

Chemistry of Plastination

Grade Levels: 8-12

Duration: 60 min

Design a robust learning experience by selecting resources from this guide that fit the needs of your students. Reinforce learning before, after, and even during your visit by diving deeper into some of the science and engineering concepts.



Table of Contents	Page
Vocabulary	2
Related Texts	3
Exhibit Connections	3
Lab-Related Activities	3
Writing Prompts	4
Standards Connections	4

When to implement

The following icons indicate when resources should be implemented for the greatest benefit to your students' experience in the lab.



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Concepts/Skills

Plastination, solvents, polarity, pressure, vapor point

Objectives

Students will:

- Model and explore the chemical process of defatting in the plastination process (i.e., polar and nonpolar characteristics that allow for solutes to dissolve in solvents).
- Describe the model and explore the depressurization process that leads to forced impregnation of polymers in the plastination process (i.e., relationship between atmospheric pressure and boiling point).

Vocabulary

These are words and concepts that we will discuss in the lab. Your students' experience will be enhanced if they are familiar with these terms prior to your visit. If you need inspiration for vocabulary activities, please see our Vocabulary Choice Board activity.

Term	Definition
Atmospheric pressure	The pressure exerted by the atmosphere.
Compound	Two or more elements bonded together whose composition is constant.
Human preservation	The process of keeping human tissue free from damage or decay.
Molecule	A group of two or more atoms bonded together.
Non-polar molecule	A molecule that has an even distribution of electric charges across the molecule.
Polar molecule	A molecule that has uneven electric charges across the molecule-one side has a slight positive charge (fewer or no unbonded electrons), the other a slight negative charge (unbonded electrons). Water is an example of a polar molecule.
Polymer	A substance that is made up of many repeating chains of similar molecules; many synthetic plastics and resins.
Pressure	The physical force exerted on an object by something that is in contact with it.
Solvent	A liquid that has the ability to dissolve a substance (or solute).
Solute	A compound that can be dissolved in a liquid (or solvent).
Solution	A mixture that is composed of only one phase of matter. The result of dissolving a solute (powder) into a solvent (liquid).

Related Texts

The following title may provide students with a greater contextual understanding of the field of chemical preservation and give additional opportunities to incorporate science and engineering into Language Arts lessons. We are not endorsing the following author but feel that the information presented in these texts may benefit your students and enhance their learning experience.

Age Range	Title and author	Text Type	Description
Grades 8-12	"Modern Mummies: The Preservation of the Human Body in the Twentieth Century" by Christine Quigley	Reference	A comprehensive look at human preservation processes through the last 500 years.

Exhibit Connections

Make connections between learning from the lab and the exhibits and programs found in The Tech Interactive's galleries.



Body Worlds Decoded

Students use augmented reality and other emerging technologies to examine organs and body systems through immersive 3D models.



This exhibit contains sensitive content featuring the human body.

Plastination: Where chemistry meets anatomy

The plastinate specimens within the exhibition are all real preserved human remains, preserved through a process called plastination. This process begins with an acetone bath to remove water and body fats, followed by the impregnation of a silicon polymer into all the cells of the body, and ends with the specimen being hardened by gas, light or heat. This lengthy and complicated process preserves the remains and keeps the muscles and organs intact. Each plastinate takes approximately one year to be fully preserved and ready for display.

Lab-Related Activities

The following activities can be implemented either before or after the lab and are meant to bridge the learning from the lab to the classroom.

Activity	Description	Time
To Donate or Not to Donate 	Students will discuss whether or not they would donate their bodies to a future Body Worlds exhibition.	Two 60-minute sessions



Looking for other hands-on activities and resources to use in your classroom? Check out our [education resources](#) page!

Writing Prompts



The following writing prompts and questions are just a few examples of journal topics you can use to incorporate writing into your students' lab experience. These prompts can be used in conjunction with any classroom writing journal.

Pre-visit prompts



- We will be attending the Chemistry of Plastination lab at The Tech Interactive; what are you most looking forward to in this lab? Why?
- Take a look at a few samples of plastinated human remains at bodyworlds.com. How do you think chemistry might be involved in the process of creating these plastinated human remains?

Post-visit prompts



- The principal is very excited to hear about your lab experience! Explain what you did and learned about in the lab since they were unable to attend the lab.
- Plastination is one of several forms of preservation of human remains. How do you think the chemical processes of plastination compare to the chemical processes behind other preservation processes such as embalming, mummification, or cryogenics?

Next Generation Science Standards

Chemistry of Plastination supports the following NGSS:

Grades	Physical Sciences	Disciplinary Core Ideas	Crosscutting Concepts	Science and Engineering Practices
Grade 8	MS-PS1-2	PS1.A PS1.B	Structure and Function Systems and System Models	2, 3, 7, 8
Grade 9-12	HS-PS1-3 HS-PS2-6	PS1.A PS2.B	Structure and Function Patterns	2, 3, 7, 8



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