



METRIC MANIA AND DATA CRUNCHERS

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NC SCIENCE OLYMPIAD
COACHES CLINIC

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<http://bit.ly/metricdata>

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METRIC MANIA

[HTTPS://WWW.SCIENCENC.COM/RESOURCES/ELEMENTARY/METRICMANIA/](https://www.sciencenc.com/resources/elementary/metricmania/)



EVENT DESCRIPTION

Teams will demonstrate their understanding of metric measurement by estimating and measuring length, mass, fluid volume, angles, and temperature and be able to make calculations based on these measurements.

HIGHLIGHTS OF THE RULES

Teams of up 2

Maximum time of 60 minutes

Students should bring **NOTHING** with them. Writing instruments will be provided.

Station format

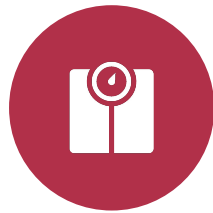
Points awarded for accuracy of responses.

Ties broken accuracy or quality of answers on pre-determined questions by the event leader.

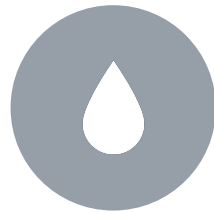
WHAT SHOULD TEAMS MEASURE?



ANGLE
DEGREE



MASS



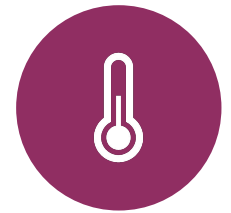
FLUID
VOLUME



LENGTH



AREA



TEMPERATURE

WHICH MEASUREMENTS ARE APPROPRIATE?

■ mg

■ g

■ kg

■ mm

■ cm

■ m

■ km

■ ml

■ l

■ kl

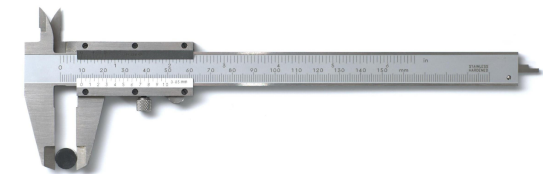
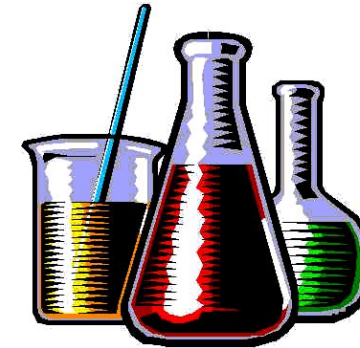
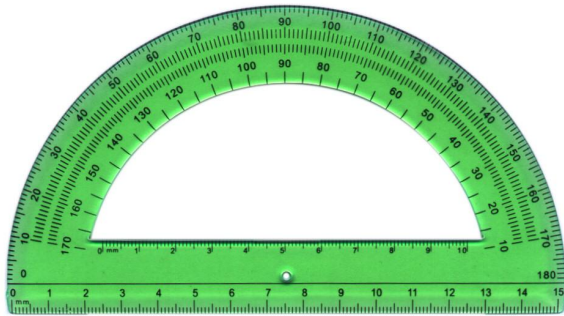
■ °C

■ K

■ cm²

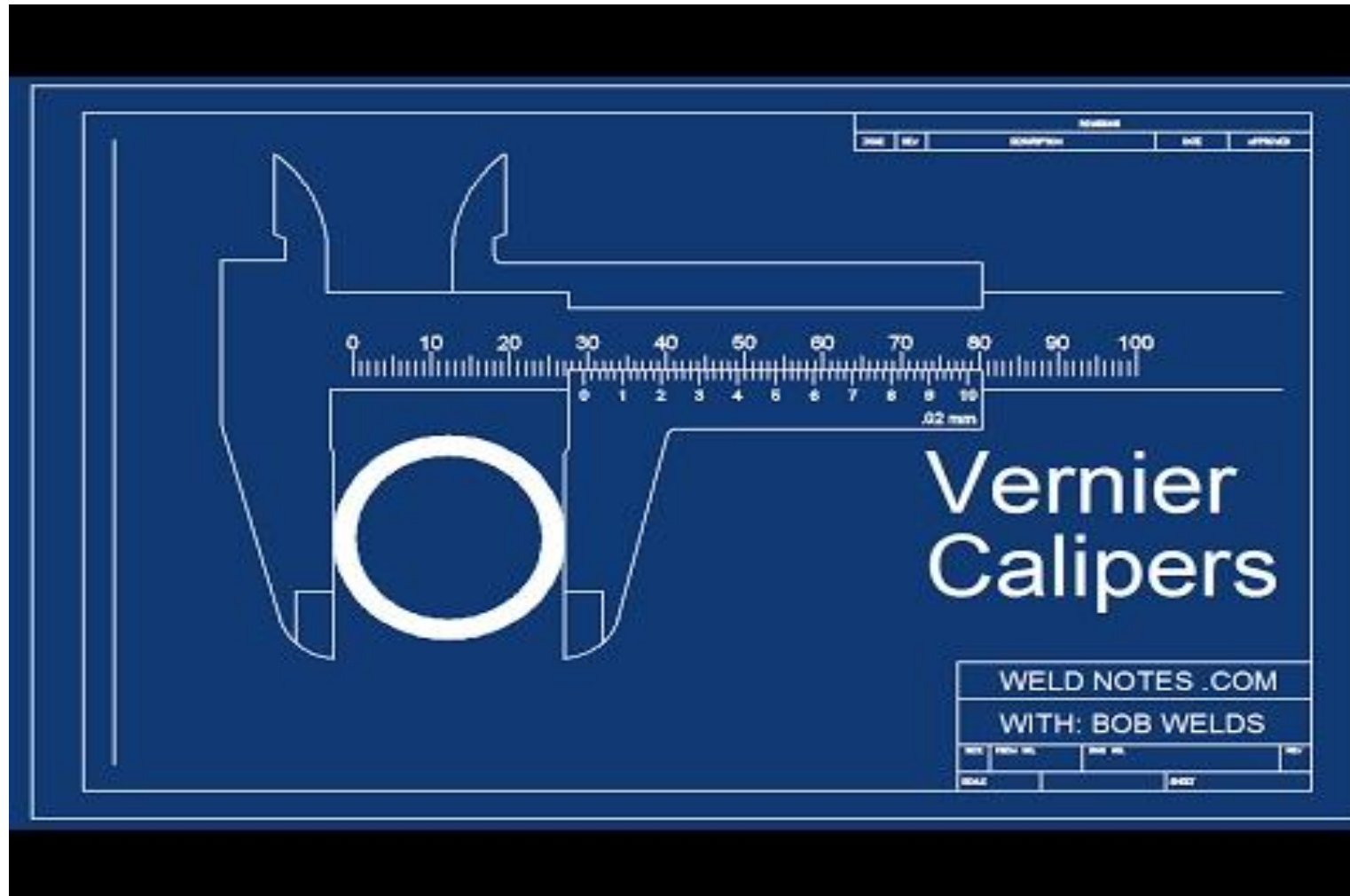
■ cm³

TOOLS TO USE



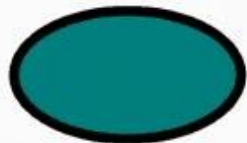
rulers, calculators, protractors, meter tapes, meter sticks, electronic and/or triple beam balances, beakers, Erlenmeyer flasks, graduated cylinders, thermometers, calipers

HOW TO USE CALIPERS

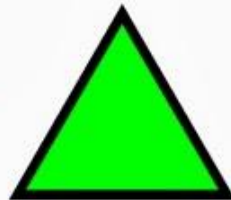




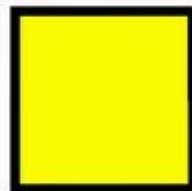
circle



oval



triangle



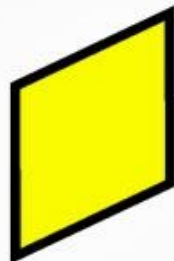
square



trapezium



diamond



rhombus



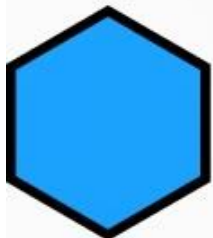
parallelogram



rectangle



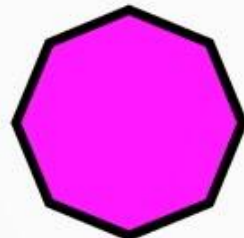
pentagon



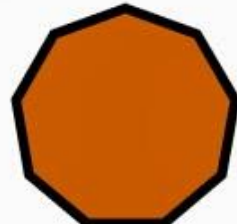
hexagon



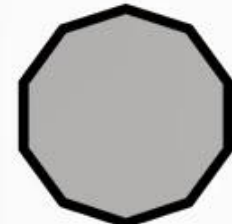
heptagon



octagon



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LINES, ANGLES, AND SHAPES

CALCULATE

Measure and calculate the volume of a rectangular prism, a liquid in a container, or an irregularly shaped object given water and a graduated cylinder

HOW TO PREPARE



work with your Data Crunchers group- have MM group do the measurements and provide the data to DC to make their charts



measure ALL KINDS of objects especially irregular objects



expect accuracy, to smallest degree possible- PRECISION counts!
Have each teammate measure the item and compare for accuracy



give students experience working with all possible tools, in various sizes



students should make sure to use correct unit- many tools have multiple units



multiple tools may be available- must know which tool to use

ESTIMATION 180

How many pieces of candy corn are in the bag?



<http://www.esteemation180.com/day-26.html>

USEFUL LINKS

- Measurement activities and games: <https://www.education.com/activity/measurement/>
- Videos and games about measurement: <https://www.neok12.com/Measurements.htm>
- Tools and measures: <http://science.jrank.org/kids/pages/190/Measurement-Tools.html>
- Estimation 180 <http://www.estimation180.com/>
- Measurement activities: <https://www.mtiinstruments.com/knowledge-center/15-measurement-activities-for-students/>
- Shapes and Angles: <https://www.theschoolrun.com/what-are-the-properties-of-2d-and-3d-shapes>



DATA CRUNCHERS

[HTTPS://WWW.SCIENCENC.COM/RESOURCES/ELEMENTARY/DATA-CRUNCHERS/](https://www.sciencenc.com/resources/elementary/data-crunchers/)



EVENT DESCRIPTION

Teams should be able to create and interpret data tables, bar graphs, line graphs, pie charts, and pictographs and perform simple experiments to collect data, graph their results and make predictions.

HIGHLIGHTS OF THE RULES

Teams of up 2

Maximum time of 60 minutes

Students should bring writing utensils with them.

Station format

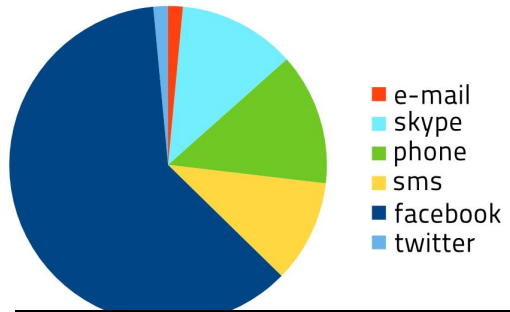
Points awarded for accuracy of responses.

Ties broken accuracy or quality of answers on pre-determined questions by the event leader.

STUDENTS SHOULD BE ABLE TO...

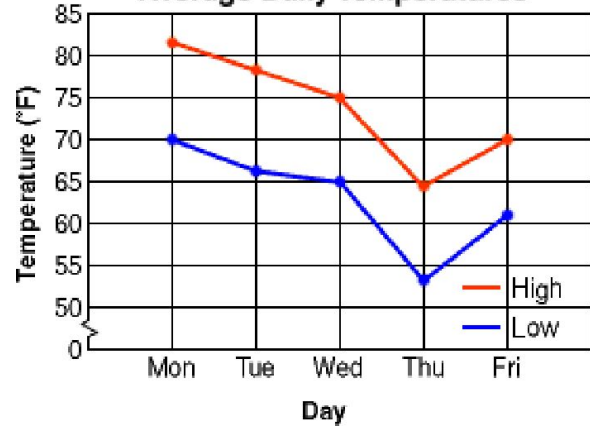
- Plot data points, make and interpret data tables
- Draw and interpret graphs, including what trends can be predicted from the data shown.
- Make estimates of data between or beyond the data points given.
- Identify types of questions when collecting data
- Calculate fractions or percentages based on charts, tables, data or objects.
- Calculate the mean, median, mode, and range for a set of data.
- Identify outliers in a set of data.
- Distinguish between accuracy and precision.

Birthday wishes by channel



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Average Daily Temperatures



GRAPHS

Student's Favorite Color



Chips	
Chocolate	
Candy	

- = 10 items sold
- = 10 items sold
- = 10 items sold

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Numerical



Categorical



Data that changes over time

QUESTION TYPES

USEFUL LINKS

TUVA: Data sets, graphing, analysis: <https://tuvalabs.com/>

EMOJI Data: <https://www.easel.ly/blog/make-data-literacy-fun-students/>

Graphing Activities: <http://www.mathblaster.com/parents/math-activities/graph-activities>

Making different types of graphs: <https://nces.ed.gov/nceskids/createagraph/>

Digital bar graphs: <http://www.shodor.org/interactivate/activities/BarGraphSorter/>

CODAP graphing: <https://codap.concord.org/help/basics/graphs>

USEFUL LINKS

Variety of graphs to discuss and describe <https://www.nytimes.com/column/whats-going-on-in-this-graph>

Lessons and activities for graphs https://www.mathgoodies.com/lessons/toc_voll1

Legos and fractions <https://www.simplemost.com/use-lego-bricks-fun-way-teach-children-math/>

Legos for Mean, Median, Mode and Range <https://bit.ly/2ldp7Lo>

Bar graph activities: http://www.softschools.com/math/data_analysis/bar_graph/activities/

Accuracy vs Precision: <https://manoa.hawaii.edu/exploringourfluidearth/physical/world-ocean/map-distortion/practices-science-precision-vs-accuracy>

Work with the Metric Mania team to collect data.

Graph anything the Metric Mania team has measured.

Ask questions!

Predict

Bring in graphs from the news, magazines, ads, etc. Ask questions!

Have the students create a survey, decide the best audience for the survey, collect the data and graph it.

HOW TO PREPARE

Thank

You