

SARSEF 2022

Southern Arizona Science and Engineering Fair.



Every child.
Thinking critically.
Solving problems.



SARSEF 2022

The Event

The Southern Arizona Regional Science and Engineering Fair (SARSEF) is an annual event with Pre-K to 12th grade students from across Southern Arizona.

Approximately 2000 projects compete at the SARSEF Regional Fair, and over \$100 000 in prizes, trips, and scholarships are awarded, thanks to community support.

Top high school students move on to international levels of competition.

The 2022 event was held at Reid Park in Tucson, Arizona on Saturday, 5 March 2022.

Normally, the fair is held indoors at the Tucson Convention Center, but due to COVID safety precautions, it was held outdoors this year



SARSEF 2022

The Booth

Items from NIST

“The SI Measurement System” handouts,
“The Guardians of the SI” action cards and stickers,
NIST Metric Conversion Cards.

Items from USMA

1 L square paper fold out cubes
250 mm plastic rulers.
A very nice Stabila 2 m folding ruler

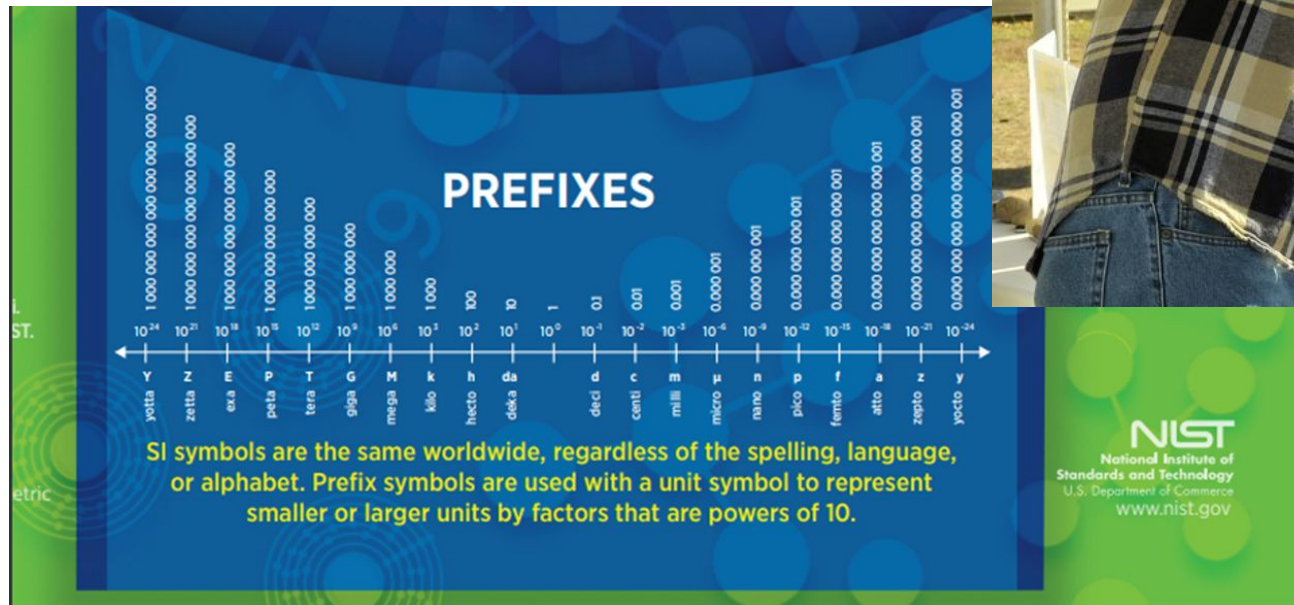
Self provided

NIST Metric program kids form to fill out with weight, height, temperature
USMA banner
Kitchen scale set in kg
Mass set (1 × 1 g, 1 × 2 g, 1 × 5 g, 2 × 10 g, 3 × 20 g, 1 × 50 g, 2 × 100 g, 2 × 200 g, 1 × 500 g)
1 1 L square cube filled with 1000 1 cm³ cubes, each weighing 1 gram
1 wooden meter stick
Garden thermometer with Fahrenheit covered;
Bathroom scale set to kilograms
Evian 500 mL and 1 L water bottles
Digital caliper set to millimeters
Vertical banners



Handouts

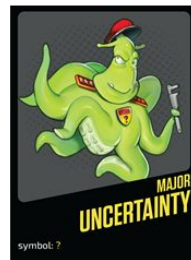
SP 304A – SI Measurement System Chart



SARSEF 2022

Handouts

*League of SI Superheroes Action Cards
and Stickers*



SARSEF 2022

Handouts

Plastic 25 mm rulers, 1 L paper cubes



Activities

Height

A Stabila 2 meter folding measurement stick was lashed to one of the ramada poles



Activities

Weight

A digital bathroom scale set to kilograms was placed on an aluminum plate to provide a stable base on the grass

An old fashioned analog kilogram scale might be better if available – the scale kept getting confused and resetting



Activities

Volume

A 10 cm on a side cube filled with 1000 1 cm³ cubes was used to explain the concept of the volume

Each 1 cm³ cube is 1 mL
1000 1 cm³ cubes is 1 liter

The cube was weighed on a kitchen scale and compared to the weight of the 1 L bottle of water



Activities

Measurement of Masses and volumes of water using kitchen scale

500 mL

1 L

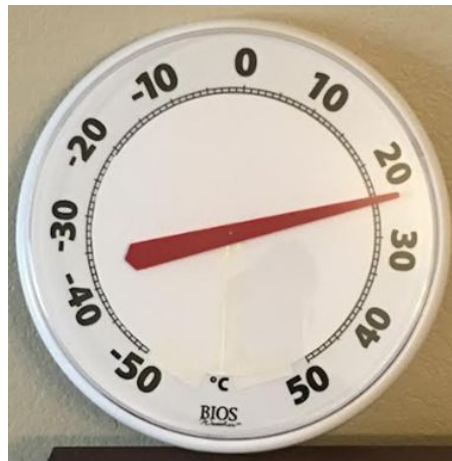
found Evian (from France) closer to true 1 L (1 kg) than local store brand – Store brand slightly underfilled



Activities

Temperature

A large garden thermometer with the Fahrenheit scale covered

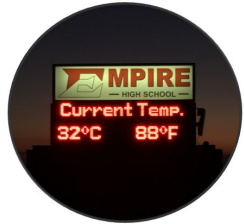


SARSEF 2022

Activities

Vertical Banners

Teach STEM outside the classroom
Put °C on the marquee!



USMA
U.S. Metric Association

Did you know?

All US customary measures are defined and calibrated to the SI metric system

Mendenhall Order

On 5 April 1901, T. C. Mendenhall, then Superintendent of Weights and Measures, with the approval of the Secretary of the Treasury, decided that the international meter and kilogram would be the future for the United States, both for metric and customary weights and measures. This decision has come to be known as the Mendenhall Order.



Thomas Conrad Mendenhall

The Mendenhall Order assumed a departure from the previous policy of attempting to maintain our standards of length and mass to be identical with those of Great Britain, and therefore there was a small difference between the British and the United States yards, a difference which may have been negligible in 1901 but which because of real importance in the British Imperial Y and for gradually changed to length and in the requirements for greater accuracy in measurements (metre).

Learn more at USMA.org/learn and Mendenhall-order



USMA
U.S. Metric Association

Learn more about
the Metric System
at USMA.org



USMA
U.S. Metric Association



FREE SI Teacher Kit



Contact: NIST Metric Program at TheSI@nist.gov

Include: Name, school, subject, grade level, phone number, and mailing address

SI BASE UNITS



SCAN HERE



FOR INFORMATION

NIST
National Institute of Standards and Technology
U.S. Department of Commerce



REGISTRATION IS NOW OPEN

Visit the [Calendar of Events](http://CalendarofEvents) to view the sessions and register

The NIST Metric Program is having a series of FREE 30-minute online sessions that are ideal for STEM educators and subject-area specialists and have implications for improving students' understanding of science and the measurement system of units (SI).

Info Session: Metric System Education Resources

Explore NIST Metric Program educational resources and other resources that help educators become familiar with the SI, commonly known as the metric system. Develop measurement quantity reference guides and learn more about SI bases.

Info Session: Metric System Estimation

This session continues the use of common estimation and unit-converting reference guides, and builds the participants' ability to estimate through the Metric Estimation Guide. You can focus on which helps middle school students become familiar with SI measurements by practicing estimation skills and be assigned to a group of students.

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NIST Summer Institute for Middle School Science Teachers

The National Institute of Standards and Technology (NIST) Summer Institute for Middle School Science Teachers is a two-week workshop for middle school science teachers featuring hands-on activities, lectures, tours, and visits with NIST scientists and engineers in their laboratories.

Applications Now Open!

This year's workshop dates are July 11-22, 2022.
The application deadline is April 30, 2022.

The Summer Institute is a two-week virtual workshop for middle school science teachers featuring hands-on activities, lectures, virtual tours with NIST scientists and engineers.

SCAN HERE



FOR INFORMATION

NIST
National Institute of Standards and Technology
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Tucson USMA Outreach to Local Teachers

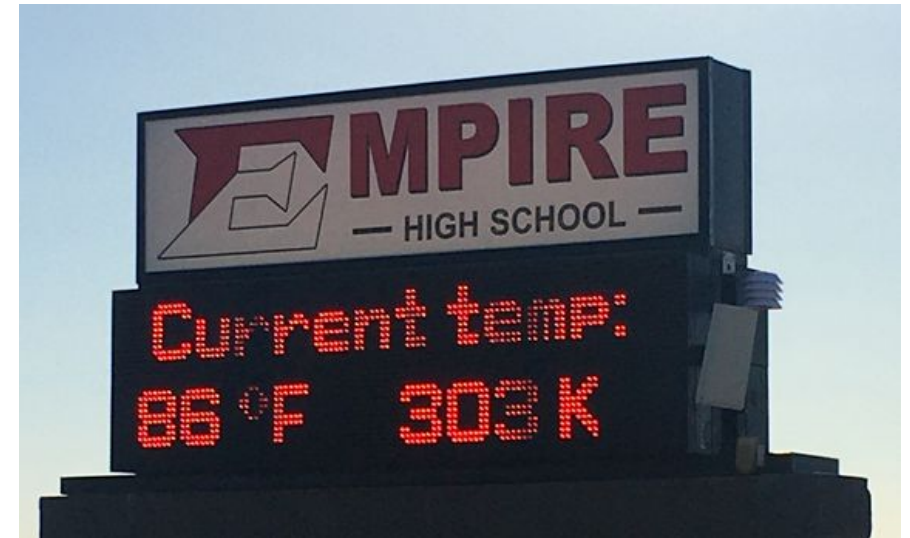
Getting SI teaching materials into the classroom

The largest group of people working to promote the use of the metric system in the United States are elementary and middle school teachers



Tucson USMA Outreach to Local Teachers

Getting SI units onto school marquees



Metric Week

Requesting Governors' Proclamations



METRIC WEEK

Metric Week



METRIC WEEK

State	No Sooner Than	No Later Than
California		Monday, July 11, 2022
Missouri		Wednesday, August 10, 2022
Indiana		Sunday, August 14, 2022
Kansas	Saturday, April 9, 2022	Sunday, August 14, 2022
Maryland		Sunday, August 14, 2022
New Jersey		Sunday, August 14, 2022
Pennsylvania		Sunday, August 14, 2022
Texas		Sunday, August 14, 2022
Georgia	Saturday, July 9, 2022	Thursday, August 25, 2022
Maine		Thursday, August 25, 2022
New Mexico	Saturday, April 9, 2022	Thursday, August 25, 2022
Rhode Island		Thursday, August 25, 2022
Virginia	Saturday, June 11, 2022	Thursday, August 25, 2022
Wisconsin		Thursday, August 25, 2022
Alaska		Sunday, August 28, 2022
Arizona	Saturday, April 9, 2022	Sunday, August 28, 2022
Florida		Sunday, August 28, 2022
Iowa		Sunday, August 28, 2022
North Carolina	Saturday, April 9, 2022	Sunday, August 28, 2022
North Dakota		Sunday, August 28, 2022
Utah		Sunday, August 28, 2022
Vermont		Sunday, August 28, 2022
Alabama		Friday, September 9, 2022
Arkansas		Friday, September 9, 2022
Kentucky		Friday, September 9, 2022
Massachusetts		Friday, September 9, 2022
Minnesota		Friday, September 9, 2022
Nebraska	Saturday, April 9, 2022	Friday, September 9, 2022
New Hampshire		Friday, September 9, 2022
Ohio		Friday, September 9, 2022

Oklahoma		Friday, September 9, 2022
Oregon		Friday, September 9, 2022
South Carolina		Friday, September 9, 2022
Tennessee		Friday, September 9, 2022
Washington		Friday, September 9, 2022
West Virginia		Friday, September 9, 2022
Colorado		Sunday, September 11, 2022
Connecticut	Monday, July 11, 2022	Sunday, September 11, 2022
Hawaii		Sunday, September 11, 2022
Illinois		Sunday, September 11, 2022
Michigan		Sunday, September 11, 2022
Nevada		Sunday, September 11, 2022
New York		Sunday, September 11, 2022
South Dakota		Sunday, September 11, 2022
Wyoming		Sunday, September 11, 2022
Delaware		Sunday, September 18, 2022
Idaho		Sunday, September 18, 2022
Louisiana	Monday, July 11, 2022	Tuesday, September 20, 2022
Montana		Sunday, September 25, 2022
Mississippi		
Guam		
Puerto Rico		Monday, July 18, 2022
Virgin Islands		Sunday, August 28, 2022

Henry Knoepfle

Henry Knoepfle is an electrical engineer for a Tucson Arizona aerospace company. His elementary school years coincided with the Ford and Carter Administrations, when the United States was “no kidding” going metric. Consequently, he was never taught US Customary units anytime during his elementary, junior high, or high school years. Concurrently, Henry lived in Rio Rico Arizona, 12 km north of the US-Mexico border along Interstate 19, then under construction. I-19 was and is the only Interstate in the United States to be signed in metric. This has always been a point of pride, and seeing non metric signs along a newly constructed portion of the I-19–I-10 interchange is what motivated Henry to join the US Metric Association in 2021.

