

Building the Next Generation of Metrologists:

Opportunities to Improve SI Education and Scientific Literacy at 150 Years and Beyond



Elizabeth Benham, NIST Office of Weights and Measures, Metric Program Leader
Katrice Lippa, NIST Office of Weights and Measures, Chief

nist.gov/metric TheSI@nist.gov

Challenges

Inconsistent SI instruction in primary and secondary education creates workplace knowledge gaps.

- Educators lack training to effectively teach SI concepts.
- Learners struggle with complex SI definitions—defining constants vs. physical objects.
- Textbooks and online SI resources use outdated or inconsistent information.
- Competing STEM priorities.
- Insufficient classroom hands-on measurement tools.
- Lack of engaging videos, simulations, and activities for students.



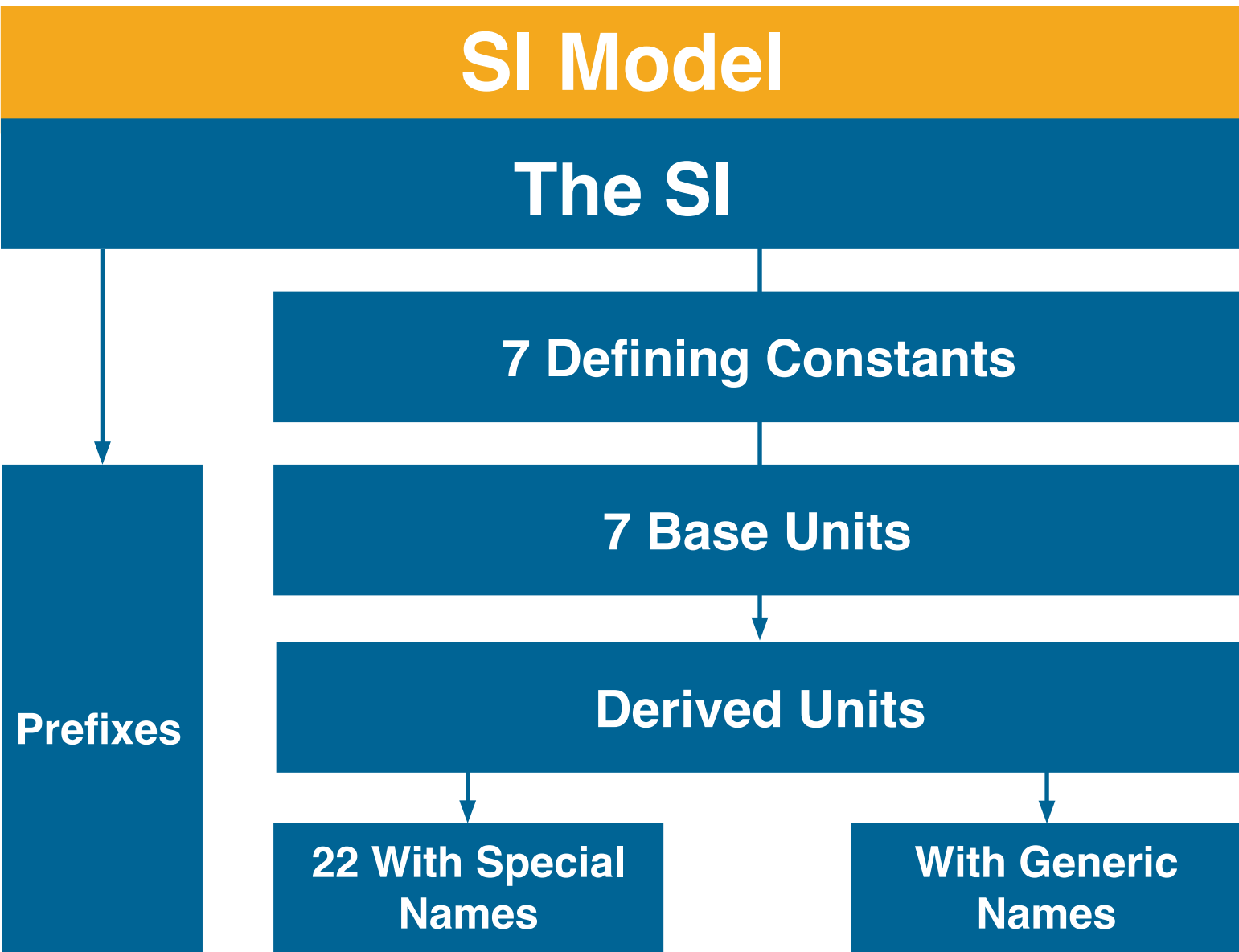
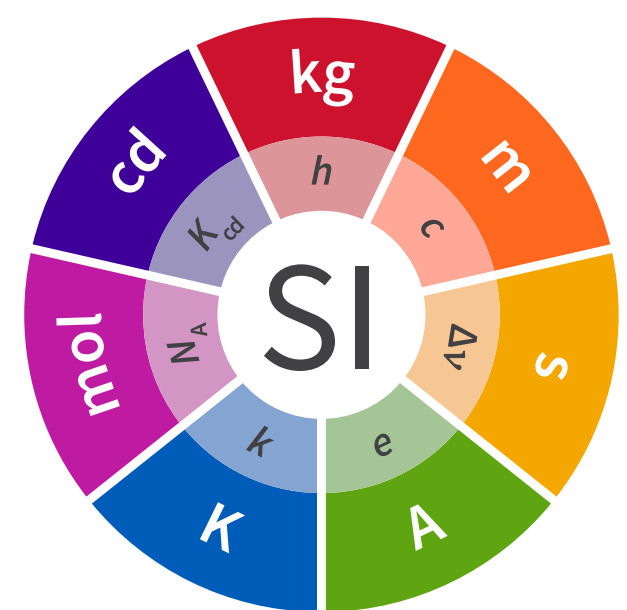
Opportunities

- Cultivate the next generation of metrologists.
- Leverage regionally developed SI education resources.
- Collaborate within global metrology communities.



Call to Action

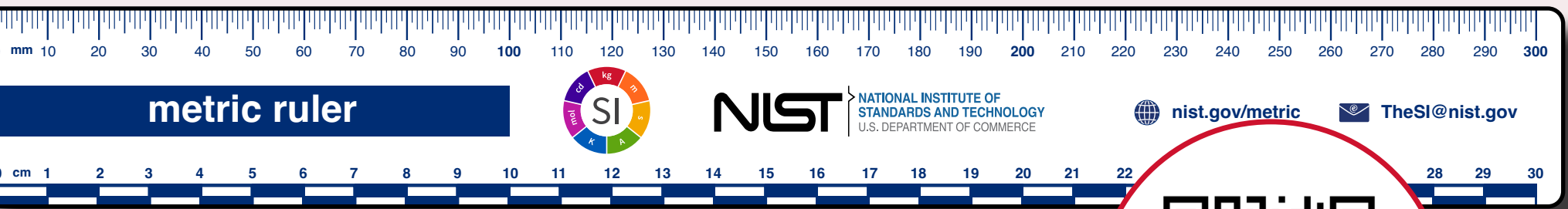
- Develop a common SI education message.
- Focus on the basic SI elements (see SI Model).
- Simplify concepts for age-appropriate learning.
- Create free classroom and laboratory resources to deepen SI understanding.
- Develop SI instructional guidance for textbook editors and instructional designers.
- Integrate SI concepts into university courses, training, and professional development.



Ages 5+

nestr.nist.gov

Metric Estimation Game: Metric Meal.



Classroom Ruler.



Discover Resources

Credit: NIST, Adobe Stock.

Ages 10+

Watch the Video

D.I.Y. Kibble Balance.

Download

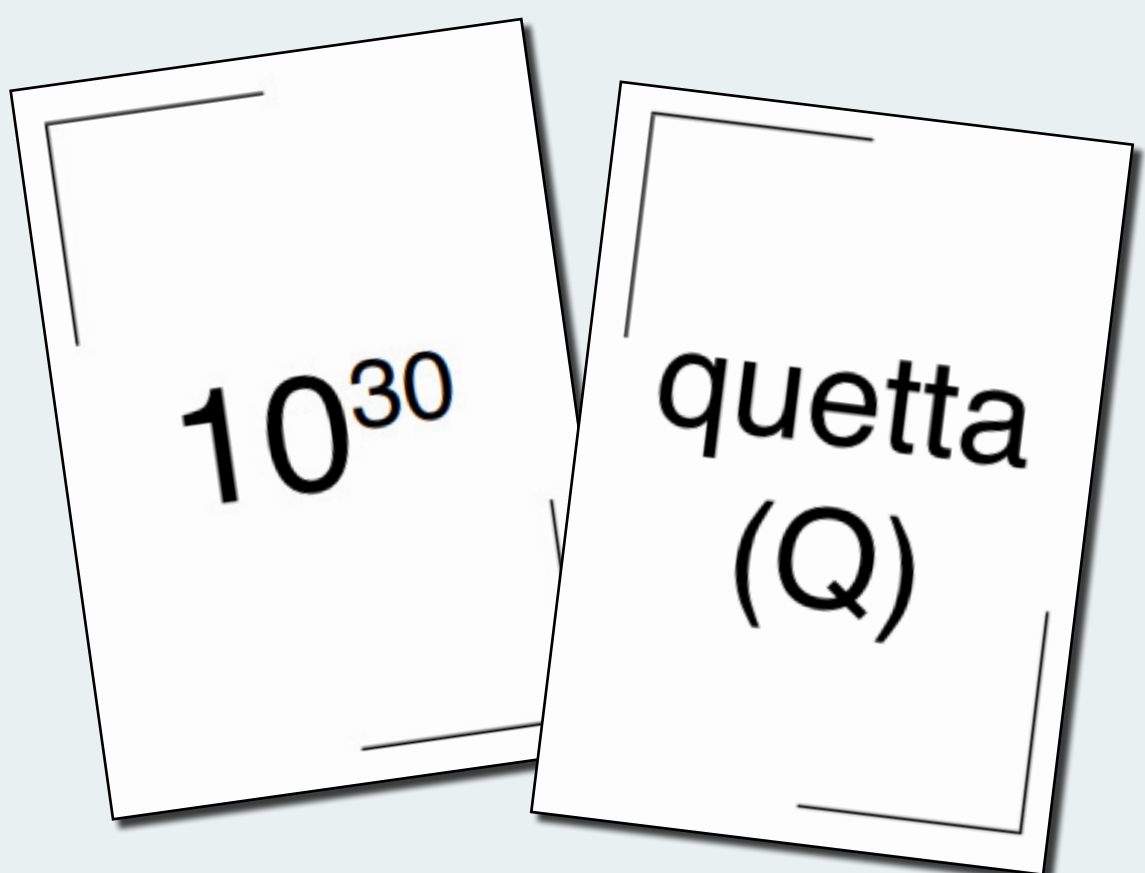


Measurement League: Guardians of the SI Superheroes Card Set.

Ages 15+

Download

Students enjoy playing Find the Match: Prefixes Game.



SI Units Card Deck.

Adult Learner

Learn More

Fundamentals of Metrology Course.

References
Benham, E. and Dill, K. (2024). *NIST Metric Ruler* (Special Publication 376), National Institute of Standards and Technology, Gaithersburg, MD.
Jagoda, D. and Benham, E. (2023). *NIST SI Units Card Deck*, (Special Publication 1297), National Institute of Standards and Technology, Gaithersburg, MD. DOI: 10.6028/NIST.SP.1297.
NIST Physical Measurement Laboratory (2015). *How to Build Your NIST D.I.Y. Kibble (Watt) Balance*, National Institute of Standards and Technology, Gaithersburg, MD.
Velychko, O. and Gordiyenko, T. (2022). *Evaluation results of COOMET Key Comparison of Power*. 25th IMEKO TC4 International Symposium 23rd International Workshop on ADC and DAC Modelling and Testing IMEKO TC-4 2022. DOI: 10.21014/tc4-2022.18.