

SDSTA

South Dakota Science Teaching Association

Summer Issue | Date: June 24, 2022

Science Educators,

Happy Summer! It is my sincerest hope that the end of the school year went smoothly, and you were able to send another “family” of students off, eager and prepared for their next school year or journey ahead.

Contrary to unpopular belief, teachers don’t put their feet up during their months “off,” but instead book their calendars full of professional development opportunities. Professional development helps you stay up to date with the latest research-based pedagogical practices and enhances content knowledge. This may include taking a book study course or working on an advanced degree. It may also be as easy, and just as beneficial as participating in one of the many opportunities offered throughout our state.

Arguably just as important is the need for networking with fellow teachers. Teachers benefit from sharing ideas, learning from others’ experiences, and creating a comradery that lasts into the next school year, and beyond. There’s something reassuring about being able to bounce ideas off of teachers in the same content area. This is vitally important for teachers in small districts where they are the only teacher in their subject. It is also empowering to be able to provide that assistance and help a fellow teacher with a difficult subject.

Beyond professional development, summers serve as a great time to reflect on the past year. Think about content, student engagement, strategies to lead each student towards success, and more. Upon reflection, summer serves as a great time to adjust and possibly improve your

approach for the next school year.

As teachers gain more experience and increase their content knowledge, their students increase their growth and success. Although you may teach the same thing from year to year, it’s important to assess your strategies and adjust and make changes as needed. High impact teaching strategies lead to increased student achievement. Ask yourself the following questions. How can I adjust the process that I used to present this specific topic? How can I better differentiate to meet students where they are in their learning? Is this a topic that would benefit from a flipped classroom? How can I provide better feedback to students? Assessing your approach may lead to some amazing, impactful changes.

Summer recharge looks different for everyone. Whether it is new adventures, slowing down your daily pace, spending time with family, immersing yourself in the outdoors, or filling your brain with new ideas, do what fills your bucket. You deserve it and it benefits your wellbeing, your family, and your students. Relax, recharge, and let’s take the 2022-2023 school year by storm.

Ashley Armstrong
SDSTA President



2022 Grosvenor Teacher Fellows Expedition to Svalbard and the Fjords of Norway with National Geographic and Lindblad

2021 Grosvenor Teacher Fellow, Julie Olson, finally got to travel on May 30th, 2022. Julie Olson set out to explore the Arctic with its unique wildlife, land, and glaciers with 3 other fellows. Polar bears, fin whales, arctic fox, kittiwakes, and walrus were just a few of the animals she saw in their natural fragile habitat. On board the class 3 icebreaker National Geographic Resolution, breaking through 1 meter ice, riding zodiacs, hiking the hills of Norway, and kayaking above the Arctic circle in the sea ice were a few of the many highlights. A few photos from the expedition are below.



The first ones to kayak aboard the 80 degree line!

What does sea ice taste like? Salty water.



Through ice fields like butter! Ice outside our dining area. National Geographic Resolution Class 1 Ice Breaker ship



Hiking on Soroya - Norway. Stunning cliffs, lakes, beach, and birds.

PD Offered by the Sanford Underground Research Facility (SURF)

In June, 28 educators from across the state participated in professional development offered by the Sanford Underground Research Facility (SURF). Part of the professional development included many tours of the SURF facility. The week focused on "The Power of Place-Based Learning" where participants focused on inspiring curiosity, engagement, and science identity through place-based learning. Teachers learned to promote recognition in students of the interconnectedness of their environment, the topics they learn in class, and themselves.



Professional development participants in front of the Sanford Lab Homestake Visitor Center in Lead, standing in front of a ring from Dr. Ray Davis' Solar Neutrino experiment, conducted at the Homestake Gold Mine from the 1960's through the 1980's. Dr. Davis won the Nobel Prize in Physics in 2002.

NEW NSTA District IX Director: Angela Osuji

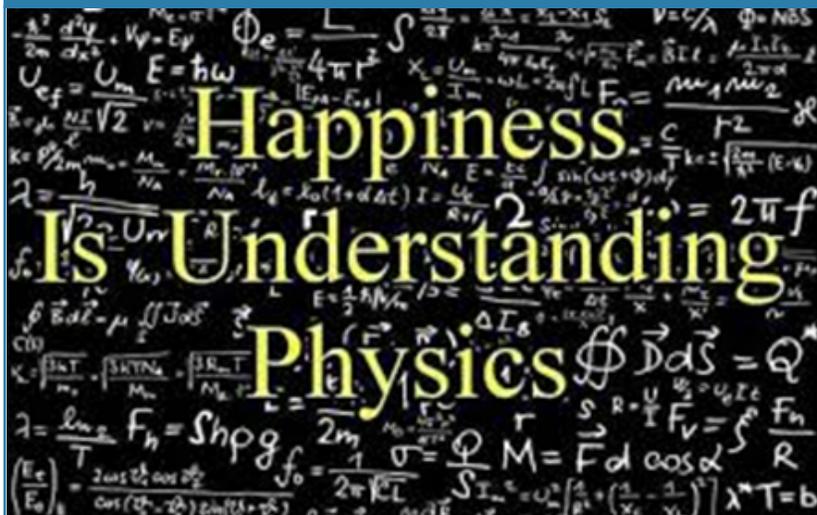
NEW District IX Director: Angela Osuji, from Minnesota

Angela teaches Chemistry and Physics at Washburn High School in Minneapolis, MN and also serves as the Vice-chair for the Professional Educator Licensing and Standards Board (PELSB).

I look forward to our mutual work together as we advance science education in our region. NSTA's new strategic plan is offering us an opportunity to do this work in new and exciting ways. I pledge to represent you well at NSTA.



Multi Section American Association of Physics Teachers meeting on Zoom



Saturday, April 15, 2023

Contact Larry Browning -
Larry.Browning@sdsta.edu -
if you have questions or suggestions

Jenna Sinner - 2022 SD Outstanding Biology Teacher

Congratulations to this year's South Dakota Outstanding Biology Teacher, Mrs. Jenna Sinner, from Webster Area High School. Mrs. Sinner currently teaches High School Biology, Biomedical Science, and Human Anatomy. Mrs. Sinner has exemplified a commitment to school and community during her past 11 years of employment at Webster Area School.

Colleagues describe Mrs. Sinner as being compassionate, hardworking, trustworthy, and a good listener. Former students credit Mrs. Sinner for allowing students to collaborate and explore, making learning fun, inspiring students to become scientists themselves, and listening when students are in need. Mrs. Sinner has been involved in volleyball, track, yearbook, officiating, and curriculum development. Outside of school hours, she regularly attends extracurricular events, has been involved in city government, and has played a variety of roles within her church community.

Mrs. Sinner will receive a \$1,200 grant provided by Sanford Health. In addition, she will be recognized formally in front of her peers at the South Dakota STEM Conference and the National Association of Biology Teachers Convention in Indianapolis, Indiana.

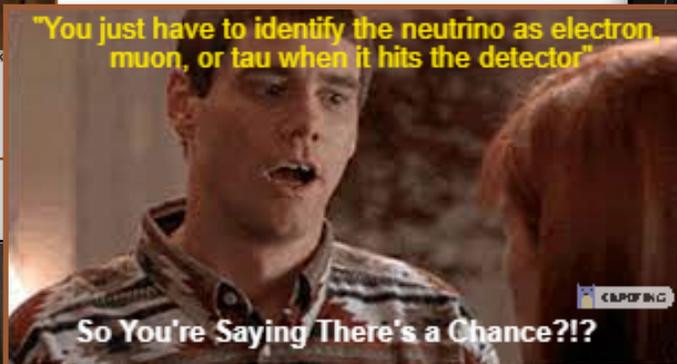
Congratulations, Mrs. Jenna Sinner!



One does not simply find dark matter.

SURF PD

One of the assignments participants completed was creating a meme.



This is Argon.
Argon just collided with Neutrino.



Tell me more about how neutrinos can change type while in the particle detector.

Using Memes in Your Classroom

- show understanding
- learn vocabulary
- class rules
- introduce concepts and units with humor



You should see Neutrino



JOIN US IN
LEAD, SD
JULY 9, 2022
NEUTRINO DAY
SURF'S FREE SCIENCE FESTIVAL



ALL DAY ACTIVITIES

HANDLEY REC CENTER
Hands on activities for all ages!
Nitrogen Ice Cream
Journey Museum's Geodome
SD Mines Geology Department
DNA Bracelets
Sanford Research PROMISE

SANFORD LAB HOMESTAKE VISITOR CENTER
Hoistroom Tours Start Here
Solar Telescope
New Science Exhibits

SANFORD UNDERGROUND RESEARCH FACILITY
Wild Science Demonstrations with SDPB's Science Steve!
Futuristic Equipment Demonstration
Meet SURF Scientists

LIVE EVENTS

Dr. Brianna Mount - BHUC
10 a.m. | Live talk from the 4850-Level
Sanford Lab Homestake Visitor Center

Dr. Claire David - DUNE
11 a.m. | Homestake Opera House

Dr. Hunter Knox - EGS Collab
Dr. Paul Schwering - EGS Collab
1 p.m. | Live talk from the 4100-Level
Sanford Lab Homestake Visitor Center

Dr. Pete Doucette - EROS
2 p.m. | Homestake Opera House

NEUTRINO DAY FINALE
Dianna Cowern, Physics Girl
4 p.m. | Homestake Opera House

Neutrino Day - Sanford Underground Research Facility

Saturday, July 9, 2022

i Neutrino Day's headlining speaker is Dianna Cowern, creator and host of the viral "Physics Girl" YouTube series. With over 2 million subscribers, "Physics Girl" is a resource for fun physics videos and has featured such legendary figures as Bill Nye.

Throughout the day, attendees will find all their Neutrino Day favorites and discover new experiences, activities and speakers.

Join us for hoistroom tours, science activities and exhibits for all ages, live video chats with scientists underground at SURF, and engaging talks about the research happening beneath your feet. You won't want to miss a tour of the Yates Hoistroom, wild science demonstrations with "Science Steve" Rokusek or The Journey Museum's immersive planetarium!

Neutrino Day takes place at locations across Lead, including the Sanford Lab Homestake Visitor Center, the Sanford Underground Research Facility, the Handley Recreation Center and the Historic Homestake Opera House. Start your day at the Visitor Center, then take buses to other locations throughout Lead.

See our Agenda for a full list of locations, activities and talks!



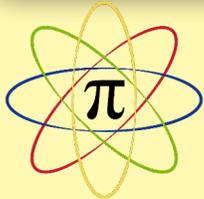
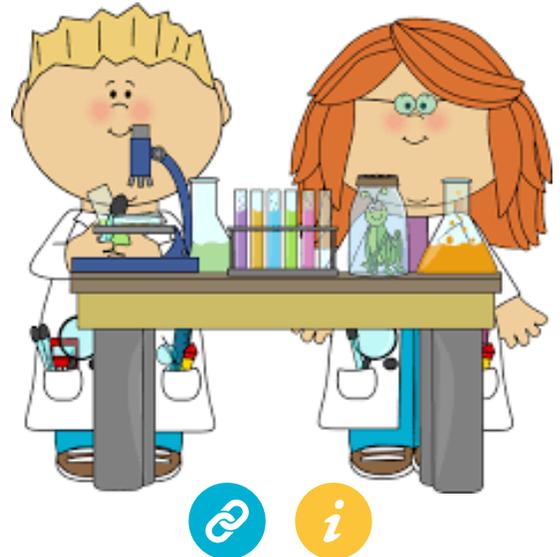
Speaker Proposal Forms

"It's not too early to submit"

Save the date! The 31st Annual SDCTM/SDSTA Professional Development Conference will be held in Huron February 2-4, 2023. Sessions presented by South Dakota's best (that's you) comprise a very large part of the success of this conference. If you have presented before, thank you. I hope that you will present again for the 2023 event. If you have not presented before, please consider it this year. Let others benefit from your ideas and experiences. You can present with partner(s) if you are hesitant to go it alone the first time.

Presenting a session is a fun and rewarding experience. You can be certain that you will have a friendly audience! Speaker proposal forms are now available at

<https://forms.gle/rLcpH1x7c3mrfrQY9> Forms will be submitted electronically this year; follow the links on the [conference page](#). The submission deadline is November 1, 2022 but why wait until the last minute? I can't wait to see what you all have in mind for your sessions!



SD STEM Ed

SD STEM Ed Conference 2023

February 2nd, 3rd, & 4th

2023 SD STEM Ed Conference Session Proposals

We are looking for STEM activities at all levels. Consider putting together a session to share with other educators from around the state. Each session will last about 50 minutes.

- Submit as many sessions as you want but you may not get acceptance of all.
- Both workshop or presentation styles are welcomed.
- Presenters must be registered or exhibiting at the conference.
- Proposals are due by October 31, 2022.
- You will receive confirmation of acceptance by December 1.
- Projectors will be supplied as needed, but not every type of cable connection is necessarily available. Presenters are welcome to bring their own devices. All other materials or technology is the responsibility of the presenter.

Submissions are taken online.



If you have questions or concerns, please email your question to: James@SDSTA.org or Speaker@sdsta.org

South Dakota Science Teaching Association Industrial Arts and Ag Grants

The South Dakota Science Teaching Association (SDSTA) invites applications from South Dakota teachers for the SDSTA Industrial Arts and Ag Grants. The award seeks to encourage professional growth and involvement of those K-12 educators who teach STEM in South Dakota through school Industrial Arts and Agriculture classroom.

Available Funds

SDSTA has a maximum of \$1,000 available for grants to assist in the cover of costs to attend the SD STEM ED Conference for 4 to 5 educators.

Purpose

One of the cornerstones of STEM education is the integration of a wide variety of disciplines to provide tools for students to explore real questions and phenomena. There is no better place to find relevant phenomena than our Agriculture and Industrial Arts programs where students often take on complex science and engineering projects to solve real world problems and challenges.

The **SDSTA Industrial Arts and Ag Grants** were established and funded by the South Dakota Well Drillers Association to create a bridge between all STEM educators across the curriculum and to explore partnerships that can provide opportunities for students to investigate real world and real life phenomena with depth and rigor that will help prepare them for 21st century careers. Career and Technical Education courses utilizing STEM foundations and concepts will provide an experience for our students that will support them in a diverse variety of continuing education and career opportunities. The Annual SD STEM Ed Conference offers an opportunity for all K-12 teachers of STEM to grow professionally by learning and sharing best practices. This is an opportunity to network and learn from each other and to connect with mentors and local, state, and national leaders.

Scope of Program

Funds may be used to assist with the cost of attending the Annual SD STEM Ed Conference.

- Grant to attend the Annual SD STEM Ed Conference
A minimum of \$100 and a maximum of \$250 may be requested to cover the costs of attending the conference. Acceptable costs include the cost of a substitute (not to exceed \$100), motel room (1 or 2 nights), the Friday Night Banquet, conference registration, and travel. If you receive this grant, you are required to share what you learned with your school district.

Eligibility

Applicants must be:

- K-12 teachers of STEM who have not previously attended the South Dakota STEM Ed Conference or it has been 5 years or greater since you last attended.
- K-12 teachers who teach STEM and/or intentionally integrate STEM into other content areas such as Industrial Arts and Agriculture Programs.

Application Submission Guidelines and Deadline

- Applications are due by December 1.
- Awardees will be notified by December 15.

More information and form can be found at the [SDSTA website](#).

Contact Chad Ronish at chad.ronish@bhsu.edu, if you have any questions about the grant.



Officer Submissions

Place-Based Education - Ashley Armstrong, SDSTA President

Has your community had an increase in high radon readings? Are some students in your class more prone to mosquito bites than others? Do you know of someone in your community who went through a major event in history? There are unlimited questions to be answered and ways to tie students to their community and use your "place" as an impactful educational setting. "Place-based education (PBE) enables students to learn while addressing issues or needs which students themselves help identify in their communities or local environment" (Discovering Place 2022).

There are countless benefits to immersing your students in the community around them. Place-based education helps students learn about the community around them and invites them to be active citizens in the world. It is not only fun for students, but fun for teachers too! When students and teachers engage in the world around them, the positive outcomes can transform a classroom and school. When citizens see students showing care and interest in the community, they are more likely to show care and interest in the school.

In the Waterworks Unit, that can be checked out at no cost to teachers or districts, from the Sanford Underground Research Facility (<https://www.sanfordlab.org/educators/curriculum-modules>), direct



standards-based activities help connect content to community. Specific middle school connections include Life Science, Earth Science, and Engineering standards. In this unit students are asked to collect water samples from around their community. Place-based learning changes testing "a" water sample to testing the water from "my city pond," "my stock dam," or "my backyard" which builds connections for students.

For more information on this unit and others like this, check out the website above or contact the SURF

Education & Outreach team by emailing BHSUSURFEducation@bhsu.edu.



Photo from: <http://thehawbridgeschool.org/place-based-education-environmental-science/>
References:

Discovering Place. Discovering PLACE. (n.d.). Retrieved May 26, 2022, from <https://blogs.umflint.edu/glsi/place-based-education-lesson-plan-examples>

Periodic Table Mix-up Activity - created by Alison Bowers, SDSTA President Elect

If you are looking for an interactive way to check students' ability to collaborate and use the periodic table, check out Periodic Table Mix-Up. I wrote this activity as a challenging way to assess my students' understanding of the properties that they can find on the periodic table and the patterns that its arrangement represents. To do this, I give a group of 2-3 students a cut-up periodic table with some elements missing. Their goal is to use the Unknown Element Cards and the properties listed on them to figure out which missing element is represented by the unknown. There is a short reading handout that goes with it and then I check their results as they work. This activity can take up to 40 minutes of productive struggle, but it is so fun to watch them work and push each other! I use this as a semi-summative assessment after we've learned what properties are described on the periodic table. Please email me at alison.bowers@northern.edu if you tackle this activity and want to check your answers.

Materials are found at the end of the newsletter.

Officer Submissions

Black Hills and Badlands: A synopsis of Geological Time - Spencer Cody, SDSTA Treasurer

Join local educator, Spencer Cody, and educators and scientists from all across the country on an exciting three day adventure in the Black Hills and Badlands of South Dakota this October 6-8 on a Geological Society of America National Conference professional field trip! During those three days, we will showcase our state by covering a remarkable array of Earth's prehistory through highlighting the stunning rock formations of the Black Hills and Badlands paired with some of the most amazing paleontological finds in the world. On day one we will travel from the conference site in Denver to the Northern Black Hills to explore the uplift that formed the Black Hills at Bear Butte, an extraordinary example of a laccolith. We will continue our day by traveling back in time as we progress deeper into the Black Hills via Spearfish Canyon revealing the remarkable geological record preserved in sedimentary rock arriving in Lead at the Lead Dome complex to tour what was once one of the world's biggest producers of gold, the Homestake Gold Mine. The next day we will cover the remarkable pegmatite granite spires of the Needles. We will cover Karst topography and formations with a tour of Jewel Cave National Monument, the Mammoth Site, and Wind Cave National Park. Once we have finished our tours of Karst formations, we will make our way out onto the plains to learn about the sedimentary deposits and fossil of the Badlands. Throughout this field trip, participants will be learning about South Dakota geology and assembling their own South Dakota rock, mineral, and fossil collections for educational use. Up to two graduate credits may be available through the University of Sioux Falls for \$45 per credit upon request.

Meals and snacks for all three days are included along with two nights lodging in Custer, South Dakota, and admission for Jewel Cave National Monument, Wind Cave National Park, Badlands National Park, the Mammoth Site, Custer State Park, Bear Butte State Park, Sanford Lab/Homestake Mine Visitor Center, and Mount Rushmore National Monument.

For additional details visit the professional field trips page on the GSA Connects 2022 page: [Field Trips - Connects 2022](#)

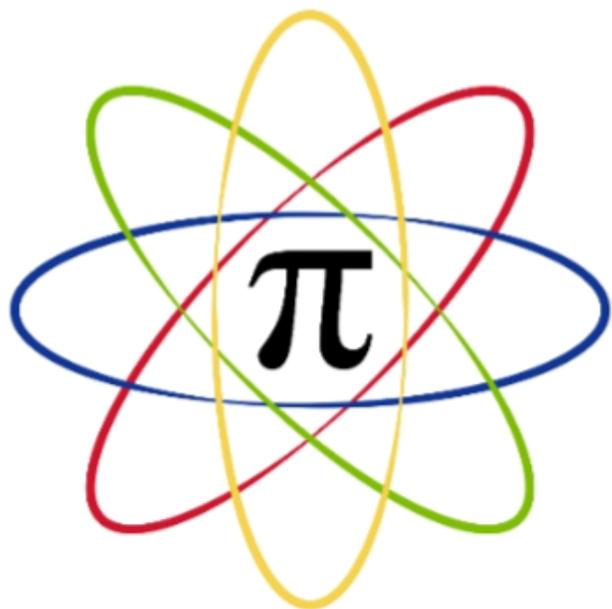
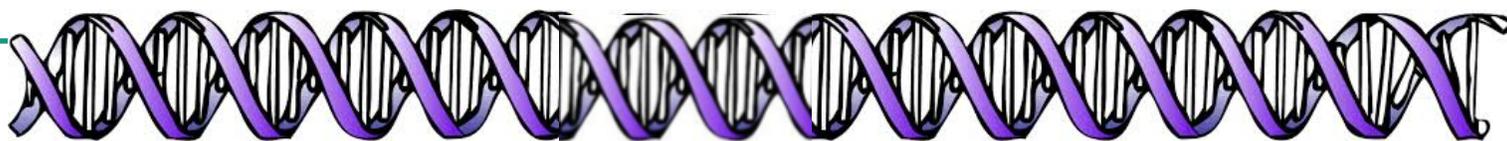
For additional questions, please email the field trip coordinator: Spencer.Cody@k12.sd.us



Officer Submissions

The Basics of Biopharmaceutical Technology - Tiffany Kroeger, SDSTA Secretary

Are you still looking to fill your summer with some AWESOME professional development? Are you interested in expanding your understanding in Biotechnology? Are you ready to get out of South Dakota for a little bit and do some exploring in another state? Check out Biotechnology: The Basics by Biopharmaceutical Technology Center in Madison, WI. According to the website, "Topics include DNA extraction, micropipetting, gel electrophoresis, restriction enzyme digestion, polymerase chain reaction (PCR), bacterial transformation, biomanufacturing, and NASA and biotechnology." I was able to participate in this workshop virtually last summer and the instructors are very knowledgeable and personable. Additional assistance is provided throughout the school year as you begin to implement the methods and procedures you learn during the course. Check out this awesome workshop this summer or put it on your radar for next summer's PD.



SD STEM Ed

Proposal deadline is
October 31

SD STEM Ed Conference

February 2, 3, & 4, 2023
Huron, SD

INTERESTED IN PRESENTING?

WE'D LOVE TO HEAR YOUR IDEAS!

SEE THIS [FORM](#) TO
SUBMIT A SESSION PROPOSAL

Nature Notes

~ Sharing info pertaining to science education in South Dakota



Summer 2022

Welcome to Nature Notes!

This is a piece I will be submitting to the SDSTA newsletters. It has a new name though the same great look as Science Notes from my previous job. I am excited to be returning to the classroom (7th life science at East MS, in Rapid City) and will be sharing ideas that inspire me! ~ Jen

Starting with Relevance!

As I am deciding how to establish my classroom routines this year, I am compiling a list of relevant current science topics to discuss. Remember to create habits using the Science & Engineering Practices. Possible topics: severe thunderstorms with large hail and summer allergies!

Education Resource Hub

Want to plan interactive experiences for your students? We can help! Check out the Black Hills Parks and Forests Education Hub an easy-to-navigate webpage for educators to access placed-based environmental education programming, including field trips, distance learning programs, and curriculum from our partner locations and other organizations in the Black Hills, South Dakota, and Nebraska.

The Education Hub starts here!

Black Hills Parks and Forests (BHPFA) is an official non-profit partner of Wind Cave National Park, Jewel Cave National Monument, Scotts Bluff National Monument, Agate Fossil Beds National Monument, Black Hills National Forest, Nebraska National Forests & Grasslands, and the National Grasslands Visitor Center. BHPFA operates 16 retail stores for these seven agencies. In 2022, BHPFA is providing \$70,000 to these partners for educational materials and programs. BHPFA is also a member organization; join us in supporting sustainable and responsible recreation on the valuable public lands surrounding us.

Go to www.blackhillsparks.org or call 605-745-7020.



BLACK HILLS
PARKS &
FORESTS
ASSOCIATION

For more information, please contact Jennifer Fowler, DrRangerJen@gmail.com

Side Note: Updated Periodic Table from the IUPAC as a printable PDF.

Side Note: STEM Teaching Tools bookmark to print and all the other resources!



**Have your students ever thought,
“I want to change the world”?
With eCYBERMISSION in your curriculum, they can.**

eCYBERMISSION is an online STEM competition for students in grades 6 to 9 that you can incorporate into your classroom. As the Team Advisor, you assist your teams of 2 to 4 students in choosing a problem in their community to explore with science or solve with engineering. eCYBERMISSION offers you a unique way to engage your students in real life applications of STEM and inspire them to learn more about future careers.



STEM

Use science and engineering practices, technology, and math to inspire your students.



Financial Aid

Apply for financial assistance through our Mini-Grant program.



Education

Supports phenomenon-based learning and aligns with Next Generation Science Standards (NGSS).



Expert Advice

Give your students the opportunity to ask questions to real scientists or engineers and learn about STEM careers.



Resources

Receive tools such as lesson plans, videos, worksheets, and more.



Awards

Compete for state, regional, and national awards and give your students the opportunity to win BIG PRIZES!

**Whoever you are, wherever you are.
Accept the Challenge. Join the Mission.**



Contact Mission Control at 1-866-GO-CYBER (462-9237) or missioncontrol@ecybermission.com for more information.

20 YEARS

eCYBERMISSION
ACCEPT THE CHALLENGE



ECYBERMISSION MINI-GRANT PROGRAM



The eCYBERMISSION Mini-Grant program provides funding to support teachers as they implement eCYBERMISSION in their classrooms and schools. Applying is easy via our three-step, online application process. Teachers do not need to commit to participating as a Team Advisor or know exact student registration numbers to apply. The Mini-Grant program is open to everyone. However, Title 1 schools and those working with underserved students are given special consideration.

eCYBERMISSION is a free, online STEM competition for 6th to 9th graders that allows students the opportunity to choose a problem in their community to explore with science or solve with engineering.

To apply and for more information visit www.ecybermission.com/MiniGrantProgram



SELECTION CRITERIA

Any Team Advisor is encouraged to apply. Special consideration is given to:

- School/program location and Title 1 status
- Number of students planning to register
- Percentage of:
 - Racial/ethnic/gender minorities in STEM
 - Free and reduced lunch
 - English Language Learners

GRANT STRUCTURE

- 1 Grant value is based on the selection criteria and number of registered students
- 2 First payment goes to the school for project supplies and is based on the number of registered students on complete teams
- 3 Second payment goes directly to Team Advisors as a stipend and is based on the number of students who submitted Mission Folders

3-STEP ONLINE APPLICATION

- 1 Your contact information
- 2 Your school/program information
- 3 Your goals for the grant

Post-grant requirements are easy, simply:

- Complete two brief Project Summary Reports
- Complete an Evaluation Survey

Application is Open!

Contact: missioncontrol@ecybermission.com or 1-866-GO-CYBER (462-9237)



GOeCYBER



AEOP_eCYBERMISSION



eCYBERMISSION



Professional Development

NATIONAL GEOGRAPHIC Professional Connection and Learning

Teaching and Learning

Develop new skills on your own or as part of a global community with free online professional learning courses for educators, Explorers, and young people ages 16-25. Courses range in content, length, and schedule, and are open to learners from anywhere in the world. In many of our courses, learners can earn graduate credits through National Geographic university partnerships.

- Developing an Explorer Mindset
- Applying Geographic Thinking Skills
- GeoInquiry
- Storytelling for Impact
- Plastics Pollution
- Mapping
- Climate Change



Exploring Conservation

One of the most powerful ways we can create impact is by supporting champions for the environment and the natural world. Exploring Conservation is a free six-course wildlife conservation series designed to educate everyone about the importance of conservation and how they can get involved. These courses were developed with United for Wildlife and the Zoological Society of London.

- INTRODUCTION TO CONSERVATION
- PRIORITIZING SPECIES AND SPACES
- UNDERSTANDING ILLEGAL WILDLIFE TRADE
- OCEAN CHALLENGES AND SOLUTIONS
- CONSERVATION PROJECT PLANNING
- SCIENTIFIC EXPEDITIONS FOR CONSERVATION

SUMMER INSTITUTE
for Climate Change Education

Finding our Collective Strength
a virtual conference

July 18th & 19th 2022
Plus a regional cohort day on July 20th, 21st or 22nd

CLIMATE GENERATION NOAA

Join Climate Generation, [NOAA's Climate Program](#), 12 regional climate change education leaders, and educators from across North America and the Hawaiian Islands dedicated to teaching

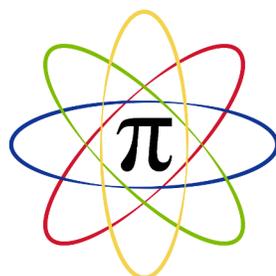


climate change as an interdisciplinary issue.

February

2023

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|-----|-----|-----|-----|-----|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | | | | |



Mark your calendar!

SD STEM Ed Conference 2023
February 2nd, 3rd, & 4th

Other Submissions

Gizmos Information - shared by Sabrina Henriksen

Gizmos users should only have one TE-Science account in TIDE no matter how many levels/buildings they may teach. Only one TE-Science account can be linked to Gizmos per user. If users have more than one TE-Science account, please delete all but one.

- You can also reach out to Cambium's help desk at SDHelpDesk@cambiumassessment.com
- SD Educator Portal - <https://sd.portal.cambiumast.com/educators.html>
- Correlation to SD Science Standards 



2023 SD STEM Ed Conference Session Proposals

Consider putting together a session to share with other educators from around the state.

- Submit as many sessions as you want but you may not get acceptance of all.
- Both workshop or presentation style welcome.
- Presenters must be registered or exhibiting at conference.
- Proposals due by October 31, 2022
- Confirmation of acceptance by December 1.

Projectors will be supplied as needed. Other materials or technology is the responsibility of the presenter.

Sanford PROMISE - <https://research.sanfordhealth.org/sanford-promise>

Sanford PROMISE provides STEM education and outreach for Sanford Research. We're working to inspire the next generation of scientists, problem solvers, and thinkers. **Check out our new Equipment Lending Library Catalog and our new lesson plans.**



Stay up to date by subscribing to our newsletter.

promise.sanfordhealth.org | @SanfordPROMISE

Other Submissions

SD AAPT HS Photo Contest - shared by James Stearns, designated SDSTA Historian

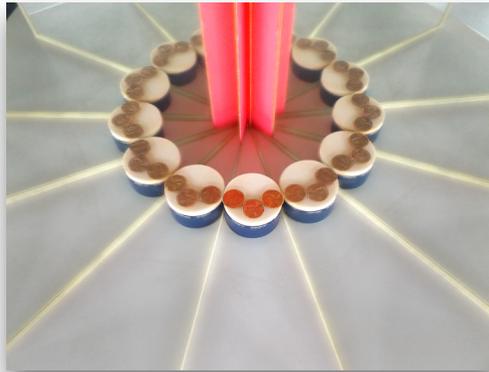
Photo Contest Results

At the February 2022 Joint Professional Development Conference (SD STEM Ed), the SD Chapter of the American Association of Physics Teachers met to conduct various business items including the final voting on the Photo Contest. Consideration is given for both the picture itself and the description of the Physics in that photo. Cash prizes are awarded to the top three. Congratulations to first place - Tyreese Loudner (The Halo); second place - Diamonique Defender (Reflections); and third place - Jocelyn Prewett (Red Sunsets). Entries must be received by January 1st to be considered for that year's competition.



The Halo

This photo depicts a reaction called a halo, specifically a circular halo or 22° halo. A halo is an absolutely breathtaking optical phenomena. A halo is an optical phenomenon which is made by sunlight or moonlight and ice crystals in the atmosphere. These beautiful phenomena can be seen when light reflects off the ice crystals. Halos can display color in many different wavelengths. The rays can display a single color, a combination of colors, or the full color spectrum. In this image the halo rings have multiple colors which means the reflection process created a dispersion. This means that the white light has been split up to show the rainbow of colors. This photo was taken on Wednesday, January 10 of this year in Mitchell, South Dakota.



Reflections

I remember as a kid being curious of how two mirrors create more of the same reflections. But with these calculations, I had thought that a 360-degree angle divided by a 30-degree angle would equal 12 sections including 1 original & 11 images. but when I measured with a protractor, I figured out they were created by 360 degrees divided by 13 is equal to 27.7 degrees with 13 sections., 1 original and 12 images. Depending on where you place the object and where it stands. In the photo you will see that the object is placed in front center of the angle, anything smaller than 180-degrees will cause more images to appear. What I'm showing as my object is three pennies on top of a bronzer sponge on a seasoning cap. The pink centerpiece would be the tape holding two mirrors together at a specific degree angle. if you look a the first two reflections right and left from the original image of the three pennies, the penny of Abraham Lincoln is reversed of him looking to the left. on the second set of the images, they are reflections of him facing back to the right like its original image. The remaining reflections alternate facing back and forth as they circle its way back around to the original image. It is a very interesting project and I'm hopeful you will think so too.



Red Sunsets

This image shows how light refracts at different wavelengths in the sky. In the visible light part of the electromagnetic spectrum, violet and blue have the shorter wavelengths while red has the longest wavelength. The sky's normal blue appearance is due to blue light waves scattering in all directions and becoming absorbed by the molecules in Earth's atmosphere. Red, yellow, and orange lights with shorter wavelengths pass through and are not scattered or absorbed. During sunrise and sunset, the light from the sun has a farther distance to travel. By the time the light reaches our eye, most of the blue light has been scattered until the red, orange, and yellow light waves are left. When larger molecules are in the sky such as rain clouds and dust, the longer wavelengths will be absorbed. Therefore, when it is cloudy at sunset, the sky tends to take on a vibrant red hue.

Other Submissions

Geology Lessons - shared by a SURF Summer Intern

Don't Forget to Eat Your Rocks!

Learning about geology can be fun and exciting for students, especially if they get to EAT their investigations! There are different geology models that allow students hands-on experiences to learn about the physical features of Earth and the minerals that are found on Earth. Allowing students to gain hands-on experiences enhances their eagerness and curiosity for science and wonder for the world around them. While searching online, you can find numerous ideas that can be used in the classroom, at home, or during a summer camp. Science is not just created in a lab, it can be created in your own kitchen too!

Edible Aquifer

In this experiment, learners are able to create their own aquifer with food and investigate how an aquifer works. For this experiment you will need:

- Clear cups
- Ice cream scoop
- Spoons
- Blue/red food coloring
- Drinking straw
- Vanilla ice cream
- Clear soda
- Chocolate chips
- Sprinkles or sugar

At the end of this experiment, students will begin to understand groundwater and the many layers it has. They can visually see contamination occur and the layers it affects.

[Click HERE for full instructions!](#)

Edible Starburst Rocks

Using starbursts for this experiment allows students to explore all the stages of the rock cycle with one simple ingredient. For this experiment you will need:

- Starburst candy pieces
- Ziplock bag or empty Starburst bag
- Small cup
- Plastic knife
- Plate

Through this experiment, students will see how sediments form into sedimentary rocks, which turns into metamorphic rock with heat and pressure, then

into magma with more heat, and finally magma turns into igneous rock as it cools. This can all be taught in 6 easy steps!

[Click HERE for full instructions!](#)

Crystal Geodes

Making your own geodes can be fun and yummy with this experiment! Unlike real geodes, this experiment creates geodes by turning a liquid into a solid. But real geodes are created over time through the collection of mineral deposits. For this experiment you will need:

- Silicone muffin cups
- Cookie sheet
- Hard candies (like Jolly Ranchers)
- Rolling pin
- Plastic bags
- Cocoa powder

Now you may not be able to break open these edible geodes like real ones, but you can eat them. To add to this experiment, you can have the students research geodes and see what color combinations they can find and recreate.

[Click HERE for full instructions!](#)

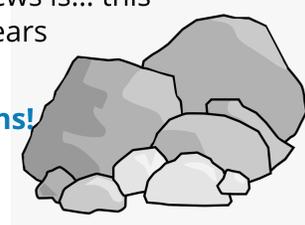
Edible Sedimentary Rocks

In this experiment, students will learn about sedimentary rocks, all while enjoying a tasty treat. Sedimentary rocks are layered and during this experiment you will use different ingredients to represent the layers of sand, mud, rock, or pebbles. For this experiment you will need:

- 10 oz bag miniature marshmallows
- 3 tbsp butter
- 1 cup chocolate chips
- 1 cup M&M's minis

After just 8 steps, you will have the perfect rice crispy treat that visually shows students what a sedimentary rock looks like and the good news is... this sedimentary rock won't take years to form!

[Click HERE for full instructions!](#)



Regional Science Fair Recipients of SDSTA Award

Flush It Fresh Not Frozen Tiernen Frederickson - Spearfish MS

Abstract

I wanted to know which flushing procedure frozen or fresh conventional or frozen or fresh IVF would produce the most live calves. I thought fresh conventional would produce the most live calves. We flush cows every year in late spring and record which flushing procedure we used to flush that cow. Then in late summer we preg check them to see if they've been bred with a calf. In February and March, when they calve we record all live births. We check the data that we had in the spring before and see what flushing we used for that cow and we record if that flushing produced a pregnancy and live calf. Then we analyze our data and see which flushing produced the most amount of live calves. When we analyzed it, I was correct, fresh conventional produced the most live calves with 66% or 132 live calves, out of 200 conventional embryos implanted. The next best procedure was fresh IVF with 59% or 42 out of 71 embryos implanted. Then the least amount of calves that were produced with the other flushing was frozen IVF with 48% or 40 out of 84 embryos implanted and the least successful flushing was frozen conventional with 41% or 44 out of 107 embryos implanted.



Tiernen Frederickson

Examination of the Prevalence of Enterobacteriaceae on Items of Constant Use Kaylee Kiesow and Holgate Middle School



Research Question

Are bacteria found on items such as a phone case, television remote, and pet's water dish? If so, how concentrated are bacteria on these items?

Results

- The EnteroPluri tubes did not show any differences.
- The LB broth did show differences, in growth before and after.
- The Nutrient broth showed minimal differences, in growth before and after.
- The optic density readings indicated more growth in the LB broth over the Nutrient broth for all groups and a noticeable difference between objects sampled.
- The gram stain showed only purple stains which indicates gram positive bacteria.

Conclusion

Bacteria were found on items such as the phone case, television remote, and pet's water dish. According to optic density readings, bacteria are more concentrated in the pet's water dish followed by the television remote, then the phone case. Bacteria grew better in the LB broth over the Nutrient broth because of the different types of food in each. According to gram staining, bacteria were primarily gram positive, which means they have a special protein coat. My hypothesis was incorrect because there were differences in growth per object.

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Newsletter Editor:

Julie Olson
kernelmom@gmail.com

Assistant to the Editor:

Michelle Bartels
Michelle.Bartels@k12.sd.us

Science Liaisons:

Jennifer Fowler
Drrangerjen@gmail.com

Larry Browning (SDSU)

Larry.Browning@sdstate.edu

Jeff Peterson

Jeff.Peterson@k12.sd.us

Sabrina Henriksen

Sabrina.Henriksen@k12.sd.us

Lindsay Kortan

LKortan@k12.sd.us

PAEMST Contact:

Jennifer Fowler
Drrangerjen@gmail.com

UPCOMING EVENTS

July 9

Neutrino Day

September 12

Newsletter Submissions due

Any member may submit lessons, ideas, links...

October 31

Speaker Proposals Due

for the SD STEM Ed Conference

February 2-4, 2023

SD STEM Ed Conference

Huron, SD

The SDSTA Newsletter is published four times a year and is e-mailed to 67 paid members. The membership year in SDSTA starts with the February conference and ends the thirty-first of January. Dues are due at each conference for member discount rates. SDSTA members may give a one year free membership to their student teachers by submitting the student teacher's name & address. One paid conference registration may be given to the SDSTA member that has made a submission to the newsletter (or given a presentation at the conference) and has referred at least three new members. Members may also earn a 10% finder's fee for any science related ads placed in the newsletter. Our rates are \$50 per page (or 3 to 4 quarter pages).



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Referred by _____

HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

Introduction:

In the 1860s, chemistry was a relatively new field, which studied the properties of elements and compounds and pushed out the previous study of alchemy (which focused on turning cheaper metals into gold through magic and pseudoscience). Dmitri Mendeleev was one of the people studying this new field, and he spent a lot of time learning about all of the roughly sixty elements that were currently known. He had a keen scientific mind and began noticing patterns in the properties of the elements. For example, he noticed that lithium, sodium, and potassium were all soft, shiny metals that were very reactive, especially with fluorine and chlorine. At this time, scientists knew most of these elements' atomic weights and some of their properties, but not much else.



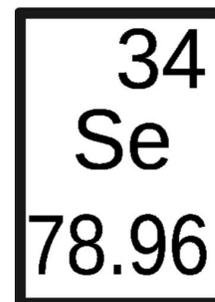
ОПЫТЪ СИСТЕМЫ ЭЛЕМЕНТОВЪ.
 ОСНОВАННОЙ НА ИХЪ АТОМНОМЪ ВѢСѢ И ХИМИЧЕСКОМЪ СХОДСТВѢ.

| | | | | | |
|--------|----------|------------|------------|-------------|-----------|
| | | Ti = 50 | Zr = 90 | ? = 180. | |
| | | V = 51 | Nb = 94 | Ta = 182. | |
| | | Cr = 52 | Mo = 96 | W = 186. | |
| | | Mn = 55 | Rh = 104,4 | Pt = 197,4. | |
| | | Fe = 56 | Rn = 104,4 | Ir = 198. | |
| | | Ni = 59 | Pt = 106,6 | O = 199. | |
| | | Cu = 63,4 | Ag = 108 | Hg = 200. | |
| H = 1 | | | | | |
| | Be = 9,4 | Mg = 24 | Zn = 65,2 | Cd = 112 | |
| | B = 11 | Al = 27,4 | ? = 68 | U = 116 | Au = 197? |
| | C = 12 | Si = 28 | ? = 70 | Sn = 118 | |
| | N = 14 | P = 31 | As = 75 | Sb = 122 | Bi = 210? |
| | O = 16 | S = 32 | Se = 79,4 | Te = 128? | |
| | F = 19 | Cl = 35,5 | Br = 80 | I = 127 | |
| Li = 7 | Na = 23 | K = 39 | Rb = 85,4 | Cs = 133 | Tl = 204. |
| | | Ca = 40 | Sr = 87,6 | Ba = 137 | Pb = 207. |
| | | ? = 45 | Ce = 92 | | |
| | | ?Er = 56 | La = 94 | | |
| | | ?Yt = 60 | Di = 95 | | |
| | | ?In = 75,6 | Th = 118? | | |

Д. Менделѣевъ

Mendeleev was perplexed, because he realized that many elements had similar properties regarding how reactive they were and which other elements they tended to react with, but the pattern had nothing to do with their atomic weights. He began organizing them based on their properties, grouping similar elements together. He noted that similar properties seemed to repeat *periodically*, roughly every seven elements for the first twenty elements or so. He shuffled his element cards around repeatedly, but kept finding gaps.

Finally, he realized his pattern wasn't incorrect, but he was missing particular elements. Based on the gaps in his periodic table, he was able to predict the properties and weights of elements that hadn't even been discovered yet. Later, Henry Moseley modified Mendeleev's work so that the elements were arranged by atomic number, rather than atomic mass, but Mendeleev is still given most of the credit for arranging the elements in a useful manner that demonstrates their repeating properties.



Objective:

Based on what you know about today's periodic table, your goal is to sort missing elements into the correct spot on the periodic table. Each card lists information about the missing element and an identification code. When you think your answers are correct, ask your teacher to check them.

Answers:

- Element #3: _____
- Element #5: _____
- Element #8: _____
- Element #9: _____
- Element #12: _____
- Element #15: _____
- Element #16: _____
- Element #18: _____
- Element #28: _____
- Element #29: _____
- Element #30: _____
- Element #36: _____
- Element #37: _____
- Element #87: _____

Periodic Table Mix-Up

Key:

- Alkali Metals
- Alkaline Earth Metals
- Transition Metals
- Other Metals
- Nonmetals
- Noble Gases
- Lanthanoids
- Actinoids

key

| |
|---------------|
| element name |
| atomic number |
| symbol |
| atomic weight |

| | | | |
|-------|--------|-----|-----------|
| C | Br | He | Tc |
| solid | liquid | gas | synthetic |

| | | | | | | | | | | | | | | | | | | |
|--------------------------------------|----------------------------|--|--|--|--|---|--|--|---|--|---|---------------------------------------|---|---|--|--|---------------------------------------|----|
| hydrogen 1 H 1.00794 | | | | | | | | | | | | | | | | | helium 2 He 4.002602 | |
| 3 Be 9.012182 | | | | | | | | | | | | | | | | | neon 10 Ne 20.1797 | |
| 11 Na 22.98977 | 12 | | | | | | | | | | | | | | | | | 18 |
| 19 K 39.0983 | 20 Ca 40.078 | scandium 21 Sc 44.95591 | titanium 22 Ti 47.867 | vanadium 23 V 50.9415 | chromium 24 Cr 51.9961 | manganese 25 Mn 54.93805 | iron 26 Fe 55.845 | cobalt 27 Co 58.9332 | 28 | 29 | 30 | gallium 31 Ga 69.723 | germanium 32 Ge 72.64 | arsenic 33 As 74.9216 | selenium 34 Se 78.96 | bromine 35 Br 79.904 | 36 | |
| 37 | 38 Sr 87.62 | yttrium 39 Y 88.90585 | zirconium 40 Zr 91.225 | niobium 41 Nb 92.90638 | molybdenum 42 Mo 95.94 | technetium 43 Tc [98] | ruthenium 44 Ru 101.07 | rhodium 45 Rh 102.9055 | palladium 46 Pd 106.42 | silver 47 Ag 107.8682 | cadmium 48 Cd 112.411 | indium 49 In 114.818 | tin 50 Sn 118.710 | antimony 51 Sb 121.760 | tellurium 52 Te 127.60 | iodine 53 I 126.9045 | xenon 54 Xe 131.293 | |
| 55 Cs 132.90545 | 56 Ba 137.327 | lanthanum 57 La 138.9055 | cerium 58 Ce 140.116 | praseodymium 59 Pr 140.90765 | neodymium 60 Nd 144.24 | promethium 61 Pm [145] | samarium 62 Sm 150.36 | europium 63 Eu 151.964 | gadolinium 64 Gd 157.25 | terbium 65 Tb 158.9253 | dysprosium 66 Dy 162.50 | holmium 67 Ho 164.930 | erbium 68 Er 167.259 | thulium 69 Tm 168.934 | ytterbium 70 Yb 173.04 | | | |
| | | 87 | 88 Ra [226] | actinium 89 Ac [227] | thorium 90 Th 232.038 | protactinium 91 Pa 231.0368 | uranium 92 U 238.0289 | neptunium 93 Np [237] | plutonium 94 Pu [244] | americium 95 Am [243] | curium 96 Cm [247] | berkelium 97 Bk [247] | californium 98 Cf [251] | einsteinium 99 Es [252] | fermium 100 Fm [257] | mendelevium 101 Md [258] | nobelium 102 No [259] | |

Notes: Elements with atomic weights in square brackets have no stable isotopes. Different sources list different atomic weights for elements. The difference arises from the differing atomic weights of various isotopes. We have tried to list the most stable isotope. For example, some sources list the atomic weight of seaborgium as 263 and others 266. The most stable isotope appears have an atomic weight of 266 so we list that weight here. Roentgenium is still the unofficial name of element 111 but it is the one recommended by the IUPAC so we list it here instead of the generic 'unununium'. Aluminum, cesium, and sulfur are the American spellings for aluminium, caesium, and sulphur. Announcements of discoveries of elements 116 and 118 were made and later retracted. This table was downloaded from http://www.science-teachers.com/printable_periodic_tables.htm

Unknown I

- Very reactive
- Lightweight, soft, shiny metal
- Properties similar to sodium, potassium, and caesium
- Atomic weight is less than 40.0

Unknown E

- Very reactive
- Metal
- Has two valence electrons
- Properties similar to beryllium and calcium
- Atomic weight is greater than 23.0

Unknown F

- Very reactive
- Lightweight, soft, shiny metal
- Properties similar to sodium, potassium, and caesium
- Atomic mass is greater than Unknown D

Unknown A

- Very reactive
- Lightweight, soft, shiny metal
- Properties similar to sodium, potassium, and caesium
- Has the lowest electronegativity of all unknowns

Unknown C

- Nonmetal
- Atomic mass is less than 20.0
- Has 3 valence electrons
- Exists naturally as a solid

Unknown K

- Nonmetal
- Typically has 8 neutrons
- Properties similar to selenium, tellurium
- Often found as a diatomic

Unknown H

- Very reactive
- Nonmetal
- Found as a gas
- Most electronegative of the unknowns
- Member of the halogen family

Unknown J

- Not reactive
- Nonmetal
- Found as a gas
- Second-lightest unknown in this group

Unknown D

- Not reactive
- Nonmetal
- Found as a gas
- Found in the same period as Unknown B

Unknown G

- Nonmetal
- Has 6 valence electrons
- Properties similar to selenium, tellurium
- Occurs naturally as a solid

Unknown B

- Nonmetal; solid
- Fairly reactive, but not as reactive as Unknown H
- Exists naturally as a solid
- Atomic mass is more than Unknown E, but less than Unknown J

Unknown L

- Solid
- Transition metal
- Conducts heat and electricity easily
- Heavier than Unknown F
- Contains 28 protons

Unknown N

- Solid
- Transition metal
- Conducts heat and electricity easily
- Properties similar to gold and silver
- Used often in wiring and plumbing

Unknown M

- Solid
- Transition metal
- Considered a poor metal
- Heavier than Unknown L
- Contains 35 neutrons