

The answer to  
*“How many  
significant  
digits?”* is  
usually *“3.”*

Converting to  
Kelvin is never  
wrong.

Converting to  
moles is usually  
a good start.

Atoms don't  
care about the  
periodic table.

The answer to  
*“Should I round  
this off?”*  
is *“Yes.”*

The answer to  
“*Do I need to  
include the units?*”  
is always “*Yes.*”

You have to  
write *something*  
to get partial  
credit.

If you don't know  
where to start, write  
down the formula  
and identify the  
variables.



If there's a problem  
with your results,  
check your  
procedure.

— Aimee Yermish

Let the units  
do the work! If the  
units are in the right  
places, the math will  
be right.

Any scientist who  
can't explain what he  
is doing to an eight-  
year-old is a charlatan.

— Kurt Vonnegut

Non sunt  
multiplicanda  
entia præter  
necessitatem.

— William of Ockham

Never solve a  
hard problem when you  
can turn it into  
an easy problem with the  
same answer.

— Aimee Yermish

It is the theory  
which decides what  
we can observe.

— Albert Einstein

If nature does not  
answer first what we  
want, it is better to take  
what answer we get.

— J. Willard Gibbs

# The Laws of Thermodynamics:

0. You have to play the game.
1. You can't win.
2. You can't break even, except on a *very* cold day.
3. It can never get that cold.



The answer to every  
“yes/no” question is  
ultimately “maybe” or  
“sometimes”. The job of the  
science teacher is to get the  
answer to make sense.

— Mr. Bigler

“Magic” is what we  
call science when  
we don’t  
understand it.

Believing  
is seeing.

If your answer  
doesn't make  
sense, tell me *why*  
for partial credit.

Never change your  
first answer unless  
you know what's  
wrong with it.

— Mr. Bigler

“Fair” means

“Everyone gets what  
they *need*,” not

“Everyone gets exactly  
the *same*.”

— Mr. Bigler

Arguing or  
whining will  
exacerbate any  
situation.

The “RMV Rule”:  
Don’t annoy the person  
who can decide whether  
or not to give you what  
you want.

— Mr. Bigler



Any sentence that starts with “*You should...*” is best kept to yourself.

A polite person  
never tries to have  
either the first or the  
last word.

Be kinder than necessary,  
for everyone you meet  
is fighting some  
kind of battle.

— T.H. Thompson or John Watson

Be proactive  
about *everything*.

All observable  
data *must* support  
the hypothesis that  
you are nice.

Whether or not  
you're being nice,  
you have to make it  
*look* like you're  
being nice.

The answer to any  
*“May I break a  
rule?”* question is  
*“Of course not.”*

The ultimate  
authority is the  
*teacher*, not the  
rules.



Projectiles require  
a flight plan.

Forms available *only*  
after 2:00 pm.

Water that has  
“gone bad” must  
be dumped or  
put away.

Being more  
interesting than the  
teacher may be  
considered  
disruptive.

If you are off task,  
I will be happy to  
give you  
something to do.

If you need to be  
out of your seat,  
don't call attention  
to yourself.

It's always better to  
voluntarily go to the  
house office than to  
be sent there.

The response to  
any interruption for  
a non-sequitur is  
*“Not now; we’re  
busy learning.”*

I will usually let  
you have a  
2-minute “A.D.D.  
moment” if you  
raise your hand.



The answer to most  
*“May I take a  
re-test?”* questions  
is, *“Yes, within the  
next 2 weeks.”*

A warning delivered  
with a smile is still a  
warning.



The answer to  
*“What did I miss?”*  
is in the class  
archivist’s  
notebook.

The answer to  
“*Will this be on  
the test?*” is  
always “*Maybe.*”

Raise your hand  
when you *don't* know  
the answer—make  
me teach the students  
who need it!

The answer to  
“*May I turn this in  
late?*” is usually  
“*Yes, for partial  
credit.*”

Instant  
gratification  
takes longer than  
you think.

— Drea Brandford

Never quote a  
dictionary definition  
unless it's from the  
*O.E.D.*



Don't believe  
everything you  
think.

(seen on a bumper sticker)

No one can stop you  
from destroying  
your own life.

That's pretty scary when  
you think about it.

I have never met an  
adult who was glad to  
have stopped taking  
music lessons or  
started smoking.

— Mr. Bigler

Never say, “*I tried  
it once and it did  
not work.*”

— Ernest Rutherford

There is no sadder  
sight than a young  
pessimist.

— Mark Twain

Substitute “damn” every  
time you’re inclined to write  
“very;” your editor will  
delete it and the writing will  
be just as it should be.

— Mark Twain

Memorization means  
*“I promise to forget.”*  
When you understand,  
you will remember.

— Mr. Bigler

*Freitag's Law:*

Never use a tool  
that's smarter than  
you are.



What is written  
without effort is  
in general read  
without pleasure.

— Samuel Johnson

No one can learn  
effectively without the  
freedom to make  
mistakes.

— Mr. Bigler

If you're not prepared  
to be wrong, you'll  
never come up with  
anything original.

— Sir Ken Robinson

People who boast  
about their I.Q. are  
losers.

— Stephen Hawking

# **Hofstadter's Law:**

Everything takes longer than  
you expect, even when you  
take into account  
Hofstadter's Law.

— Douglas Hofstadter

If you can't say  
something nice about  
yourself, don't say  
anything about  
yourself at all.

# The Laws of Educational Dynamics:

0. Nothing works if the students don't work.
1. It is impossible to get more out of a class than the work you put in.
2. The work you put in is always larger than the success you will achieve.
3. On an ideal test, if you have zero knowledge, you will score zero points.

A large part of  
stupidity is just  
chronic boredom.

— Paul Goodman



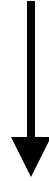
You can't  
do the task  
at all.



You can only do the  
task sometimes, and  
it's frustrating!



You can do the  
task whenever  
you want.



Impossible → Hard → Easy



You've already  
made it this far.  
**Don't stop yet!**

Do not fear mistakes.

You will know  
failure. Continue to  
reach out.

— Benjamin Franklin