

Peak Area Leadership in Science (PALS) 2020-2021

Professional Development Workshops* for Science Teachers

Meetings are FREE! Reservations (and cancellations) required!**

To make reservations register online at www.sciencehubs.org

or contact Tammy Johnnie at rsvp@sciencehubs.org or 719-337-1552 (cell)

Date/Day/Time	Topic	Location	Contact Hours /Sem Credit***
Aug. 22, 2020 (Sat.) 8:15 am – 4:00 pm	Explore Biodiversity and Life Zones at Mueller State Park Linda Grout, Tracy Predmore, April Estep Colorado Parks and Wildlife	Mueller State Park Provide your own transportation to Visitor Center and meet at 8:15 am	7.5 / 0.5
Sept. 9, 2020 (Wed.) 4:00 pm - 8:00 pm	Going Viral: Coronavirus Lessons you can share with YOUR students	Sand Creek High School	3.75 / 0.25
Sept. 26, 2020 (Sat.) 8:00 am–1:00 pm	The Discovery of Rise of the Mammals at Corral Bluffs	Corral Bluffs Meet at Space Village Loaf n Jug at 8 am	5 / 0.25
Oct. 10, 2020 (Sat.) 8:00 am – 4:00 pm	Brain Matters: How Stress and Drugs Impact the Teenage Brain	Sand Creek High School	7.5 / 0.5
Oct. 27, 2020 (Tues.) 4:00 pm - 8:00 pm	Making your Science Lessons 3D! Explore classroom lessons that highlight disciplinary core ideas, science practices, and cross cutting concepts.	Sand Creek High School	3.75 / 0.25
Nov. 7, 2020 (Sat.) 8:30 am - 12:30 pm	From the Nile to the Colorado - Hippos and Water Conservation at the Cheyenne Mountain Zoo	Cheyenne Mountain Zoo Meet at front gate at 8:15 am	3.75 / 0.25
Dec 5, 2020 (Sat.) 8:00 am – 12:00 pm & 1:00 pm - 3:00 pm	Experience Caving - CaveSim, Cave Lessons and the Cave of the Winds	Cheyenne Mountain Junior High School and Cave of the Winds	3.75-6.0 / 0.25
Jan 23, 2021 (Sat.) 8:15 am - 4:00 pm	Chemistry of Medicines and Drugs	U.S. Air Force Academy Chemistry Department	7.5 / 0.5
Feb 13, 2021 (Sat.) 8:00 am - 4:00 pm	DNA at the Crime Scene and Beyond	Discovery Canyon Campus	7.5 / 0.5
March 10, 2021 (Wed) 4:00 pm - 8:00 pm	Incorporating PhET in Your Science Classroom	Vista Ridge High School	3.75 / 0.25
April 8, 2021 (Thurs.) 4:00 pm - 8:00 pm	Physics in the Natural World - Little Shop of Physics	Discovery Canyon Campus	3.75 / 0.25
May 1, 2021 (Sat) 8:30 am – 12:30 pm	Operation Montserrat at the Challenger Learning Center	Challenger Learning Center	3.75 / 0.25
<i>Generous funding for these workshops provided by:</i> The Mikkelson Education Fund & Jim Mikkelson, USAFA K12 STEM Outreach Program and the Dan Furstenu Memorial Donation		TOTAL	60+ hrs / 4 sem credits*

* **The information in this chart is subject to change!** See our web-site www.sciencehubs.org for a detailed flyer posted around the date of the previous month's meeting and for any updates to the information above.

Sessions offered this year may be converted to virtual meetings, rescheduled or cancelled depending on the status of COVID-19 in our community. Also - Sessions offered January – May 2021 are dependent on funding.

** **NEW - Registration** for the August 22nd meeting is accepted on or after July 30th. Registration for each subsequent meeting is accepted on the day AFTER the most recent PALS hub meeting.

*** **Documentation** will be provided free for active participation in any hub meeting. In order to receive college credit you must earn a minimum of 7.5 hours or 0.5 semester credits. No college credit is given for only 3.75 hours or 0.25 semester credits. College credit only earned in increments of 0.5 semester credits. Hours/credits accumulate for the current school year only – no carry over for prior or future school years. Documentation / credit available at the end of the school year, typically in June. Total hours possible will change if meetings are cancelled or time is adjusted due to pandemic restrictions.

----- 2020-2021 PALS Workshops (Hub Meetings) Info -----
Semester One

Sat., Aug. 22 Full Day [8:15 am - 4:00 pm] 0.5 sem hrs / 7.5 contact hours

Title: **Biodiversity of Mueller State Park**

Presenters: Linda Groat, Program Coordinator, Mueller State Park and Tracy Predmore, Southeast Region Education Coordinator, Colorado Parks and Wildlife, April Estep, Wildlife Biologist, Colorado Parks and Wildlife.

Description: Participants will explore the biodiversity of the many life zones of Mueller State Park and learn how to use the iNaturalist app. They will observe and identify macroinvertebrates, learn about bats and their biology and behavior, and study the watersheds of Colorado

Agenda:

8:15	Arrive, registration, restrooms, name tags, notebooks
8:30 – 9:05	Welcome; Announcements ; Overview of the Day, Introductions of hub coordinators, presenters and participants – Auditorium
9:05 – 9:15	Resources available from Colorado Parks and Wildlife (Linda Groat, Program Coordinator, Mueller State Park and Tracy Predmore, Southeast Region Education Coordinator, Colorado Parks and Wildlife)
9:15 – 10:30	Activity: Observing Relationships within an Ecosystem using the Biodiversity Poster sets (small groups) (Linda Groat and Tracy Predmore,)
10:30 – 11:00	Introduction to iNaturalist
11:00 – 11:45	Explore three habitats (insects, plants, birds/mammals)
11:45 – 12:15	Share Out (working lunch)
12:15 – 1:15	Bats (April Estep)
1:30 – 2:30	Pond Study at Dragonfly Loop – a 1000 foot walking tour of a wildlife pond habitat – focus on aquatic insects (Linda Groat and Tracy Predmore)
2:45 – 3:45	The Shape of Colorado – Understanding the Watershed
3:45	Door Prizes, Evaluations
4:00	Depart

Wed., Sept. 9 Part Day [4:00 am - 8:00 pm] 0.25 sem hrs / 3.75 contact hours

Title: **Going Viral - Coronavirus Lessons you can share with YOUR students**

Presenters: Lt. Col. Tracy Clinton, Associate Professor of Chemistry, USAFA
Jane Wilson, Part-time STEM and science teacher
Sandy Smith, Part-time science teacher

Description: The current coronavirus pandemic has impacted each and all of us in many ways. Join us to learn a bit more about this virus and to explore some coronavirus lessons that you can use with your students this school year. Hear from Lt.Col.Tracy Clinton, an associate professor of chemistry at the USAFA who has recently completed her PHD studying the Ebola virus. Learn how her research is informing current research on the COVID-19 virus. Then, you will participate in an illuminating hands-on investigation that simulates how disease is spread. Experience how this investigation can be utilized to incorporate a phenomena-based lesson into your classroom. Finally, you will learn about other

phenomena-based activities you can use with your students. You will receive materials that you can take back and use in your classroom the next day.

Agenda:

- 4:00 Eating and Greeting
- 4:20 Administrivia
- 4:30 Speaker - Virus Research
- 5:30 Break & Transition
- 5:45 DYO Investigation - How do viruses spread and how can we minimize transmission? What is the most effective way to reduce the spread of viruses?
 - Demo of materials available [10 min]
 - Design, conduct, and analyze your investigation. Make a claim, evidence and reasoning. [50 min]
 - Sharing [30-min]
- 7:15 Other lessons to share - overview of 3-4 specific coronavirus activities and access to folder of resources
- 7:45 Evaluations & Teacher Materials & Door Prizes
- 8:00 End

Sat, Sept. 26 Part Day [8:00 am - 2:00 pm] 0.25 sem hrs / 5 contact hours

Title:

The Discovery of the Rise of the Mammals at Corral Bluffs

Presenter:

Sharon Milito, retired teacher, DMNS volunteer, member of Corral Bluffs Rise of the Mammals Discovery

Description:

Corral Bluffs Open Space - in our very own backyard - is the site of a 'paleontological trifecta' that holds a major discovery of how life came back after an asteroid wiped out the dinosaurs. Corral Bluffs combines animal fossils with historical climate indicators and precise dating to tell the story of the 'rise of the mammals'. Located just 10 minutes east of Colorado Springs, this unique area is only accessible by guided hikes that feature the geology, botany and zoology of the area. Join PALS on a custom hike led by a member of the Denver Museum of Nature and Science scientific team. You'll get to see where the different mammal skulls were found at Corral Bluffs and participate in a variety of fossil activities that you could use in your classroom.

Agenda:

- 8:00 Meet at Space Village Loaf'n'Jug - Sign In, Last minute prep (bathroom, check for long pants, close-toed shoes, waiver)
- 8:15 Safety Briefing
- 8:30 Depart for Corral Bluffs
- 8:45 Introductions & Administrivia - PALS / Corral Bluffs Alliance / Sharon
- 9:00 What is a Fossil? Activity
- 9:15 Hike in Corral Bluffs Open Space - Includes multiple stops where different fossils were discovered as well as discussions and a lunch stop.
- 12:15 Fossil Sort Activity
- 12:30 Evaluations and door prizes
- 1:00 Depart for Space Village Loaf'n'Jug

Sat., Oct. 10 Full Day [8:00 am - 4:00 pm] 0.5 sem hrs / 7.5 contact hours

Title: **Brain Matters: How Stress and Drugs Impact the Teenage Brain**

Presenters: AM: Tim Blesse & Robert Payo (Teacher Programs Coordinators, Denver Museum of Nature and Science
PM: Brittany Schilling, Corporate and Community Relations Specialist, Marketing and Communication, Children's Hospital of Colorado is arranging for local speakers.

Description: Uncertainty and lack of predictability can stimulate the biological mechanisms of stress. In this workshop, you will have the opportunity to take a practical look at the science of stress from the perspectives of neuroscience and behavior. How do we benefit from stress **and** get harmed by it? How can we and our teenage students regulate stress in a way that promotes health and learning? You will have the opportunity to learn from the research of experts and interact with peers in a meaningful way.

For the afternoon session, medical professionals from Children's Hospital of Colorado will present interactive sessions on the effects of marijuana and nicotine on learning and the teenage brain.

Tues, Oct. 27 Part Day [4:00 am - 8:00 pm] 0.25 sem hrs / 3.75 contact hours

Title: **How to make YOUR science classroom 3D ! Explore classroom lessons that highlight disciplinary core ideas, science practices, and cross cutting concepts.**

Presenters: Christa Lundberg - Retired Science Teacher, Robin Walters - Science Teacher - SCHS D49, Katy Snider - Science Teacher - DCC D20, Matt Steele - Science Teacher - EHS D22

Description: Join us for an overview of how YOU can utilize principles of 3 dimensional learning to implement science standards. Learn about the three dimensions as described in both the Colorado Academic Standards - Science and the NGSS. Then, select a breakout group facilitated by a local science teacher to participate in model classroom lessons. In **life science**, join Robin Walters (SCHS) to explore a storyline focusing on melanin through the context of human skin and animal fur coloring. Major biological concepts include: Genetics, Protein Synthesis, Mutations, and Natural Selection. In **physical science**, join Katie Snider (DCC) to address the student question "Why do I need to know this?" We will use an inquiry based approach to have students investigate careers in science (particularly in physics). Students will explore their preconceptions of scientists and learn of the diversity in both the people and careers in science. We will be analyzing data to support conclusions using scientific practices. In **Earth and space science**, join Matt Steele (EHS) to explore lessons from his earth and space science unit. Be a scientist as you model moon phases and investigate the nature of the orbits of satellites like moons and planets. Matt will also share an overview of his unit with you.

<u>Tentative Agenda</u>	4:00	Eating and Greeting
	4:20	Administrivia
	4:30	Speaker - Implementing the 2020 CAS-Science Standards through 3-Dimensional Learning.
	5:15	Break & Transition....
	5:30	Breakout Groups - Classroom Implementation A - Robin Walters - Biology / Life Science - Melanin Lessons B. - Katy Snider - Physical Science - Science Careers Lessons C. - Matt Steele - Earth/Space Sciences - Phases and Orbits Lessons
	7:30	Return to the large group - Share out connections to 3D from the breakout groups.
	7:45	Evaluations & Teacher Materials & Door Prizes
	8:00	End

Sat., Nov 7 **Part Day** [**8:30 am - 12:30 pm**] **0.25 sem hrs / 3.75 contact hours**

Title: **From the Nile to the Colorado - Hippos and Water Conservation**

Presenter: Stacey Graham, Director of EdVenture Programs, Cheyenne Mountain Zoo Educator

Description: Coloradans and hippos have something in common. We need water, and sometimes it is in short supply for both of us. Join the Cheyenne Mountain Zoo team in exploring all things hippo, including natural history, conservation, adaptations. You will get to meet the zoo's resident hippos: Zambezi, Kasai, and the newly arrived Biko! We will also be diving into water conservation in both Africa and here in Colorado, and how you and your students can be better water stewards for the planet

- Agenda:
- 8:30 Arrive at Cheyenne Mountain Zoo.
 Check in at the front by the elevation sign (left of the front gate)
 - 8:45 Introductions and discuss goals of the day
 - 9:00 Water Use Activity: How much water do you think is used?
 - 9:45 Quick Activity: Calculate Your Water Footprint. How does it compare?
 Watercalculator.org
 - 10:00 Meet an animal ambassador. Learn how Cheyenne Mountain Zoo connects people to animals through storytelling and hands on animal experiences.
 - 10:30 Water's Edge Africa Tour: Explore the new space, see hippos, penguins, and more! TBD: Meet a hippo keeper!
 - 11:15 Create a Water Filter: How to turn "dirty" water into "clean" water.
 - 12:00 Q&A and Wrap Up; Evaluations and Door Prizes
 - 12:30 Free to explore the zoo on your own!

Sat., Dec. 5

Part Day [8:00 am - 3:00 pm] 0.25 sem hrs / 6 contact hours

Title:

Experience Caving - CaveSim, Cave Lessons and the Cave of the Winds

Presenters:

Dave Jackson, CaveSim Inventor and Engineer
Cave of the Winds Staff

Description:

For the Morning: CaveSim: From physics, to chemistry, to biology, CaveSim programs teach a wide variety of science lessons, all centered around the theme of cave exploration. Come join us to experience our mobile cave system, and see how we teach students to love science by allowing them to feel the joy of exploration. We'll show you how we teach bat biology, epidemiology, and statistics using bat games, and how we use our 12' vertical caving tower to teach forces, friction, pulleys, and other physics concepts. You'll gain a better understanding of how CaveSim programs can integrate with your curriculum, and you'll come away with activities that you can do in your own classroom.

For the Afternoon: Travel by car to the Cave of the Winds where you will participate in ONE of the following tours:

- Caving 101 - "Take An Exciting Cave Trek! Explore the wild, undeveloped depths of the Manitou Grand Caverns on the 2 – 2.5-hour guided tour that involves an assortment of crawling, climbing, and walking through wet and muddy passages of various sizes. On this tour, you will crawl / climb / walk for nearly a mile while learning basic spelunking skills and the history as well as geology of the cave. *This tour is not recommended for guests who have back or knee trouble.* Please wear clothing you won't mind getting dirty and possibly ruined by the mud in the cave. Each participant needs to bring a flashlight or headlamp, a change of clothes, and an extra pair of shoes. Knee pads and/or a pair of gloves may be helpful. There will be no other source of light in the portion of the cave you will be exploring.
- Discover Tour! - Explore the electrically lit portion of the Cave of the Winds on a 45 – 60 minute guided walking tour which includes 15 rooms, a 1/2 mile of concrete walkways, and 196 stairs. On this tour you will learn about the history and geology of the cave while being shown some of its most beautiful formations. The cave is consistently 54 degrees fahrenheit, so a light sweater or jacket may be necessary. Wear comfortable clothing, such as a long sleeve shirt and pants, and good walking shoes.

Agenda:

8:00	Introductions & PALS Administrivia
8:15	Overview of CaveSim and Cave Activities <ul style="list-style-type: none">● CaveSim - Explore over 60 feet of artificial cave filled with beautiful formations, sensors and computer scoring, science lessons● Bat Biology● Chemistry of Carbide Lamps● Physics of Vertical Caving from 12 feet in the air
8:30	Rotation through CaveSim and Cave Activities
11:30	Wrap Up, Evaluations, and Door Prizes
12:45	Meet at Cave of the Winds for one of the two optional tours Discover Tour (45 min - 1 hour) Caving 101 Tour (2 - 2.5 hours). You must pre-register for these tours when you RSVP for this workshop.

----- 2020-2021 PALS Workshops (Hub Meetings) Info -----
Semester Two

Sat., Jan. 23 Full Day [8:15 am - 4:00 pm] 0.5 sem hrs / 7.5 contact hours

Title: **Chemistry of Medicines and Drugs**

Presenters: Dr. Gary Balaich, Professor of Chemistry, USAFA
Dr. Ron Furstenau, Retired Professor of Chemistry, USAFA
Dr. Abby Jennings, Assistant Professor of Chemistry, USAFA
Dr Doris Kimbrough, Professor of Chemistry, UCDenver

Description: Now more than ever, the Chemistry of Medicine and Drugs is a fascinating study. You will learn about materials in medicines, the chemistry of vaping, and the drug approval process. You will participate in experiments that can be used in your classrooms and experiments in a research-style environment using advanced equipment to identify and synthesize drugs.

Agenda:

0815	Meet participants on the south steps of the Cadet Field House; Escort to Chemistry Conference Room (2N189)
0845-0915	Introductions, refreshments, admin items in Chemistry Conference Room
0915-1015	Presentation: "Chemical Functional Groups, Drug Synthesis and Analysis" Dr Gary Balaich
1015-1030	Break, Chemistry Conference Room (2N189)
1030-1230	Laboratory Experiments
	<i>"Identifying Drugs by Instrumental Analysis": In this series of labs, participants will synthesize biodiesel and biodiesel petroleum diesel blends. Different techniques will then be used to analyze drugs, including high-performance liquid chromatography (HPLC), Fourier Transform Infrared Spectroscopy (FTIR), and gas chromatography/mass spectrometry (GCMS).</i>
	<i>"Thin Layer Chromatography (TLC) to ID Drugs": TLC is a powerful, but simple technique which can be used to separate and identify over-the-counter drug mixtures and to identify unknowns, applicable to a wide variety of middle and high school classes.</i>
	<i>"Synthesis of Aspirin and Methyl Salicylate": This is a straightforward lab allowing participants to make their own aspirin and methyl salicylate (oil of wintergreen; Ben Gay).</i>
1030-1130	Group A: Identifying Drugs by Instrumental Analysis (Dr Balaich) Group B: Thin Layer Chromatography to ID Drugs (Dr Jennings) Group C: Synthesis of Aspirin and Methyl Salicylate (Dr Furstenau)
1130-1230	Group A: Thin Layer Chromatography to ID Drugs (Dr Jennings) Group B: Synthesis of Aspirin and Methyl Salicylate (Dr Furstenau) Group C: Identifying Drugs by Instrumental Analysis (Dr Balaich)
1230-1330	Working Lunch Break in Lecture Hall

Title: **Incorporating PhET in Your Science Classroom**

Presenters: Kathy Perkins, CU Boulder Physics Department and
Local PhET experienced teachers and content experts

Description: Experience using PhET simulations in a science classroom. Get up to date information about new programs and best practices for using the simulations with students - in person or virtually. The PhET Interactive Simulations, created at the CU Boulder Physics Department, are free interactive math and science simulations. "PhET sims are based on extensive education research and engage students through an intuitive, game-like environment where students learn through exploration and discovery."
(<https://phet.colorado.edu/>) Join us to learn how you can use these to improve student learning in your science classroom.

Agenda:

4:00	Registration & Food
4:20	Introductions and computer setup
4:40	Overview and fundamentals of PhET simulations [Virtual Presentation]
5:30	Break & Transition....
5:40	Breakout Groups - Content Lessons using PhET
	A. Biology / Life Science
	B. Physical Science - Physics
	C. Physical Science - Chemistry
	D. Earth / Space Science
7:30	Return to large group - Report Out Share insights from the breakout groups.
7:45	Evaluations & Teacher Materials & Door Prizes
0:00	End

Thurs, April 8 Part Day [4:00 am - 8:00 pm] 0.25 sem hrs / 3.75 contact hours

Title: **Physics in the Natural World - Little Shop of Physics**

Presenters: Brian Jones, Little Shop of Physics
Sheila Ferguson, Little Shop of Physics

Description: **The natural world is full of seeming puzzles: Hippos spend their lives in water, and they look quite chubby, but they aren't fat, and they can't swim. Seals breathe air like all mammals, but they actually exhale before they take a deep dive. And there are animals possessed of what seem like superpowers: There are snakes who have a second set of vision organs that let them see in complete darkness. A dolphin can stun a fish with sound. The hairs on the body of a bee give it a "sixth sense" that lets the bee tell, from a distance, that a flower has been recently visited by another bee. A shark can sense your heartbeat. A dog can tell, from another dog's growl, how big it is.**

In this session we'll use physics as a tool to explain and explore the natural world, using it to investigate all of these topics, and more. As with all Little Shop of Physics workshops, it will be active. We'll spend our time making measurements and observations, sharing ideas and hypotheses, and then we'll connect all of this back to the living world. Along the way, we'll show you some superpowers that you possess. You can see beyond the rainbow. You have a rudimentary sense like that of a honeybee. And you, too, size up animals by their growls, whether you realize it or not!

Sat., May 1 Part Day [8:30 am - 12:30 pm] 0.25 sem hrs / 3.75 contact hours

Title:

Operation Montserrat at the Challenger Learning Center

Presenters:

Ron Bush, Vice President of Education, Challenger Learning Center
Robert Fredell, CEO, Challenger Learning Center

Description:

Following a tour of the newly built learning center, participants will be able to experience a presentation in the new Mikkelson Planetarium and learn how to bring the portable planetarium to an individual school site. Teachers will then participate in a shortened e-mission, breaking into teams to evaluate and respond to a global emergency simulation, thus gaining insight into the programs available through the Challenger Learning Center.

Agenda:

8:30 – 8:45	Welcome and Introductions
8:45 – 9:15	Simulator tour and overview of Challenger programs
9:15 – 9:40	Mikkelson Planetarium Show
9:40 – 9:50	Break
9:50 – 12:15	Operation Montserrat e-mission
12:15 -12:30	Questions, wrap-up, and giveaways