Taken from the book, Taken by Storm by the scientists, Essex and McKitrick, who took Mann et al. to task, is the following conundrum designed to get us to look at what average temperature really means:

- Take 4 thermometers. Find a place for them in a room or in your home. Leave them for several months. For an example. Let's say I had placed these in one of my rooms during the winter and took the temperature of each thermometer on that day. Values were (in Celsius): 17°, 19.9°, 20.3°, and 22.6°. I could have put one in my coffee, another near a window, one near the ceiling and another near a vent. All locations and environments are allowed as they all contribute to the "average temperature".
- Now, imagine several months have passed. Open the windows on a spring day and allow the air to circulate through the house/room where the thermometers lie. Imagine you read the temperatures on the thermometers. They each now read 20°C.
- Now, average the results from both times. In the winter, the first situation with temperatures of 17°, 19.9°, 20.3°, and 22.6°, the average temperature of my house turns out to have been 19.95°C. In the spring, after I opened the windows, the average comes out to be 20°C. *So, in this case, the "average" went up from winter to spring.*

But there is another way to look at this. I just took the average of numbers; numbers are just numbers. What we're trying to get at is the energy of the molecules – that's what heat is. After all, aren't we interested in whether the heat has gone up or down? So, I want to consider the average of the kinetic energy represented by those numbers. To find the average of kinetic (moving molecules) energy, i.e. heat, a different formula is used – the kinetic energy rule.

- The "kinetic energy rule" requires that the numbers are first squared, and then added together; after this, divide by four; then the square root is taken.
- The result of averaging the kinetic energy of the room in winter is 20.05°C.
- The result of averaging the kinetic energy of the room in the spring, with the windows open, is 20.0°C. *In this case, the "average" went down from winter to spring.*

This is from Taken by Storm, by Essex and McKitrick, the mathematics guys who took on the procedures followed by Mann et al. in their analysis of the hockey stick.

They say that global temperature doesn't exist; it is a statistic, as the world in not in thermodynamic equilibrium. They emphasize that temperature only means something locally, as thermodynamic conditions vary from point to point. They emphasize that temperature is not energy. That the global temperature has little physical meaning doesn't mean that there isn't global climate change, it's just that the one number isn't capable of telling us much, because it is a statistic, not representative of a change of something physical

They say if one wants to construct a physical meaning out of all this, one should look to the mean energy of a system. Where temperature represents the condition of a physical system and is an intensive property (and therefore not additive), quantities of energy can be added; they are extensive. They say if we take two identical boxes of energy, we can join the boxes together and the result is twice the energy. The same cannot be done with temperature, as there is no “amount” of temperature; it simply is a measure of the condition.

They go through computing averages and pose a variety of other ways to “average” out physical parameters. They then suggest different scenarios that they suggest are equally valid in “assessing” the situation. They point out the example of averaging kinetic energy of molecules, that one must calculate the mean of the squares of speeds because energy, which goes as the square of speed, is physically additive, where speed, like temperature, is not additive. They then point out that all averages based on the same data might be expected do the same thing, but don’t. That’s when they introduce the exercise given above.

They conclude that if one has no physical reason to choose one average over another, then one is just making guesses because warming or cooling depends on the formula chosen to determine the average; it does not depend on the actual measurements. Furthermore, the averages are not physically meaningful; they are just statistics.

If you get the book, this begins on page 101. It’s a good and fun easy read.