One Scientist’s Thoughts about

Science Magazine (American Association for the Advancement of Science) and about using scientific methods with Middle School Students

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"Science" by the AAAS is one of the best.

Indeed, the actual scientific process on the bench is a lot less

orderly.  There is a lot of refinement that goes on.  It's not unusual

for someone to spend a year building an instrument to make 1 weeks worth

of measurements.  Also, as one analyzes data, different ideas pop up and

sometimes you follow those.  I think understanding the formal process is

valuable, but it is a guideline.  In the 50 papers that I've published,

maybe 2 or 3 of them followed the formal path of scientific method as

usually taught.  Mostly there is a lot of sitting around and

head-scratching asking "What happened here"?  But, that's where the

great fun is.  It's an exploration and when you are the one making the

map you don't follow in others footsteps, you break out on your own and

reap the consequences thereof.

I strongly believe that, by middle school, most kids are able to

actually come up with scientific questions that are 1) answerable and,

2) answerable by them.  I ran a laboratory over the summer where I

taught kids from 9 to 19 to use an electron spin resonance spectrometer

and how to use it to answer questions.  It was amazing to watch the kids

as they pursued their ideas.  From some simple demos (free radicals in

roasted coffee), they came up with some really interesting stuff.

The advantage of a formal presentation setting is that it forces one to

sit down and formalize what has been very informal.  Thus, the continued

loop of do, present, think, do, present, think, talk, is something most

kids do naturally.  Why force them into someone else's idea of how they

should proceed?  It's pretty clear to a kid when they get no results, or

highly variable results, that they can make no conclusions from what

they have done.  So, they need to rethink what they are doing.  It's

much more personal for them when it's their ideas and their approach and

their results then when it is ours.  Mostly during my summer class I

said "I don't know.  Why don't you try it?"  The electricity was palpable.

Just my thoughts.