

Featured Speakers

FS1: Adler Student Project: From High-Altitude Balloons to Underwater Hunts

(Student Projects / Astronomy)

Dr. Mark Hammergren & Dr. Geza Gyuk, Adler Planetarium

Since 1930 the Adler Planetarium has been connecting people to each other through the inspiration and exploration of our shared universe. We have developed several long-running programs that directly involve the public in scientific investigations, ranging from massive online Citizen Science efforts to hands-on collaborative science and engineering projects. One of these, the “Far Horizons” program, has brought adult volunteers and teens together to investigate the upper atmosphere – an alien regime more similar to the conditions on Mars than near the surface of Earth. We have flown more than 125 high-altitude balloon missions to the stratosphere, where this unique vantage point is currently being used to map light pollution in the Chicagoland area. We have also delved hundreds of feet below the surface of Lake Michigan to hunt for fragments of a meteorite. The unifying theme of our work is real science in the real world performed in a collaborative environment (involving learners of all ages), where sometimes failure is an option – to be overcome through lessons learned, perseverance, and renewed imagination.

FS2: Asteroids, Comets, and Meteorites through Time and Space

(Astronomy/Earth Sci, MS/HS)

Dr. Mark Hammergren, Adler Planetarium



The geological and biological history of Earth is intimately and inextricably intertwined with asteroids and their icy cousins the comets, from the very origin of our planet to the near-total mass extinction of life 66 million years ago. But human culture has also been powerfully influenced by these space visitors, incorporated not only into scientific understanding but also folklore, religions, art, and even iconic architecture from prehistoric times through today.

FS3: Gravity, Cosmology & Reality

(Astronomy/Physics, MS/HS)

Dr. Geza Gyuk, Adler Planetarium



"What is the Fate of the Universe?", "What happens inside a Black Hole?", "Do we live inside a 'hologram' or a 10-dimensional space?", "Why do I always fall down when I trip and not up?" In the past few decades scientists have begun to realize that these questions are inextricably bound together. In a whirlwind tour Dr. Gyuk will discuss our current conceptions of gravity and the surprising connections to black holes, cosmology, and the fundamental nature of reality.

P01: Atomic Tiles and Lewis Structures*(Chemistry, HS)**Jeremy Daugherty, Argo Community High School*

Atomic Tiles are used to introduce the concepts of covalent bonding and Lewis structures. This activity appeared in JCHEMED and has been modified and used by Argo students for the past three years. It is an excellent hands-on introduction to Lewis structures.

P03: Utilizing your Outdoor Classroom for NGSS Style Labs*(Biology, HS/MS)**Scott McCreary, Lincoln-Way Central High School*

Outdoor classrooms present an excellent teaching opportunity. This presentation will present a variety of NGSS style labs to better utilize the outdoor classrooms. Topics will include Biodiversity and Camera Phones, Energy Pyramids and Fire, Trail Cameras and Animal Behavior, and Remote-Control Boats and Population Density Patterns.

P05: 5E Instructional Model*(General/Instructional Methods, HS)**Lamis Nickeas, Bloom High School*

To provide students with a quality science education, educators must employ effective teaching techniques that give students opportunities to become active participants in the scientific process. In this session, teachers will be introduced to the 5E Learning Model consisting of five phases: Engage, Explore, Explain, Extend, and Evaluate. The 5E model will facilitate student-centered learning with five succinct learning opportunities that scaffold learning by giving students multiple opportunities to learn a concept.

P06: Vaccines, infectious disease, and global warming, oh my!*(Biology/Cross Curricular, HS/MS)**Kim Smith, Homewood-Flossmoor HS*

History repeats itself. We can use history of public health to teach science. If we look at the relationship between politics, science, and society in the past, it is evident that we are repeating the same

patterns. How can we incorporate social studies into science to help our students become better informed decision makers in the future?

P07: Thermodynamics? It's a gas!*(Physics, HS)**Dave Baran, Lincoln-Way Central HS*

This is a calculational based project I have my AP Physics 2 students do. they make and model a Thermodynamic cycle with an isobaric, isochoric, isothermal, and adiabatic process, trying to maximize the output work, and the system's thermodynamic efficiency. A bit more fun than mindless calculations!

P08: The Immortal Life of Henrietta Lacks*(Biology, HS)**Jeanetra Watkins, Homewood Flossmoor HS*

To promote awareness and recognition about Henrietta Lacks. Sharing her story can give students insight into the life of a black woman at the mercy of powerful doctors and scientists in an age of racial segregation when the poor were routinely used as research subjects. It also honors a woman who, for decades, was a nameless ingredient in a laboratory. Sample lessons and activities will be provided.

P10: Digging in the rough: paleontology as a lens to demonstrate science as a process*(Earth Sci/Biology, MS/HS)**Matt Knoepke, Homewood-Flossmoor HS*

Bringing a specimen from field to museum demonstrates the full spectrum of science as a process. From the knowledge required to locate a specimen, identify what you find, and present it accurately in a museum setting, paleontologists develop and test hypotheses at every turn in the process. In this presentation, we will explore how the same lessons learned on a dig eastern Montana played out for a team in northern Africa while excavating the animal that later came to be known as "Nigersaurus taqueti".

P11: Reinventing the vinegar and baking soda lab to teach High School Chemistry

(Chemistry, MS/HS)

Kathryn Stolzenbach, Homewood Flossmoor HS

This presentation will go over many different labs and topics that can be covered with only using vinegar, baking soda and some common lab materials. The focus is to get students to develop and perfect their own lab techniques and procedures using common household items that are safe yet efficient when teaching various Chemistry topics.

P12: Who Dun It? Using Forensics to Increase Student Interest in Science

(Chemistry, MS)

Natalie Coleman

This 50-minute session will be hands on and show teachers how to use forensics to increase students interests in science, specifically chemistry. It will also help students use real world examples to increase their knowledge of Science and Engineering Practices (Analyzing Data, Constructing Explanations, and Engaging in Argument Using Evidence). Teachers will be able to participate in 2-4 activities depending on the number of participants.

P13: Student Citizen Science Monarch Butterfly Ecological Engineering Project

(Earth Sci, MS/HS)

Kevin O'Toole, Morton Freshman Center

This NGSS aligned student citizen science human impact project is centered around saving the eastern Monarch Butterfly from extinction by using scientific inquiry and the engineering design process. In 2018, students at the Morton Freshman Center designed and created a 5,000 square foot monarch waystation on school grounds with the help of the school community. The garden now serves as an outdoor classroom for students to study ecology and perform citizen science. On June 8, the Smithsonian Museum of Natural History in Washington D.C will be featuring our garden in their new exhibit as an example of how people are trying to help the decline of our pollinators.

P16: Adapting NGSS Storylining to the Everyday Classroom

(Biology, HS)

Caitlin Gallagher, Mother McAuley HS

NGSS Storylining is a unique approach to teaching science. My colleague and I have been piloting this curriculum this past year. My presentation would consist of sharing some of the key strategies we use to adapt the curriculum to our classroom, the various levels that we teach, and the timeline that our school follows.

P17: ChemSouth Presents....

(Chemistry, HS)

Elizabeth Hamann, Lincoln-Way Central HS

ChemSouth is a group of local HS chemistry teachers who get together 4-6 times per school year. We'll share classroom management ideas, demos, activities, labs and more! Something for every HS chemistry teacher!

P18: Top 10 ways to increase student engagement!

(General/Instructional Methods, MS/HS)

High School presentation (General) - Recommended

Tracy Sukalo, Victor J. Andrew High School

Barb Sopiartz, Victor J. Andrew High School

The presentation will focus ways to increase student engagement. We will focus on teambuilding, increasing student choice in the classroom, and cooperative learning strategies that will get them up, out of their seat, and excited to come your class every day. (Appropriate for both HS and MS.)

P21: Exploring the Nature of Evidence*(General, HS)**Kevin Knapik, Evergreen Park Community HS*

Join this session to examine how students use evidence to construct explanations and walk away with several ideas for how to support students as they practice building arguments. As a group, we will work through several nature of science activities and evaluate which strategies are most effective in promoting student engagement and scientific thinking. Furthermore, we will explore how to establish a positive and persistent relationship between your students and the claim-evidence-reasoning (CER) framework for scientific argumentation.

P22: Gathering Evidence through the 5E's*(Earth Sci/Instructional Methods, HS)**Erica Sobanski, Argo Community High School*

This year we have focused our high school Earth Science curriculum on the 5E's (Engage, Explore, Explain, Elaborate, Evaluate). Through each stage of the 5E's, students gather evidence to answer a driving question or prove a scientific theory is true. Students use prior knowledge, observations of objects, simulations, and articles to gather evidence. Then students are often asked to discuss in groups, draw diagrams, and present their ideas on whiteboards to the class. Overall, the emphasis throughout the year has been the importance of evidence and why we need multiple pieces of evidence to prove something to be true.

P23: Teaching with Primary Sources*(General, MS)**Joseph Galvan, Century Jr High. OSD 135*

Open to all grade levels! Build students' digital literacy skills and increase engagement, questioning and critical thinking by utilizing primary sources from the Library of Congress. Access free, vetted, standards-aligned lessons for immediate use in K-12th grades. Lessons cover content in Next Generation Science Standards, social studies and language arts and focus on teaching students to critically analyze sources. Bring your device to

explore the Library of Congress website, resources from Teaching with Primary Sources at Governors State University and other digital tools to incorporate primary sources in the classroom.

P24: Modeling Physics*(Physics, HS)**Mike Brahm, Evergreen Park Community HS*

This session will introduce the techniques used in Modeling Instruction, as well as the framework used to teach students an understanding of Physics. A focus will be placed on how Modeling works in a Physics classroom and introduce ideas of how to get students analyzing phenomena to make scientific conclusions, based on data.