

## Thread NSTA Metric System question

Hello,

I have a question. Do you teach the metric system and conversions as part of your physical science class? (ninth grade)

The reason why I ask: At a class today we were supposed to bring a unit to rework. I pulled out what I teach first quarter and it focuses on measurement. The only other physical science teacher there looked at me and said "I don't do that."

I spend a lot of time getting kids up to speed on making good measurements. I don't find the metric system in the Iowa core. There are references to measurement and metric units are used in the examples, but there is nothing explicit. I just assume it's something they need to know. I'm wondering if anyone else feels the same way.

Nanette

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Then your colleague isn't looking at the core. The measurements listed in the core are ALL in metric. The earth science component discusses movement of plates in cm/year. The physical science section deals with a mousetrap car which must move 5 meters. The life science section specifies an activity examining life in a 1 m<sup>2</sup> area, etc.

We actually teach our grade 11 math students the imperial system and they all think its the dumbest thing ever. Their parents however are familiar with it because it only died out here very recently.

I like how units of temperature, distance, mass etc. all scale by 10, but we still use 60 second per minute like imperial time. We don't have 10 second minutes, 10 minute hours, 10 hour days. 10 day weeks.

Perry

"A teacher that can be replaced by a machine should be" - Arthur C. Clarke

----- Original Message ----- From: Peggy WILSON <[PeggyWILSON@aseschool.org](mailto:PeggyWILSON@aseschool.org)> To: Perry Schlanger <[lists@mrschlanger.com](mailto:lists@mrschlanger.com)> Cc: Nanette Fladung <[nanfladung@gmail.com](mailto:nanfladung@gmail.com)>, [physicalscience@list.nsta.org](mailto:physicalscience@list.nsta.org) Sent: Thu, 31 May 2012 20:14:00 -0400 (EDT) Subject: Re: metric system?

I don't understand teaching science without the metric system . In 8th grade PS, it is the language we speak. BUT, I have them learn only the measurements used most often. Kilo. Milli, centi, no

hecto, nano because it's fun (we research the research and they love it). I try to keep it simple but consistent.

Sent from my iPhone On May 31, 2012, at 6:56 PM, "Perry Schlanger" <[lists@mrschlanger.com](mailto:lists@mrschlanger.com)<mailto:[lists@mrschlanger.com](mailto:lists@mrschlanger.com)>> wrote:

Then your colleague isn't looking at the core. The measurements listed in the core are ALL in metric. The earth science component discusses movement of plates in cm/year. The physical science section deals with a mousetrap car which must move 5 meters. The life science section specifies an activity examining life in a 1 m<sup>2</sup> area, etc. We actually teach our grade 11 math students the imperial system and they all think its the dumbest thing ever. Their parents however are familiar with it because it only died out here very recently. I like how units of temperature, distance, mass etc. all scale by 10, but we still use 60 second per minute like imperial time. We don't have 10 second minutes, 10 minute hours, 10 hour days. 10 day weeks. Perry "A teacher that can be replaced by a machine should be" - Arthur C. Clarke On May 31, 2012, at 7:32 PM, Nanette Fladung wrote: Hello, I have a question. Do you teach the metric system and conversions as part of your physical science class? (ninth grade) The reason why I ask: At a class today were were supposed to bring a unit to rework. I pulled out what I teach first quarter and it focuses on measurement. The only other physical science teacher there looked at me and said "I don't do that." I spend a lot of time getting kids up to speed on making good measurements. I don't find the metric system in the Iowa core. There are references to measurement and metric units are used in the examples, but there is nothing explicit. I just assume it's something they need to know. I'm wondering if anyone else feels the same way.

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In my NJ district, by middle school, ALL measurements and calculations are in the decimal/metric system. We do NOT teach conversion. Personally, I think that converting is a wasted step and doesn't have much use, with a few exceptions:

- 1) students do need to know the critical temperatures 0, 37C, 100C, 32F, 98.6F, 212F, as well as a basic sense of distance (a millimeter is the thickness of a paper clip, a centimeter the length of a fingernail, and how long is a 5K race anyway?)
- 2) when it's useful to use English system references, for example in teaching acceleration: "A car goes from 0 to 50 miles per hour in 5 seconds." Students can relate to that.

My unfounded recollections are that I think the USA was one of the 18th Century leaders in moving to a decimal currency, the system of 60's is still left over in geometry (360 days - degrees in a circle?), and the French proposed days of 10 hours of 100 minutes, too radical. And that Burma (Myanmar) is the the penultimate holdout in embracing the metric system. Corrections are very welcome (I haven't ground truthed any of this).

Don Dean  
Oakland NJ Schools  
Project Amazonas Reforestation and Environmental Education

<http://projectamazonastree.wordpress.com/>

Also, made a cubic meter out of PVC pipe and they make cc out of card stock. Amazed how many go in there ! Also on mL water fits in that little cube and masses I g. Cool

Sent from my iPhone

> *Also, made a cubic meter out of PVC*

We do this with meter sticks (first four students who figure out how many sticks it takes makes the thing), then we stuff a few kids inside... good for eighth graders

Don Dean  
Oakland NJ Schools  
Project Amazonas Reforestation and Environmental Education  
<http://projectamazonastree.wordpress.com/>

Remember, too, that a space probe missed its mark because of a confusion between miles and kilometers.

Bob Drake

On Friday, June 1, 2012, wrote:

My husband is an offshore operator all his work is in metric.. none in American Standard.. you better get them ready for basic jobs which if you look at any container it has both metric and American ..required for distribution.. check out the history of measurement:  
<http://lamar.colostate.edu/~hillger/laws/metric-act.html> or  
[www.math.utep.edu/Faculty/.../20021025%20Metric%20System.ppt](http://www.math.utep.edu/Faculty/.../20021025%20Metric%20System.ppt) All the new juice containers with the smarter size to fit in the Frig door ??? hello liter size.. just like cold drinks.. .. the short fall is the education system.. which seem to have problems everywhere.. As the teacher from Canada replied they start in kindergarten ..good luck with that in most school..

Judy Reeves Louisiana middle school

-----Original Message----- From: "Tommy Franklin" <[frankltd@k12tn.net](mailto:frankltd@k12tn.net)> Sent: Thursday, May 31, 2012 10:43pm To: "Peggy WILSON" <[PeggyWILSON@aseschool.org](mailto:PeggyWILSON@aseschool.org)> Cc: "Perry Schlanger" <[lists@mrschlanger.com](mailto:lists@mrschlanger.com)>, "Nanette Fladung" <[nanfladung@gmail.com](mailto:nanfladung@gmail.com)>, [physicalscience@list.nsta.org](mailto:physicalscience@list.nsta.org)  
Subject: Re: metric system?

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Nanette,

I do teach 8th graders in physical science, how to convert from English to Metric units. To introduce the unit, I introduce both systems and the errors (some are devastating) made because both system exist. Following the intro, conversions are taught. Dimensional analysis is used to convert English to metric, and factors of ten to navigate within the metric system. This unit is taught prior to motion, fluids, and machines. Dimensional analysis prepares them for some of the math used in the physics units to come, and it introduces students to the prefixes and names used in the metric system. I also teach how to take accurate measurements at the end of the metric unit. After teaching them conversions, only metric units are used in the course.

It seems more difficult to teach them about units, at the same time we are teaching them the algebra necessary for introductory physics. My vote is to teach the conversions and measurements first.

My two cents.

Meeta Evers  
St. Louis

Sorry if I was unclear: I'm in Canada. Our kids learn metric from kindergarten. Its the senior level students who we introduce to the imperial system so they can communicate with American customers/suppliers, etc. Most of them wouldn't know a mile from a fathom, furlong, or rod.

Perry

"...died out recently?" "Imperial?"

The better term is U.S. customary. The true Imperial gallon was 5 of our quarts, and the British pint beer glass is bigger than our pint (1.2 U.S. pints).

Gas and paint in the U.S. is still sold in gallons, paint in quarts and pints. Speed signs are in miles per hour, mileage in MPG (miles per gallon). Speedometers are in miles per hour and odometers are in miles.

Butter, sugar and flour comes in pounds, not kilograms. Temperature is almost exclusively in Fahrenheit here. Food calories (Cal = kcal) are the norm, not joules.

And if you read the car reviews published by the Guardian (U.K.) they still state gas mileage and acceleration in time to 60 miles per hour.

Canada has done better in terms of metric but in the U.S. we do students a disservice if we do not teach both systems and conversions between the two.

Great stuff for conversions using dimensional analysis. And the temperature conversions are great logic problems. I used to make up my own scales with different boiling and freezing points and have students convert to/from them.

[http://en.wikipedia.org/wiki/Imperial\\_units](http://en.wikipedia.org/wiki/Imperial_units)

In the U.S, air conditioning calculations are based on the Rankine absolute scale and Fahrenheit rather than Kelvin and Celsius. You would think engineers would "know better." Of course it could be because "customary" functions well.

[http://en.wikipedia.org/wiki/Rankine\\_scale](http://en.wikipedia.org/wiki/Rankine_scale)

Bob Drake

Am pleased u mentioned not teaching conversions. I don't either. There are charts for that if ever someone were in a need to convert. Need to get them up to speed on basic metric

I do the same! I call it "SI for Dummies ". They should be able to move between these 3 prefixes and the base unit. If they need to convert between systems they can Google it!

Thanks everyone. It's nice to hear that I'm not nutty. I was just shocked when someone said they don't teach measurement. I will keep chugging away and working on my lesson plans.

Nanette

I agree, when I start getting into dimensional analysis that is when I teach metric-english conversions, we usually have already done work with metric measurements, but using these two systems that they are now familiar with is a great starting point to get into DA. Two birds with one stone in my mind, give them the conversions, that living in the states they need to understand to relate their science learning to their "real" world, and have a nice and tidy starting point for DA. Hooray.

-Korin Meyer

I agree (almost) completely with Meeta below. When my 9th grade physical science students hit chemistry and physics, those teacher report that their comfort level (even after 2 years) with dimensional analysis in conversions gives them a leg up on the 9th graders who skipped directly to biology.

I do occasionally throw in english units for reinforcement throughout the year, but I **\*\*rely\*\*** on "miles per hour...per second" to get them thinking about acceleration. In my suburban school, everyone spends (too much) time in cars, so they all intuitively think in miles per hour, and most have heard "zero to 60 in x seconds". Mustangs vs. minivans. MUCH more memorable than "meters per second ... per second", or, heaven forbid, "meters per second squared". Then on day 2, we do the conversions and start using them interchangeably.

-Mark Holthouse  
Math, Science & Engineering  
Westwood (MA) High School

Keep in mind that the United States does have a federal law on the books regarding the required use of the metric system. The metric system **MUST** be used on any and all products that are shipped outside of our borders - hence we can't ship a "gallon" on paint to Canada, we are required to also put the value in metric. This is the reason why American industry has the two values on their products not because they have "seen the light". It's obviously easier to make a 2L soda bottle than two different sizes one for the US and one for the rest of the world.

The reason why we don't have the metric system in the United States for the consumer is both due to the reluctance of Congress to mandate it (and this is not a discussion of Congress please) as well as the end user (that would be all of us) to accept it. The conversion over process wasn't exactly quick and easy for the Canadians either.

I've also gone ahead and attached a short written homework assignment about the metric system and the error associated with the initial measurement of the meter. The other two files are the audio from the Canadian Broadcasting Company that will be needed for the assignment.

Enjoy!

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David Thesenga  
Science Teacher  
Lake Forest Country Day School  
science6.lfcds.org & science8.lfcds.org

I only teach the metric system as well. But it is just a measurement system, it is not science. My chemical engineering days were based on the english system of units. Vessels are sized at, e.g. 2,000 gallons, not 7.5 cubic meters. And if you go into U.S. plants today, you will see pressure gauges reading psi, not KPa.

We do our students a disservice if we make no connection to the world they live in. One day they will buy air conditioners or refrigerators rated in BTU's. They need to know what these units mean as well.

Ron Brandt

I started talking about healthcare because Perry mentioned he was from Canada where metric starts in kindergarten.

We may have liter and 2 liter bottles of Coke, but smaller ones are 20 oz and 16 oz and 7 oz.

Our kids need to know both systems. Yes they can ask Siri, like Samuel L. Jackson does, about ounces in a cup, but it helps to know "a pint's a pound the world around" as well as cups in a pint, pints in a quart, quarts in a gallon. We still have gallons because there is no equivalent useful metric equivalent.

Canada also has eliminated paper dollars and 2-dollar bills (substituting the loonie and the twonie) and most recently the penny. Meanwhile our Congress worries about \_\_\_\_ (fill in whatever).

Have a great weekend.

Bob Drake

I should say that I teach 8th graders, a few of whom are in geometry, a few in pre-algebra, the rest in algebra, algebra honors. It is a mess for me as they are all mixed up in physical science. They all go directly to biology or biology honors in 9th grade. I also use English units when we need to get a feel for speed, and try to go back and forth between systems. I am forever grateful that the meter is close to the yard! (Football is king here in Texas so at least I have the field as a reference.)

It seems I spend a year getting the bulk of them to grasp density as a derived quantity. (Really. I introduce it in the fall and revisit it every chance I can.) My goal is for them to speak some metric when they go to high school. Unfortunately, most of them act like they have never heard of it.

I start the year in my Level-1 Physics class (11th and 12th graders, who already had Chemistry) with a measurement Lab.. They have to measure the Length, Width and Height of our classroom and calculate the volume. They must take the measurements in Feet & Inches as well as Meters. Many students complain about having to use metric measurements until they try to calculate the volume of the room by multiplying  $49\text{ ft } 4\frac{5}{8}\text{ in} * 24\text{ ft } 8\frac{1}{8}\text{ in} * 12\text{ ft } 7\frac{3}{8}\text{ in}$ . Metric wins every time with  $15.05\text{ m} * 7.52\text{ m} * 3.85\text{ m}$ . After that, only the most chronic complainers still hold out for non-metric measurement. Lucky for them that I don't have any instrument to measure slugs of mass.

Peter Tordo  
Framingham HS

From the National Institute of Standards and Technology loads of information on abbreviations derived units see <http://www.nist.gov/pml/div684/fcdc/upload/sp330-2.pdf>

This is a really good reference book should be on every science teachers computer. You can download the pdf for free.

Science students should be taught to convert within SI units, but no conversions to the English system. Of course some of my students found moving the decimal point a challenge. I guess this should be no surprise as they cannot make change in a system which is also base 10. Anyway all measurements should be made in SI.

VA

Very true, but this doesn't necessarily mean that we need a whole separate unit on measurements. Talk about psi and kPa in the units that they fit in and re-emphasize the connections between the prefixes if needed for the level of teaching. I thought that was the original question: Do people teach a separate unit on measurement? Maybe that wasn't the question....

On Fri, Jun 1, 2012 at 3:03 PM, Ronald Brandt <[reb124@aol.com](mailto:reb124@aol.com)> wrote:



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