily lives of people in both nearby and distant places.

SS.H.1.6–8.MdC: Analyze connections among events and developments in broader historical contexts.

SS.H.4.6–8.MC: Organize applicable evidence into a coherent argument about the past.

SS.H.1.9–12: Evaluate how historical developments were shaped by time and place as well as broader historical contexts.

SS.H.4.9–12: Analyze how people and institutions have reacted to environmental, scientific, and technological changes.

SS.H.8.9–12: Analyze key historical events and contributions of individuals through a variety of perspectives, including those of historically underrepresented groups.

SS.H.11.9–12: Analyze multiple and complex causes and effects of events in the past.

ACTIVITIES

- Explore the research, development, and applied sciences of the U.S. Department of Agriculture, the Food and Drug Administration, the U.S. Military, and the pharmaceutical industry in producing penicillin and other fungus-based resources as tools for major health initiatives and military efforts.
- Why are antibiotics important? Predict what might have happened during WWII had antibiotics not existed. Evaluate the impact of antibiotics and how they have affected healthcare.
- Investigate how bacteria adapt to make antibiotics less or even ineffective over time. Research antibiotic resistant bacteria cases and discuss various outcomes. Speculate how this will influence the future of medicine and human health.
- Write a dystopian short story or letter to a friend describing a future where modern antibiotics have become ineffective against bacterial colonies of "superbugs".

MIRACULOUS MOLDY MELON

MEDICINE FROM ROTTEN FRUIT SET TO SAVE ALLIED LIVES

By our science editor
October 1, 1943

A REVOLUTIONARY antibacterial drug is certain to become as indispensable to the Allied war effort as any weapon, U.S. military chiefs predicted yesterday. The fungus needed to mass-produce penicillin has been successfully isolated—from a moldy cantaloupe in a Peoria grocery store.

The discovery of penicillin by Scotsman Alexander Fleming more than a decade ago received limited attention at the time. However, World War II has since created an urgent need for antibacterials to combat diseases and infected wounds.

Finding the right fungus to make sufficient quantities has eluded scientists—until now. Thanks to the tireless work of the U.S. Department of Agriculture's research laboratory in Peoria, a "super mold" has been found capable of treating wounds as well as a wide range of life-threatening illnesses.

The ingenius Peoria scientists first tried to mass-produce penicillin using a syrupy by-product of cornstarch often dumped by local corn mills into the Illinois River. Although it upped the yield, they concluded that a more resilient mold was needed to maximize results.

Mycologist Kenneth Raper led the hunt for this tougher strain, ordering the U.S. Army Transport Command to collect new mold samples wherever they traveled in the world.

Peoria staff were also told to collect samples locally. Raper spent weeks sifting through decaying fruits, old cheeses, breads, meats, and soil samples, and finally came upon a mold on an overripe cantaloupe that was 50 times more potent than anything else previously tested.

It is said to have been brought in by a lab technician, now called "Moldy Mary." After cutting the precious mold off the rind, staff are understood to have sliced up the "miracle melon" and unceremoniously eaten it.

Military chiefs said yesterday the pharmaceutical industry was ready to begin producing millions of units of penicillin for the U.S., British, and other Allied armies. The antibacterial drug is expected to save many lives in wartime, and beyond.

They added that Nazi Germany's forces will have to rely on less effective sulfa drugs, which means higher fatalities and longer recovery times for their wounded.