NATIONAL MUSEUM OF HEALTH AND MEDICINE

INTRODUCTION TOUR

MUSEUM DISCOVERY
TEACHER'S GUIDE GRADES 9 -12

This guide will help you prepare for your visit to the National Museum of Health and Medicine. It outlines the major ideas and exhibitions that will be presented during the visit and suggests activities to help extend the experience into your classroom.

TIME
15-20 minutes

GROUP SIZE
minimum of 10 students
maximum of 50 students

ABOUT YOUR TOUR:
Explore innovations in military medicine, anatomy and pathology - including traumatic brain injury - and the richness and importance of the museum's collections through the Civil War, Biomedical Engineering and Human Identification exhibits. To enhance this tour, Discovery Sheets may be downloaded from the NMHM website.
Note: NMHM will not provide copies of the Discovery Sheets or pencils. Clipboards can be obtained at the museum front desk.

AT THE CONCLUSION OF THIS TOUR, STUDENTS SHOULD BE ABLE TO:
- Explain the relationship between anatomy and physiology for each organ system.
- Identify three causes of congenital anomalies in developing humans.
- Identify and describe the functions of the brain, causes of traumatic brain injury and its treatment.
- Describe professionals who explore the body and describe their equipment, including: forensic anthropologists, medical professionals and engineers.
- Explain the use of the Kolff-Brigham Artificial Kidney as an engineering solution to a real-world problem.
- Identify how and why the museum was founded.
- Identify three advancements in military medicine.
- Describe the significant medical events and innovations of the Civil War, including President Abraham Lincoln's death.

EXHIBITIONS FEATURED IN THIS GUIDED TOUR INCLUDE:
"Military Medicine: Challenges and Innovations"

"Anatomy and Pathology: Traumatic Brain Injury"

"The Collection That Teaches: The Museum's Collections"

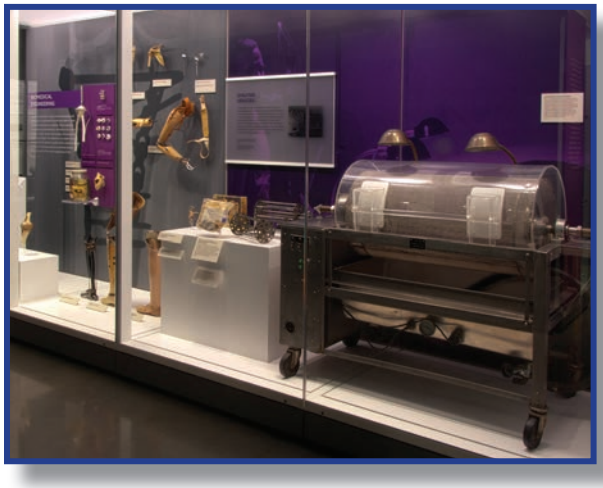
HANDS-ON OBJECTS USED FOR THIS GUIDED TOUR MAY INCLUDE:
Plastinated Organs

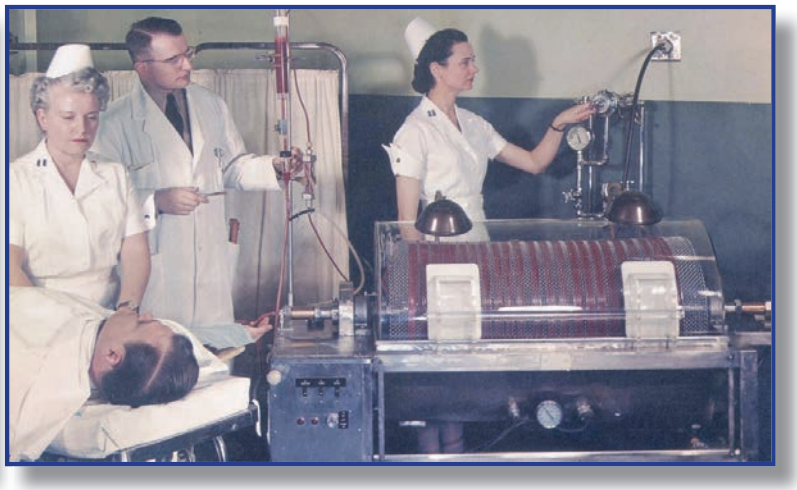
SUGGESTED PRE-VISIT CLASSROOM ACTIVITIES

- Discuss ***Visiting Our Museum*** and what students will see.
- Discuss with your students different diseases and disorders associated with the body systems. This should include cancers, genetic disorders, infectious diseases and metabolic disorders. Have the students determine the causes and ways that taking care of your body can prevent some of these diseases.
- Visit the museum's Facebook album page and choose a photograph(s) from the Museum's archives collection for the students to analyze. Ask the students to make a list of observations about the photograph (for example, clothing, housing, food, etc.) and have them write an informational text about the photograph, including their observations.

SUGGESTED POST-VISIT CLASSROOM ACTIVITIES

- Investigate a medical professional career or interview a medical professional. Discuss their job, career path and education. Have students present their research to the class.
- Have students research current therapies or treatments used for service members returning from deployment. Have the students compare this to a previous conflict and describe how this has improved the medical care of service members returning from war. Consider visiting the Defense Centers of Excellence: For Psychological Health and Traumatic Brain Injury or BrainLine website for additional resources and information.
- Have the students select one disease discussed during the tour. Have them create an informational brochure about the disease that should include pathology, treatment, and prevention.
- Have the students evaluate the docent's presentation using the NMHM Student Tour Evaluation form (Appendix 1). Discuss their observations and opinions of the tour.





VOCABULARY

AMPUTATION:
surgical removal of all or part of a limb

ANESTHESIA:
a method of preventing sensation, used to eliminate pain

ANTHROPOLOGY:
the study of humans

ARTIFICIAL ORGAN:
a man-made device used to replace a natural organ

ASPIRATION:
the act of breathing and especially breathing in

AUTOPSY:
an examination of the body after death

BLOOD PRESSURE:
pressure exerted by the blood upon the walls of the blood vessels, especially arteries, usually measured on the radial artery by means of a sphygmomanometer

DISEASE:
an impairment of the normal state of the living animal or plant body that interrupts or modifies the performance of the vital functions and is a response to environmental factors, to specific infective agents, to inherent defects of the organism, or to a combination of these factors

HYPERTENSION:
abnormally high arterial blood pressure

MICROSCOPE:
an optical instrument used for observing small objects by magnification

OSTEOPOROSIS:
condition characterized by a decrease in bone mass and density which produces porosity and fragility. Results from disturbance of nutrition and mineral metabolism

PATHOLOGY:
the study of the nature of disease and its causes, processes, development, and consequences

PHYSIOLOGY:
the study of the mechanical, physical and biochemical processes of living organisms

PLASTINATION:
the process of preserving remains by injecting a solution containing a polymer (plastic) that maintains the original properties of the specimen

PERISTALSIS:
successive waves of involuntary contraction passing along the walls of the intestine or other hollow muscular structure that forces the contents onward

PROSTHESIS:
an artificial device to replace a missing part of the body

PUBLIC HEALTH:
the art and science dealing with the protection and improvement of community health by organized community effort, including preventive medicine and sanitary and social science

TRAUMATIC BRAIN INJURY:
an injury to the brain caused by an external force

TREPHINATION:
the surgical procedure in which a hole is drilled in the skull and a circular piece of bone removed

RESOURCES

The appearance of hyperlinks does not constitute endorsement by NMHM or any other agency of the U.S. Government of the destination web site or the information, products or services contained therein.

WEBSITES

- **Science and Nature, Human Body and Mind -** http://www.bbc.co.uk/science/humanbody/body/
- **Cells Alive! -** http://www.cellsalive.com
- **Centers for Disease Control -** http://www.cdc.gov
- **Human Anatomy Online -** https://www.innerbody.com/htm/body.html
- **Body Worlds Plastination -** http://www.bodyworlds.com/en/plastination/idea_plastination.html
- **Brain Line -** http://www.brainline.org
- **The Embryo App (available on iTunes) -** https://medicalmuseum.health.mil/index.cfm?p=media.news.article.embryo_app_debuts
- **Defense Centers of Excellence: For Psychological Health and Traumatic Brain Injury -** https://www.health.mil/Military-Health-Topics/Centers-of-Excellence

PUBLICATIONS

- *The Human Body Book,* DK Publishing, 2007
- *Gray's Anatomy Book*, Henry F.R.S. Gray, 1992
- *The Anatomy Coloring Book,* Kapit and Elson, 2002
- *Stiff,* Mary Roach, 2004
- *The Forensic Casebook: The Science of Crime Scene Investigation,* Genge, 2002
- *From conception to birth: A life unfolds,* Alexander Tsiaras, 2002

BIBLIOGRAPHY AND LINKS

National Governors Association Center for Best Practices, & Council of Chief State School Officers. (2010). *Common Core State Standards*. Retrieved from www.corestandards.org

National Research Council. (1996). *National Science Education Standards*. Washington, DC: The National Academies Press.

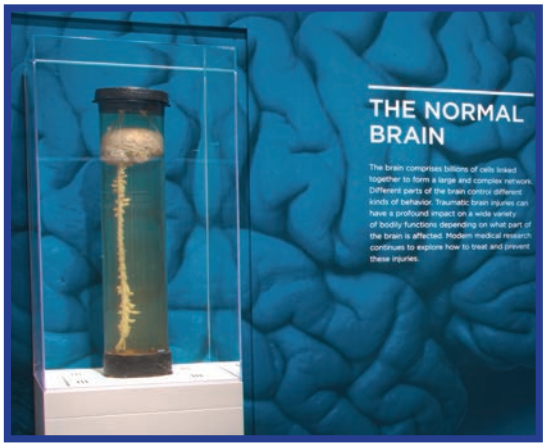
National Research Council. (2012). A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Washington, DC: The National Academies Press.

NGSS Lead States. (2013). *Next Generation Science Standards: For States, By States*. Retrieved from www.nextgenscience.org

Maryland State Department of Education. (2013). *Maryland State Curriculum*. Retrieved from http://mdk12.org/instruction/curriculum/

NATIONAL SCIENCE STANDARDS

- Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring (HS-LS3-1).



COMMON CORE

- Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level, demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression (L.11-12.6).
- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-12 texts and topics (RST.11-12.4).
- Synthesize information from a range of sources into a coherent understanding of process, phenomenon, or concept, resolving conflicting information when possible (RST.11-12.9).
- Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 9-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively (SL.11-12.1).
- Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used (SL.11-12.3.).

APPENDIX 1: STUDENT TOUR EVALUATION FORM

Help NMHM improve field trips by telling us about your visit! Write clearly and answer each of the questions below. Return this form to your teacher. *Thank you!*

SCHOOL/GROUP NAME: TYPE OF TOUR:
GRADE OR AGE: DATE OF TOUR:

1. WRITE DOWN 3 THINGS YOU LEARNED ON YOUR TOUR.

2. WHAT WAS THE BEST PART OF YOUR VISIT TO NMHM?

3. WAS THERE ANYTHING YOU DIDN'T LIKE ABOUT YOUR VISIT TO NMHM?

4. THE VOCABULARY USED BY YOUR DOCENT WAS:

_____ Too easy---I would have liked more difficult vocabulary words
_____ Too difficult---I didn't understand the vocabulary words that were used
_____ Just right

5. THE AMOUNT OF INFORMATION PROVIDED BY YOUR DOCENT WAS:

_____ Too little---I would have liked to hear more information
_____ Too much---I would have liked to hear less information
_____ Just the right amount of information

6. WHICH TOPIC WOULD YOU LIKE TO LEARN MORE ABOUT?

_____ Diseases _____ Military Medicine _____ Forensics _____ Civil War _____ Biomed

7. WHICH ACTIVITY DID YOU LIKE THE BEST AND WHY?

_____ Holding artifacts or specimens, like the organs
_____ Working on the Discovery Sheets
_____ Talking with the Docent
_____ Exploring NMHM

8. WOULD YOU RETURN TO THE MUSEUM FOR ANOTHER TOUR OR PROGRAM?

___ YES ___ NO IF NO, WHY?

9. WHAT COULD WE ADD OR CHANGE TO MAKE THE FIELD TRIP MORE INTERESTING FOR OTHER STUDENTS?

10. WHAT EXHIBITS/TOURS WOULD YOU BE INTERESTED IN SEEING ON FUTURE VISITS TO NMHM?

11. HOW WOULD YOU GRADE YOUR FIELD TRIP?

_____ Great! _____ Good _____Okay _____I don't know

12. ADDITIONAL COMMENTS OR SUGGESTIONS: