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Curriculum and Lesson Planning Mini-workshop

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TIPS for Beginning Teachers:

Lab Set-up

Always **rotate responsibilities** between lab partners. Don't let them fall into teams of "Scientist + Secretary". They need to practice skills about which that they are most confident and least confident. It is seductive to let them work if they are happy, don't fall into that trap.

- Assign Colours for lab partners (rotate often)
  - Red gets equipment
  - Green takes notes
  - Blue operates equipment
- Rotate lab "teams" consistently, but give them time to learn to work together. (Maybe every 3 or 4 activities ?)

- **Cleanup.** Have an organization in place where the students are responsible for cleaning up once the lab is complete. Specific strategies include: role assignment, lab checklist, weekly lab assistant, station assignment, among many others.

Traffic Flow

Always plan the **traffic flow** of your lab. Think about the layout of the classroom or lab and ensure that students have ample room to maneuver while obtaining chemicals and equipment. What works in one classroom, might not necessarily work in another.

- Generally, dispense chemicals from the front bench equipment from carts or side-benches.
- Lab glasses must be used when "getting" chemicals as well as when using them ! (This included the people sitting at tables as well as the equipment carriers.)

Lab Safety

Always pay attention to how your students are interacting with each other, the chemicals and equipment in the lab.

- Use STAO's "Stay Safe" booklet as a fast "reminder" of what to watch for in experiments. Cheap and well-organized!

- Lab Goggles: MAKE a BBQ lighter gun!
  - Demonstrate the gun, then ask them to cover their eyes when the gun fires… no-one will be able to. "Danger seldom comes from "Your" experiment, but from the one across the room. Do you want to trust your lifetime vision to someone on the other side of the room?
- Base safe behavior on "maturity". IF you are not mature enough to work safely, then sit out this experiment (switch "colour-roles"). If it is a group activity, they can watch.
  - First "offense"… ask if they truly meant to work unsafely, then forgive.
  - Second time … sit out "this time" and think about how they can behave in a more mature way.
  - Third time … <u>private interview</u>: "Why are you insisting on proving to all your classmates that you are too immature to be trusted to work responsibly?" "Employers know that if you can work safely in a lab, you can work safely on the job. Why are you CHOOSING to create a bad impression that your teachers will have to record on a letter of reference?

Lab Assessment

Scaffold the skills necessary for success in labs. Try to think about the bigger picture, and design labs so that students are constantly building on previous skills. By the end of the chemistry unit – you may wish your students to be able to create a question, design a lab to answer the question, setup all the equipment, complete the lab and answer the question using a complete Formal Lab writeup. The first lab of the semester, may simply introduce students to traffic flow; second lab students focus on taking observations; third lab students work on hypothesis; fourth lab students focus on skills and analysis; and so on.

- Pre-lab: need something quick and easy to check
  - Have students DRAW the procedure the night before.
    - You scan diagram & initial before they can start the expt.
    - Include it with lab report
    - Student can add comments IF they found their diagram was incorrect
    - **Reduces lab confusion!**
- Post-Lab: varies with the pedagogical purpose of the lab.
  - Have a clear rubric for FORM, not for CONTENT (You don't want to stifle thinking about what happened and why it happened.)
  - Prior to "levels", I used to mark Labs out of 6

6/6	“can’t expect better at this stage”	100%	4
5/6	“excellent job overall”	83%	3
4/6	“reasonable job”	66%	2
3/6	“ barely adequate “	50%	1
>3/6	“incomplete… re-do !”	50% when complete	

- “You can’t fail Labs if you do your work.”

Post Lab Lessons

- When the students have completed the lab, there is still a great deal of teaching left. Be sure to take time to elaborate on important concepts that should have been acquired during the lab. Model how to create Labs, Report, graphs or summary of the information garnered during the activity.

General Tips:

Planning:

- **Use a planning grid** to work out how you are going to organize the lessons in the course. If you have 80 periods in the term, count on a maximum of 70 productive periods. (I’m not kidding!) Have 20 periods per page so you have an overview of where you are and where you are going next. [These are guides, NOT lesson plans! Revise the grid as you go AND at the end of term in case you teach that course again!]

- You do not need to **assess** everything. As you design your course plan, think on what skills you wish your students to acquire. Create a balanced assessment plan that will give the students an opportunity by the end of the year to demonstrate their abilities

- Use the **STAO Virtual Library** to find out what other teachers think are good resources and good ways to teach individual topics. You MUST invent your own wheel, but you can always use the experience of others to make yours better.

Study Skills:

- For junior classes, at the end of every chapter (or topic) take a period to review YOUR notes with the class.
- Hand out a piece of coloured paper to each student.
- Go through each lesson period.
- Ask
    - "What did we do?
    - What did it show us?
    - How can we summarize that? "
- **Have them construct a summary of the chapter** before your summative test.
- You will have to do the writing for the first two summaries, after that, just write the headings and get them to fill in the details.
- If they keep those pages, they only have to study 10 pages or so for a final exam.
- Before the final, have them summarize the 10 pages into ONE page (handwritten of course).

For senior classes do the first chapter with them and then require that they do their own after that. Require a course summary on one page and then a summary of that page on one 3 x 5 file card. TEACH them how to study!

The First Class:

ALWAYS start the first class of the term with a MEANINGFUL SCIENCE ACTIVITY.

In every other class, the teacher will be "reading the rules".
In yours, they will be DOING things!
You can work in the rules on day 3 and 4.

In Gr. 9 (or even younger) the line is:
"IF I can trust you, we can do some very interesting activities this term. If I can't, we won't. I will assume that you are mature enough to follow instructions. Please don't disappoint me, and your fellow students. IF you insist on proving that you aren't mature enough to act responsibly, you will have to sit back and watch the others do the experiment.
So let's get started… "

Spend maybe 5 minutes (MAX!) on warnings and instructions and then get them started.
Copper chloride and aluminum foil is a great "write down your observations" exercise. My only warning would be about copper chloride. READ to them the warnings on the label of the bottle! Then… "Do not taste it even though it looks pretty. If you do, you will have your stomach pumped in the hospital emergency department. When I say it is a poison, it IS a poison. "

If you have a long first period, have them observe burning candles as well. Young boys LOVE fire.
You get a chance to be different AND show that **you trust and respect them**. Both will help you to go far!

The Secret to a Successful Career:

"Treat every student and every colleague as if you will be applying to them for a job in 5 years time."

If you let the class run wild, what will they remember about you?
If you make unreasonable demands of them, would they want you in their business?
If you are fair, firm, and reasonable, if you work hard and model enthusiasm for your subject and for learning in general, why wouldn't you get the job?

Respect can never be demanded,
it can only be EARNED.

The only lesson that students will
truly remember is
YOU.