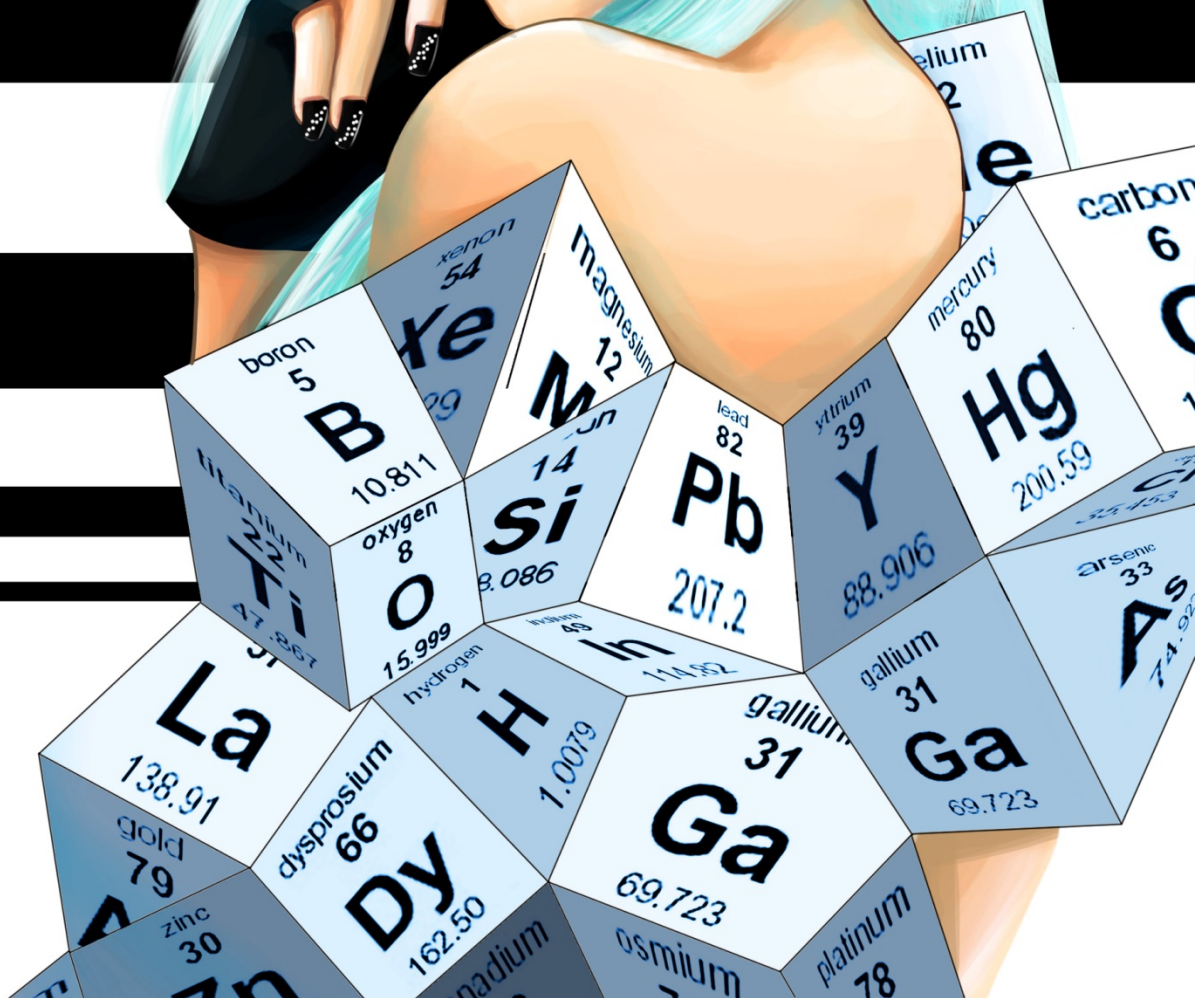
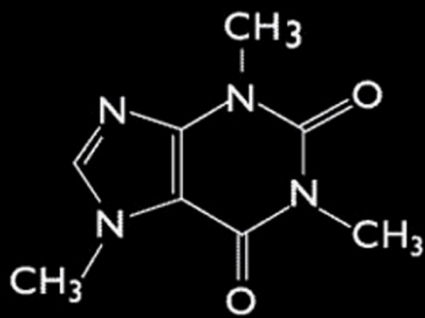


GAGA for GENCHEM



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Introduction

I hate to admit this, but when the SAM class picked their theme this year, I said “Lady Gaga who?” Then, I had to ask my co-instructor Dr. Bryn Lutes to make sure any references were appropriate! I was totally out of my league; I come the era of Chicago, Eagles, Led Zeppelin, and Fleetwood Mac. However, the class was wonderful; they took pity on me and made me a CD containing some of Lady Gaga’s songs. In writing this introduction, I listened to the music for enlightenment and I read about Lady Gaga via the internet. Thanks...I have enjoyed expanding my horizons.

Lady Gaga....she is the consummate performer. She thinks about the music, her clothes, and the performance, and how all of these parts should come together to create the perfect environment for her fans to experience her music to the fullest. She is a singer, a writer, a performer, a producer, a dancer, and an entrepreneur. As a peer leader, you also have many facets: facilitator, student, mentor, employee, and chemist. Your role is to create the perfect environment for the members of your group to experience learning general chemistry to the fullest.

The first session is always the scariest for new leaders. What should you expect? How will the students in your group behave? Will they talk? How do you get them to buy into the PLTL philosophy?

The leaders who have written essays for the first section **Get Ready to Put on your Poker Face** have given great tips to get started. One of the main tips is to come prepared; remember you are the leader. You want your students to feel comfortable with each other and to talk. This requires having activities that stress both camaraderie and structure. For camaraderie, Lauren Nolte suggests that you “start your [first] session by having the students make name tags, introduce themselves, and play an ice-breaker game.” Structure is stressed by Kerry Aldrich, “have your group brainstorm some rules of its own to create a sense of community.” You may feel uncomfortable with some of these activities and think that your students won’t be cooperative. But they will, if you follow Akhila Sure’s advice, “Be confident – they can smell fear.” One of the best ways to feel confident is to prepare, and Lizzie White tells us that the best way to prepare is to “really take advantage of the PAM class on the Friday before each session.” Working together with the other peer leaders will save you a lot of time each week in preparation. Finally,

remember James Ko's advice, "the best PLTL leaders do very little during their sessions besides asking simple questions and keep on unwavering poker face while deflecting questions."

What is the PLTL philosophy? One of the most essential, yet hardest, rules of the PLTL philosophy for both the students and the peer leaders is the "no answers are given" criterion. Peer leaders know that allowing the students to decide whether their answer is correct or not is best for the students in their development as independent learners. But Lindsey Steinberg describes the leaders' conditioning as students perfectly, "[giving the answer] is a difficult reflex to suppress." Laindy Lu describes the scene perfectly, the inevitable "...turning of nine carefully blank and confused expressions in your direction." Before you have time to think about how to handle such a situation, "...your students have mastered the art of wheedling information out of you" (Jiali Fang), and "you've turned from a facilitator into a teacher." (David Randolph).

Before you give up in despair, read the leaders' advice in Section Two **Don't Look at Me, Alejandro, Fernando, and Roberto**. One way to start is not to walk around with your answer sheet in your hands (as Jiali Fang writes that beginning leaders tend to do), and to remember that students do not like silence as much as you do not like it. Hence, they will usually break before you do. (David Randolph). Your final objective as David Randolph aptly says, "The goal is to develop a PLTL group that is entirely student run."

Last, if during the session you are on the edge of giving in; remember Jiali Fang's concern, "How will you be able to look Dr. Frey in the eyes ever again?"

One of the main objectives of PLTL is for students to learn to work together in groups to solve problems. "PLTL is about active, collaborative learning: everyone contributes to the discussion." (Walter Fu) The third section **Dealing with your Little Monsters** describes how to form your students into a group and work together as a community?

Mallory Highstein suggests correctly that one needs to "establish good group dynamics from the get-go." It is important to discuss the group philosophy of PLTL on the first day and to explain why it is essential for your group to become a community. However, you must remember that a group consists of

many people and “...you alone cannot force a good group dynamics on your group.” (Lulu Yu) Everyone must participate in forming the group.

Peer leaders often come back from their first session believing that their group is already formed; everyone is working together. Walter Fu reminds us, “this façade of courtesy will slip away, and their true personalities will reveal themselves.” And while William Chang suggests that “group dynamics hinges on so many random things” on a session-by-session basis, Rivfka Shenoy encourages us to constantly work on group dynamics because “without taming your monsters, you won’t be able to pass on knowledge.” Hence, it is essential to work on your group dynamics starting on day one and throughout the entire semester.

You look around and your group is very diverse in how they approach problem solving. Some students want to answer right away; others want to sit and think first. Some students like to see a sketch or graph, while others like to approach the problem purely mathematically. These differences can affect group dynamics. Derek Miller gives an example, “Sensing students can often feel left out or behind at PLTL sessions when intuitive students immediately start answering questions as soon as they read [the problem].” How can you address all of these different learning styles?

In section 4 **Beautiful, Dirty, Rich, and Everyone Else**, peer leaders give sage advice. As Alissa Stavig writes, “In order for all the students to learn effectively, the group needs to be taught the information in multiple ways.” Hence, “you as a peer leader must be able to approach the same topic from many unique angles.” (Taleef Khan) The PLTL approach gives you the formula; using the collaborative-learning methods is one of the best ways to make sure all students have the opportunity to participate. Hans Zhang says it well, “The different collaborative-learning methods, then, are your best friends in dealing with the various learners in your group.”

It is mid-semester and the slump has hit not only your students, but yourself. The perfect group has started to slip and all they want to do is just dance. The fifth section **When All They Want to do is Just Dance** helps you and your group to persevere through the slump. Yi Huang and Pamela Peters astutely point out that these issues just do not magically appear. They start occurring little by little as

students get busy, and should be discussed from the beginning. For example, address any attendance issue at the beginning of the semester by stressing the importance of PLTL from the beginning so students don't skip sessions randomly. Both Pamela and Yi remind us that peer leaders should act as role models; students will follow your example – both the good and the bad.

While Sophia Korovaichuk points out that every student will not be 'gaga for PLTL every session', you can remind them that "those two hours on a weekend working collaboratively may save them hours and hours of work later in sorting through the lectures and homework problem independently." Madeline Spahr offers peer leaders excellent advice about the structure of the PLTL session, "It is important; therefore, to make PLTL different from a class." She suggests giving them advice on "life" during the session such as study hints for lab, or the best Thai restaurant in the loop. All the leaders stress that one should not get discouraged during the mid-semester slump; we all come out of the slump for the end of the semester. Students just need a little nudge.

The final section in this book is **How to Play the Love Game**. The best secret to making your PLTL sessions successful is to use the collaborative-learning strategies. However, you will find that most of your students will feel just like Emily Middlebrook who honestly confesses, "[as a student], I honestly did not like most of them [the collaborative-learning strategies] very much." But, she found out as a peer leader that "it is important to use all of them, to use them correctly, and to use them on the correct problems"

Jennifer Stevens very succinctly describes how to run your session, "PLTL has rules for the game, ...and you are the referee, so you have to mediate, or else you will have complete chaos." As many of the peer leaders do in this section, Andrew Yu gives advice about how to use the strategies to best accomplish your goals. His example for round robin, "[It is] important to have the other members help whoever is up at the board and to smoothly transition between students." As only Cedric Huchuan Xia can so wonderfully and humorously tell us why a peer leader should use collaborative-learning strategies, "...when you are truly "educated in the collaborative-learning strategies, your students will 'want it bad, want it bad' ... the weekly gen chem party with you!"

Next year, you will be expanding your horizons about peer leading and PLTL just as I have expanded mine about Lady Gaga. And just as this year's peer leaders helped me when I was naïve about the phenomenon that is Lady Gaga; we will work together as a community to learn about peer leading. You will be joining the wonderful community of General Chemistry peer leaders (both new and experienced); we all work toward common goals while learning from one another – and we have fun while doing so. Use the SAM and PAM classes as you develop your own peer-leading persona. I look forward to working with you this semester.

Regina Frey

Playing Your First Cards

by Kerry Aldrich

Congratulations on being selected to be a PLTL leader! By this time you've had a whole summer to soak in this very exciting news. However, the new semester has arrived and you're probably starting to feel a bit anxious for your first session... but you needn't be. After all of the helpful advice you will receive in this booklet and in your first PAM and SAM sessions, you will be very prepared to make your first session a successful one. Here are a few important tips to remember:

1. Be confident with yourself as a leader. Remember that you were selected for this position and also that you took this course last year and excelled in it. Obviously it's natural and understandable to feel nervous, but as Lady Gaga would say you need to put on a good poker face to keep your students from seeing your anxiety. Try to recall your first PLTL session from last year and how your leader's attitude set the tone for the session. If your students, who are most likely nervous themselves, see that you are calm and comfortable on the outside (due to your impressive poker face), they will be able to relax and benefit from the session.
2. Try to make the session enjoyable. It is really important to set up a comfortable and fun environment from the start so that you and your the students come to enjoy and look forward to PLTL. This won't be as hard as you may think. Most of your students will be freshmen that are still very eager to meet new people and make new friends. Here are a few ideas to get off to a fun start: begin your session with an icebreaker so that everyone can start to learn each other's names, always remember to smile, and engage your students in conversation so that they can begin to find similarities amongst themselves. Also, you can always bring food to energize your members.
3. Establish group rules. While this might not seem like the most fun thing to do, it's very important that you make sure that every student knows what is expected of him or her. At the beginning of the session, after an icebreaker, explain the PLTL philosophy and basic rules so that

everyone has a joint understanding of the purpose of the group. It's also a good idea to have your group brainstorm some rules of its own to create a sense of community.

4. Remember to prepare for your session. Not only will this help your session go more smoothly, but it will also help to ease your nerves. Go to PAM, look over your notes from last year, and organize your problem sets and handouts. Put all of your supplies (markers, problem sets etc.) in your bag the night before PLTL. This may also help you start to create a routine that you can complete before each session, which will benefit you throughout the remainder of the semester.
5. Loosen up and have fun!

Good luck! Just remember that you are qualified for this position and that if you attend PAM and SAM you will do a great job. While there are variables that you will not be able to control in your session, such as who your group members are, you still have all the help you need to make this first session successful.

Preparing that Poker Face

by James Ko

Preparing for your first PLTL session can be an extremely daunting task and you definitely don't want to be caught with only "mum mum mum muh" to say. While there isn't much you can do to be completely prepared for your first day, there are several things you can do to be as prepared as you possibly can be.

Being prepared with all of your materials is only the first step and being mentally prepared is extremely important. In high school, I had experience talking with large groups of hundreds of students. However, this experience only prepared me a little for my first encounter with the small personal and intimate setting of the PLTL group.

Your first fear may be that you need to be an expert on General Chemistry. However, this could not be further from the truth. Each PLTL leader probably excelled on certain topics within General chemistry and understood other topics less well throughout the course. It is not only not looked down upon but also not expected for PLTL leaders to understand everything completely. The PAM session with other PLTL leaders the Friday before your PLTL sessions ensures you grasp the concepts enough to guide your group. Make sure to ask all the questions of your peer leaders when you can so you can subtly point out when your group has gone astray and lead them back on the right track.

In reality, understanding all of the concepts completely isn't necessary to be a PLTL leader. As your job title says, you are a peer leader (or facilitator) and not an instructor. It is your job to question reasoning and get explanations out for every group member to vet. In fact, the best PLTL leaders do very little during their sessions besides ask simple questions and keep an unwavering poker face while deflecting

questions. Learning the skill of deflecting questions effectively and allowing your students to figure out the problems through collaboration is difficult but is something you will be able to develop as the semester progresses.

All of this advice may be overwhelming and if your nervousness takes over during you session and you forget what the PLTL leaders said in this book or mistakenly digress from the PLTL philosophy, don't worry, everyone makes mistakes in the first session! Every week is a new session and a new opportunity to improve on the mistakes made the previous session.

The Perfect Accessories for the First Day

by Lauren Nolte

This is it—your first session. You may be a little anxious getting up on that PLTL leader stage for the first time, but don't worry—no fishnet stockings, metallic leotards, or lobster headpieces necessary. In addition to putting on a poker face, a PLTL leader should bring a few essential accessories to his or her first PLTL session.

What to bring: Make sure to bring these items the first day, and every day:

1) Problem sets. 2) Dry-erase markers and erasers. 3) Old notes and PAM notes.

You should have problem sets for everyone in your group, as well as your own problem set and notes from PAM. Also, make sure you remember the sheet that lists the strategies being used for each problem. The room I was in never had markers, so I always remembered to bring my own every week. I found my old notes to be helpful when I needed to quickly check on a concept.

Just relax: You may be really nervous in anticipation of your first session. You may be wondering what your group will be like and if you have reviewed the concepts and problem set enough. And you may even be wondering why you were chosen to be a PLTL leader in the first place. When you get a little nervous, just remember that most, if not all, of the students in your group are freshmen, experiencing PLTL for the first time. And if they've heard anything about Gen Chem, they are probably nervous themselves. If you put on your poker face, look confident, and appear like you know exactly what you are doing, as far as your group knows, you do. As the sessions go on, you will find your own rhythm and learn what to expect.

Get the vibe: Just as you don't know any of the students on the first day, they don't know each other. Starting right off the bat with the problem set may be overwhelming. Start your session by having the students make nametags, introduce themselves, and play an icebreaker game. Bring in food (I baked

cookies), which always puts people at ease and gets people talking. Remember to also set some ground rules the first day. Having the students generate their own list of rules will not only get them communicating right away, but will also make everyone immediately feel more comfortable. If they have trouble thinking of rules at first, try to start off with a couple yourself. If you can get a positive vibe going from the start, it is likely to last throughout the semester. And remember to smile and be enthusiastic!

Final thoughts: Remember—the goal for the first day is not to get through the whole problem set. Rather, it is to get the students to feel comfortable with each other, with using the problem solving strategies, and with the PLTL philosophy in general. Remember that you did well in Gen Chem last year and that you are totally qualified to do this. It is difficult not knowing what to expect, but you'll be surprised at how quickly your stage fright goes away and leading a session becomes routine.

First Day

by Akhila Sure

The night before my first PLTL session as a leader, I lay awake in my bed thinking about what to say, how to act, and how I shall arrange the desks the next day. This nervousness swept away the next day when I realized that I was prepared to meet my group. There are several ways you can get ready for your PLTL session:

1. Bring Food! – Food is one of the best ways to get your group talking. I found that whenever the students had food around them, they socialized more thus lessening the number of awkward silences.
2. Focus – Be warned, however, that the students will be more likely to go off topic when they talk to each other. As a PLTL leader, it is your responsibility to bring all the students back to Chemistry. My personal favorite way to bring them back is demonstrated in the following example:

Student A: I love snow.

Student B: I love sun.

PLTL Leader: You know what weather I love the most?

Students A and B: What?

PLTL Leader: (Reads the problem set question)

Students A and B: (Laugh). Gee whiz, I guess we got off topic again. Thank goodness we have our wonderful PLTL leader to keep us focused on Chemistry.

☺

3. Be confident – they can smell fear. The moment that you show signs of weakness, the students will lose faith in you and will not listen to your guidance with as much interest later on. Remember, as a PLTL leader, you are not supposed to answer their questions. So if a student asks you something that you are unsure of, refer the question to the group or tell the student to go to help sessions and office hours.

4. Don't forget your materials – Always bring an appropriate number of problem set sheets. Also, do not forget the markers. The whiteboard is a very important resource and having sufficient markers with ink is very useful.
5. Go a little early – By doing so, you can arrange the seats and look over the problem set to refresh your memory of the material.
6. Look through your old notes before class – Your old notes will help vastly in preparing for PAM as well as your session. Having a greater understanding of the material will help with not only understanding the problem sets but it will also give you more confidence and assurance for your session.
7. Definitely include the “No Cell Phone” policy in your ground rules – Though it seems like it would be common sense to not use cell phones during the PLTL session, there are many students who continue to do so. They will attempt to text very “discretely.” You should make sure to explain that using cell phones and mp3 players is disrespectful to not only the PLTL leader, but also the other students. Make sure that you follow this rule too. There is nothing worse than a PLTL leader who seems disinterested in being there.

By following these basic principles and others given in this guide before your first sessions, and the sessions after that, your PLTL group will sail more smoothly.

Week One: Let the Games Begin

by Lizzie White

So, it's the first week of PLTL. You are probably feeling some combination of excitement, nerves, and uncertainty about what this weekend will bring, but that's normal! There are several things that you can do to prepare that will hopefully decrease your nervousness and uncertainty while keeping you excited about your first session. Even if these preparations do not completely get rid of your nerves, they will enable you to find your poker face so that you appear calm and collected.

The first thing to do in preparation for PLTL is to really take advantage of PAM class on the Friday before the session. Before PAM, briefly look through your Gen Chem notes on the relevant topics so that you have an idea of what you will be discussing. When you get to PAM, ask for clarification on topics that you don't remember well. Use the other PLTL leaders as resources; chances are that between all the members of your PAM group, there is at least one person who has a firm grasp on the topic that you do not remember. When you are leaving PAM, don't forget to pick up the weekend's supplies. Keep these supplies together so that you don't leave anything behind this weekend.

The one thing that you should bring to your first session that you cannot get in PAM is food. Bringing snacks to PLTL, especially the first week, is surprisingly beneficial. Snacks raise the energy level, entice students to come to PLTL (free food), and generally make everyone happier. If you don't want to bring food every week, I suggest establishing a rotation so that the students can take turns bringing snack. My students never forgot when it was their turn to bring snack, which showed me that the snacks were important to them.

Another thing to prepare before getting to PLTL is an icebreaker. I suggest using an icebreaker that is also a name game; students will get to know one another and they will become comfortable using each other's names.

An essential part of the first PLTL session is going over the PLTL philosophy and setting ground rules for the group. Ground rules can range from funny (don't forget snack) to serious (don't interrupt someone when they are speaking). Although it is most effective for the students to generate these rules themselves, it is a good idea to think ahead of time about how you will lead this discussion.

Finally, RELAX! Despite your preparations, there will undoubtedly be a time during your first session when you will feel anxious or fear that you are doing something wrong. Getting through the group introductions, PLTL philosophy, and ground rules can feel overwhelming, but for the first week, these steps are actually more important than the problem set itself. To make it easier, try getting to PLTL early, talking to your students, and getting yourself acquainted with them. The students will feel more comfortable with you, and you will feel less nervous around them, allowing you to keep your poker face intact.

Stop looking at me; I don't know the answer either!

by Robert Achilike

So you have been to the SAM sessions twice and you've gone to your first PAM session in preparation for your first PLTL session. The night before your first PLTL session, you may begin to reminisce on the trials you experienced during your PLTL. How can I be a better PLTL leader or as good as my PLTL leader from last year WITHOUT giving my students the answers? How do I move the students toward the correct concepts WITHOUT giving them the answers? Well just take after contemplating that for almost half semester, the answer hit me out of nowhere. Just don't give them the answer. Do everything it takes NOT to give them the answer.

In order to serve as a facilitator in PLTL (what PLTL calls on students to be), one must utilize questions as the only answers to the students problems. The students are there to learn from each other not from you. Furthermore, if the students wanted a mentor, chemistry mentors are available but that is not what PLTL is and you are not expected to be the expertise of chemistry. It has been at least a year since you took the course.

In sessions, you *will receive* the awkward stares after you ask them to begin working. In those situations, remain silent. The silence is more awkward for the students than it is for you. In addition, it helps the students form stronger bonds among each other, making the students more comfortable with each other. With silent "treatments" that arise from an inability of the students to answer the present question, ask the students to refer to their notes. Chances are the PLTL problems are somewhat similar to the problems discussed in class.

Then there's the other problem: the deafening glare of the students (more the one). When one person asks a question, everyone looks at you for an answer. In those situations, say always try and say, "I don't know; maybe someone else in the group knows" or "(Name of student asking), you know I can't tell you the answer, so try and find something in your notes that could move you all closer to the answer". Either response not only lets the students that you don't have the answer for them but rather it allows you to establish your assertiveness as a leader. Assertiveness is something that can also help pushes the students towards working with each other towards an answer instead of always looking at you for the answers.

You must be consistent in retaining your assertiveness and constantly diverting the glares and withstanding the awkward silences. The students are surprisingly persistent in expecting asking for answers and staring. In order to be a good facilitator, one must move the students towards being comfortable around each other, even if you have to force them to rely on each other to survive PLTL. Essentially, to be an efficient PLTL leader, you must implicitly say the students, "Don't look at me, Alejandro, Fernando or Roberto; instead, look at Alejandra, Meghan or Deborah to see what they know".

But I Can't Be With You Like This Any Longer

by Jiali Fang

As a PLTL leader, you pride yourself for not running up to the board and start blurting out all that pent up chemistry knowledge inside you. Unfortunately the temptation to do just that gets stronger as the semester progresses. Not only are you swamped in exams and activities, your students have mastered the art of wheedling information out of you. It just gets worse as the topics become more and more complex and sometimes you just can't help yourself: after all, one teensy unit on molecular particle-in-a-box won't hurt right? Now before you fall prey to this apple of discord, consider this. How will you be able to look Dr. Frey in the eyes ever again? Not when she told you many times to facilitate, not instruct. Even more importantly, what about your students who may never learn to study on their own because you keep instructing them? What about yourself? If this continues they might expect you to teach them about conjugated pi system! (Oh, the horror). Okay, so I am exaggerating, but it is important to remind yourself that you are a facilitator and not a tutor. Not only it also helps your students succeed, but also it makes life easier for you.

Hold em, fold em, but don't show em

One mistake that beginning PLTL leaders tend to walk around with their answer sheet held fast in their hands. While it is nice to know what the answer should be, it is terribly distracting for both you and your students. After all, in PLTL there is no "answer key" and if you walk around with one, your students will be less impressed when you do not give them the answer. Furthermore, instead of concentrating on the answer, you should be more aware of what the students are doing to solve the problem and how the students are interacting with each other. To avoid needing that piece of paper, you should review your material beforehand and during the session, stick it inside your backpack so you can't look at it. It also makes the session more fun when you are not obsessing over doing the problem the "right way".

Hello, hello? I can't hear a thing.

If you find yourself being bombarded by questions, sometimes the best thing to do is to act clueless. If you act like you don't know, the students will give up eventually. However, you have to be careful because you don't want to appear like you do not understand the material. A simple response such as, "I don't know. What does everyone else think?" when spoken with confidence can deflect questions without undermining your authority. If you don't feel comfortable with saying "I don't know", then keep deflecting the question to the group. Even if it takes awhile, if you keep it up, the students will learn to stop depending on you for answers and discuss with each other. You are removing attention from yourself, which will help you remain a facilitator.

'Cause I'm bluffin'

So maybe you are getting tired of saying "what do you think" and you want to try another tactic. One of the goals of PLTL is to teach students to be confident about their own answers. Sometimes, the best way to build that confidence is to undermine it. Students tend to look at you for approval when they are explaining a problem. Instead of responding with a neutral "OK" to show that you are listening, shake up their confidence by asking "Are you sure?" even when they are right. This forces the student to defend their answer, which is what they must do on exams. By subjecting their work to active doubt, you make them think critically about why they are solving a problem in a certain way. If they can develop a good habit of always asking themselves "why am I doing this?" they will be successful in chemistry.

I've only provided a few suggestions based on things that have worked for me. There are many other ways to facilitate in PLTL and a lot of it requires experimentation on your part. If you are worried that you have done too much instructing, don't panic! You can still change, even if it is at the end of the semester. Some students may get frustrated or angry when you dodge questions, but instead of caving in

to their demands, you must do your best to encourage them through their struggle. After all, you are doing this because you are their biggest fan, and they will ultimately be grateful.

Learning to Facilitate

by Laindy Liu

It's like something out of a nightmare—a nightmare that repeats every weekend, without fail, for two hours straight in a study room somewhere on campus. And eerily enough, it always follows the same direction. It always starts out with a begrudging voice reading out loud a complex question about molecular orbital theory, followed by complete silence, and finally, the inexorable and inevitable turning of nine carefully blank and confused expressions in your direction. Pinned as you are beneath the heavy expectation of that collective 'save me!' scrutiny, your first instinct might be to step into that tantalizingly empty 'helpful instructor' position. After all, it couldn't hurt to just explain just a single concept to the group. This is probably your reasoning for the first or second PLTL session. But as you progress through the weeks and the material becomes more difficult, you notice that you've begun to hear your own voice more and more frequently instead of group discussion, and what was meant to be peer *led* has instead turned into peer *teaching*, a position you aren't entirely sure you are completely ready to take on.

Fortunately, that is where this essay comes in—to give you suggestions on how to turn away Alejandro, Fernando, and Roberto's siren calls for you to teach them general chemistry (Alejandro, Fernando, and Roberto being hypothetical students, of course).

First and foremost, it is important to set a good example from the first session, so that students understand the philosophy of PLTL, what their responsibilities as students include and where your duties as peer leader stop. Be sure to emphasize the fact that you are there to facilitate their discussion of chemistry, and not to teach them the concepts. If, at any time during the semester, you feel that you have fallen back on the instructor role, remind students about other resources (such as Cornerstone, help sessions, or professor office hours) as possible places where they can have their questions better answered.

Another important tactic to take up is the art of deflecting questions. One of the easiest ways of falling into the instructor role is actually answering the questions that are directed at you. Instead, you should direct the question to the group, or to a specific student. For example, when 'Alejandro' turns toward you with a question about how to draw an s-orbital, helpfully redirect the question to 'Roberto', who seems to understand the material relatively well, or even to 'Fernando', who is vaguely introspective and who, you feel, has been left out of the discussion a bit.

Alternatively, if you have an extremely quiet group, you may have to polish up on your ability to ask the 'correct' sorts of questions. Asking open-ended questions will generate discussion and keep the situation from devolving into a 'ping-pong' scenario—namely, when the bulk of the conversation is you asking a question, followed by one student answering, followed by you asking another question, etc. Though it sounds like a difficult task, it is easy to prepare a few questions beforehand on problems you feel might be challenging or to even direct a general question to the group, asking for someone to summarize the concepts covered in a particularly lengthy or complex problem.

With enough time and enough perseverance, you will soon find yourself with a group of students who will ask questions amongst themselves instead of turning to you for the answers. Not only will this make your role as peer leader easier and more efficient, but playing the role of the effective facilitator will also allow students to build up more confidence in their own abilities to answer the problems.

All Eyes Are Turned Towards You

by David Randolph

So you're students are claiming that they've never seen the material on this week's PLTL problem set before. The formulas appear to be a foreign language to them and they've all magically become mute. Then, they start staring at you. You think to yourself, "well, the professors must be behind in their material. I'll do them a quick favor and teach the students the concepts they've missed in lecture." You begin spewing the concepts and answers to the PLTL problem set onto the board and the students begin to copy down the solutions. Perfect. Problem Solved. Until the next week.

In the weeks that follow, you realize your students seem to give up on topics sooner and sooner and turn to you faster and faster. Eventually, the collaborative learning strategies outlined in the PLTL philosophy begin to evaporate, and the PLTL session instead descends into a two hour lecture every Sunday afternoon, exactly what students don't want to do with the last bit of their weekend. You've turned from a facilitator into a teacher.

So, then, when your students are actually stumped, what's the appropriate plan? Ignoring the students obviously isn't the right call, but then again neither is becoming a teacher. Instead, you ask the questions. But how do you do this?

First of all, you need to go over the material covered in Chemistry 111 the week before and make sure any fuzzy concepts in your mind are cleaned up. If something seems unclear to you, ask questions in PAM, either to fellow leaders or to Dr. Luesse. Of course, you aren't meant to be a professor, but you still need to have adequate knowledge of the concepts of the course. The review questions for each week will be a good gauge of what you know.

Once the session starts, make sure students are given plenty of time to think critically and apply lecture concepts to new situations. This, ultimately, is college-level thinking, and what the students will be asked to do on exam day. Remind the students that you won't be with them while they're taking the exam. Any struggles the students encounter should be brought up with each other prior to turning to you. If that uncomfortable silence ensues, the students will usually break before you do. This silence can encourage students to think harder, and make deeper insights regarding the questions at hand.

Questions directed towards you can usually be deflected and redirected towards the group fairly easily and even rephrased to guide the students in the right direction and encourage them to question any incorrect, as well as correct, answers to questions. The questions directed back towards your group should start with what they know well. Once the students get the hang of it, follow up questions can be used to augment their knowledge of concepts. Building off of foundations the students have developed will ultimately benefit them on exam day.

In the end, the goal is to develop a PLTL group that is entirely student run. The role of the leader is not one of a teacher, but rather one of a facilitator. You know you've done a great job once you don't have to speak during the PLTL sessions at all, and your students get through their problem sets on their own.

I'm in the B-School

by Lindsey Steinberg

I know how it is. You're sitting there, minding your own business, following their conversation but not giving away any information like the good little PLTL leader that you are, when all of a sudden, they ask you a question. And you almost answer it too. Instinct. What kind of person doesn't answer a question asked directly to them even when they know the answer? It's a difficult reflex to suppress.

I never thought it would happen to me. My group got off to a great start at the beginning of the semester and worked well together for weeks on end without any direct violations of the sacred PLTL philosophy. The group had discussions, but never really any disagreements. Until one week when they couldn't decide whether Δx was the full width of the peak, or half the width. As with any good controversy, there were firm believers on both sides with a significant number of easily persuaded middle-grounders who were continually pulled back and forth. And then it happened. A student bravely announced, "I know how to solve this!" Then turned to me, "You have an answer key."

"I most certainly do not."

"But you know the answer."

"So do you, you just need to look through your notes and problem sets."

So they looked. They didn't find anything. They really hadn't looked very hard.

Another student said, "Can't you just tell us?"

"Nope."

"What if we all left the room and then came back and the answer was mysteriously on the board and no one knew who put it there?" (You think I'm making this stuff up, trust me, I'm not this creative.)

"If you can't find any examples from class or recitation, why don't you try thinking through the equations you have seen that use this value and deciding what makes the most sense conceptually."

Although this is clearly a more difficult alternative to finding the answer in class notes, for some reason they went with it. They discussed, and they reached an answer that all except one student was confident in. That one student said the group decision made sense, but she still wasn't completely convinced. I told her to go to office hours. She did.

The majority of the times someone asked me a question were not this extreme. I could easily turn to the group and say, "What do you guys think about that idea?" and the discussion would continue as if I weren't there. Those aren't the ones that are hard to handle. It's when they persist that you have to be prepared to hold your ground. Doing so will teach them that you really are going to follow the PLTL philosophy, and it will cut back on future problems. Making them talk through their confusion and figure out where they are going wrong helps them learn. They'll thank you later.

There was only one other time that someone in my group tried to get me to answer a question. I responded, "What would you do if I were really bad at chemistry? They actually only hire people who failed the class to lead these, that way there's no chance we'll give away any information. Better yet, I never even took chemistry. I'm in the B-School." They laughed. Not only that, but they laughed and then talked to each other. And learned some chemistry in the process.

Dealing with your Little Monsters

by William Cheng

The world has changed much since Lady Gaga entered the scene. Alejandros all over the globe have been forced to flock to dating sites under fake names, and a surprising number of voicemails now sound something like “Sorry, at the club, talk to you later.” However, the most pressing issue for us PLTL leaders seems to be the influx of little monsters. But have no fear; our PLTL monsters lack the peacock suits and handclapping skills that tormented poor Gaga.

One of the most important things for you to do as a leader is to make your students comfortable with each other. Starting from the first session, try to mix and match your students, make them talk to each other, and get a good start on acquainting all of them. Your sessions will be filled with enormous amounts of awkward if you have situations like:

You: “Okay, how about Dave and Alli work together”

Alli: “...Who’s Dave?!”

It’s always awkward to place a bunch of random people in the same room together, and so it’s your job as the leader to set the tone of PLTL.

So hopefully your group gets off to a good start. You’re golden right? Oh, if only...Group dynamic hinges on so many random things, and those invariably change for each student depending on the weekend. Just wait for the session after the first exam when you can almost taste the angst in the PLTL air. As the leader, all you can do is make an effort to make the environment as conducive to learning as possible. Narrow their attention and keep them focused on the information at hand, and make the little

gestures like weekly messages and encouragements to keep them engaged in PLTL. Likewise, the best incentive ever for PLTL is and always has been food. Sun chips, cookies, and candy have been proven to make everything better. If you can keep PLTL a fun and social environment, your students might even forget the pain that chemistry brings, and might even want to come to PLTL.

Although we all love Jane's stories about the squirrels that pop out of the trash cans by the DUC, obviously we want to talk about chemistry, too. At some point, it might be difficult to steer the conversation away from the week's happenings and back to the problem set. That being said, there are some tricks. My personal favorite is to make the problem set more interactive. For wave functions, have your students act out nodes rather than just write down answers, and the same thing goes for mass spec and Milliken's oil droplet experiments, and everything in between. Different, quirky variations on the usual problem-solving methods will help break the monotony of the problem set, and give everyone a different take on the same material.

Half the battle of PLTL is keeping the little monster inside all of your students at bay. Chemistry doesn't make many people happy, and so PLTL *needs* to be entertaining and engaging for students to get the most out of each session. Try your best to make the environment conducive to learning; keep it light-hearted, social, interesting, and engaging. With enough pizzazz, charm, and entertainment factor, hopefully your students will enjoy PLTL. Heck, if you strap last night's steak dinner to your feet, they might even go Gaga over you.

When your Monsters go Gaga

by Walter Fu

It's been a few weeks, and PLTL's going swimmingly. Your students are coming prepared, they seem to have taken the PLTL philosophy to heart, and the problem sets are flashing by. Then all of a sudden, your group mentality seems to fall apart. The talkative students are discussing plans for the weekend, the dominant group member is busy doing homework, and everyone else is working by themselves. No longer are your group members discussing chemistry with one another. Some of them are pissed, and they're getting revenge. They just want the answers; they don't want to be friends!

While not by any means desirable, this situation is completely normal. During the first couple of sessions, your students will be on their best behavior. They'll get along well and discuss problems politely while they adjust to collegiate life. At a certain point, though, this façade of courtesy will slip away, and their true personalities will reveal themselves—and if you're not lucky, the result can be the nightmarish scenario depicted above. Luckily, the situation is far from hopeless, but fixing it will take some work on your part. The first thing you'll want to do is remind your group why they're there. PLTL is about active, collaborative learning: everyone contributes to the discussion, and the group moves forward together. Be friendly, but make sure you get your point across. You might try referring back to the group rules that your students themselves created—you do have rules, don't you? If not, now might be a good chance to have your group brainstorm some. In any case, once your students have agreed on why they're participating in PLTL and what they hope to accomplish by doing so, they can begin to fix any problems they might have.

At this point, you're set, right? Your group has begun working together again, and there's nothing left to do but coast on to the end of the semester, is there? Don't we all wish it were so. Trust me, you'll still have issues to work out. Your group might start to fray at the edges again, or they might even go in the

opposite direction, socializing to the point where they aren't getting their work done. Whatever happens, bring them back to why they're in PLTL. Molding the perfect group dynamic takes time; it may not even be possible. But if you work at it, you can at least prevent a bad group dynamic from developing. Remember, they might be having fun, or the beat may be sick, but the problems need to get done, and the knowledge has to stick.

Preventing Little Monsters

by Mallory Highstein

Every now and then your PLTL group will certainly seem like little monsters. The best way to prevent your group from terrorizing you is to establish good group dynamics from the get-go. Much of the group dynamics can even be determined before the first session begins.

In establishing a good work environment it is important to let everyone know what will be expected of them. General expectations, like coming prepared and bringing a calculator, can be explained in a pre-PLTL e-mail. Sending a friendly introductory e-mail before the day of your first PLTL will let the group know that you are on their side and enthused about having them in your group.

It is crucial to show up to the first PLTL session early. In doing this, you can introduce yourself to the early comers and begin establishing a relationship with them. This will help them feel at ease with the whole group. Additionally, an icebreaker is helpful in the first PLTL session. The best icebreakers are those that get the whole group laughing and feeling at ease with each other. This will make the group dynamics fall into place, as everyone will already feel comfortable.

Everyone is smiling and laughing and that is great; however, this is a place for learning and working together as a group. Establishing a learning atmosphere is the next step. This is where the PLTL philosophy should be introduced. You will be encouraged to agree upon group rules. This is something I cannot stress enough. You may think that respecting each other and not using your cell phone during PLTL sessions seem like obvious civilized rules but you would be surprised how often people don't follow these simple guidelines. If for some reason, you don't establish these rules and you see a problem later in the semester, it is not too late to change.

Okay, so now your group is going great. It's three weeks into the semester and you love all your students; however, you have noticed a few problems in the flow of sessions. Contrary to what you may believe, it is not too late to change the group dynamics. You can address these problems in session or if you are afraid of the confrontation, you can send the group an e-mail. It is important to keep the group informed on what they are doing well and what areas need improvement.

As the group facilitator, it is your job to make sure the sessions flow well. It rests on your shoulders to ensure that everyone is involved in the problems and to make sure that everyone understands what is going on. If a student has not been contributing much during a session, you may want to call on them to answer a question or be scribe to get them involved. Make sure to remind them that this is not you picking on them and that the rest of the group is there to help if they get stuck.

As the semester progresses, you will be able to tell who is grasping a concept and who is not. If someone has a blank stare on his/her face, he/she probably does not know what is going on. It is best to call on another student and tell them to explain the solution to the group so everyone can understand. This avoids any confrontation and it gives everyone a chance to get back to the same page.

Group dynamics are the key to having a successful PLTL group. Lay down the law from the beginning, but keep the atmosphere light and fun. This will ensure that your group members don't turn into uncontrollable little monsters.

How to Tame your Monsters

By Rivfka Shenoy

Sometimes when you lead a group of freshmen they can seem like untamable beasts. Lady Gaga would even call them her little monsters. But there are certain strategies that we as leaders can employ in order to control their group and help build the best working environment possible. Group dynamics can often be thrown to the side since they seem less important than the actual material. However, without a group that functions well together, it is impossible to get the information across. Some techniques that I learned are to allow the group to get out their giggles and gossip during the session, to watch out for those members who will steal the show every session if you let them and to always mix things up.

Your students are going to love to talk. My group would discuss a variety of subjects every session, ranging from what they did over the weekend to when they are going home for breaks to what they should eat for dinner that night. It is important to let this type of chatter happen up to a certain point. If you cut off any and all talking that is unrelated to chemistry, your group is not going to enjoy the session and they will be more reluctant to participate. I found that after a particularly challenging problem set problem, cracking a joke to relieve the tension or asking them about something unrelated to chemistry for five to ten minutes helped to get them energized for when we returned to the subject. I also was not afraid to make fun of myself during the session. This helps them loosen up and feel more comfortable sharing while working on chemistry. For example, when I was adding up formal charges on the board once, I messed up some simple math. Instead of getting flustered and embarrassed, I simply laughed at myself and told one of the students to come up and do it instead. However, a balance is important. The sessions only last for two hours and if your entire two hours are a social session then your students will not learn. You need to be careful to interlace some fun with the actual material that they come to learn.

In every performance there is always someone who steals the show. You will always have that one

student who thinks he or she knows the answer and is not afraid to blurt it out. In order to create the best possible group setting, you need to have the authority to make that person stop talking sometimes. You are the leader, and as the leader you have the power to kindly tell them that they are not allowed to answer the question sometimes. While that may seem rude, on the contrary, it can feel flattering to that person. However if you let them continue to dominate your group then you will never get the other members to participate. Having one person who always speaks causes the rest of the members to become dependent upon that person. However, they will not have that aid during test-time! In addition to mixing up who talks all the time, it is also important to keep other parts of your session diverse as well.

Different students have different learning styles. Therefore you need to always change the way the material is presented. If you have a few sessions where you only use the board, change it up so that the next few problems you work on are in small groups so that they can verbalize their thoughts. Even if you stay focused on using the board, don't always write words; tell them to draw pictures sometimes. Also, since most of us are or were in organic chemistry at some point, pull out the model kits. During Lewis structures and three-dimensional drawings of molecules, those model kits will help your students visualize what they need to draw, and it will be a good way to change the routine. This will help establish good dynamics since the students will be more excited and focused on participating if they are kept interested and on their toes.

While the dynamics of a group is often underestimated, it is one of the most important aspects of being a leader. Without taming your monsters, you won't be able to pass on knowledge. I will leave you with one final piece of advice: always bring food!

Let Your Monsters Run (Almost) Free

by Lulu Yu

As an ambitious PLTL leader, one of your main goals is probably to create a cohesive group of students—a group that loves PLTL, chemistry, and spending time together. However, you might have noticed that, like most things, it is easier said than done. So, how are you supposed to create a good group dynamic? Let's take some tips from Stefani Germanotta, also known as Lady Gaga. Having garnered a massive following of devotees, she clearly knows how to keep a group together.

Tip 1: Have confidence in yourself and in your abilities. You were chosen to be a PLTL leader because you are fully capable of being one. This material is not new to you, as it probably is to the students in your group. Lady Gaga radiates confidence because she believes she is talented and deserves to be on the stage; so, her little monsters believe it, too. If you want your group to work well together, you should first make sure that they trust you; and, the best way to show that they should trust you and your capability to lead is to demonstrate that you trust your own abilities by having confidence (which can be easily acquired by preparing adequately each week).

Tip 2: Remember your role—PLTL leaders are facilitators. Part of your job is to help the group establish a group dynamic, but it is important to remember that you alone cannot force a good group dynamic on your group. Lady Gaga knows that she has little influence over her fans' personalities and actions outside of her role as a pop singer. So, she uses her position and the tools at her disposal to unite her fans. If you want your group to unite together, remember that each student is an individual, and you will be unable to change that; it'd be a better use of time to take advantage of what you have to work with. For example, noting certain personality types and trying to complement them during small groups or pairs will probably further the dynamic more than wishing your group members would become best friends.

Tip 3: Be patient because things take time. It took Lady Gaga years (and a dropped record deal) to become as popular as she is now, but she knew it would only be a matter of time. The same is true of a good group dynamic. Most likely, it will take time for your group to become comfortable with each other, with the problem solving techniques, and with the environment of PLTL and college. The culmination of multiple events will result in the establishment of a good group dynamic; it probably won't be an overnight change. The best thing you can do to move the process along is to make sure these events have an opportunity to happen. One temptation will be to interject information or questions into the discussion, but it is best if you avoid this and allow your group members to work together and keep building their dynamic. Maintain a positive, relaxed, and open atmosphere (by being positive, relaxed, and open!) so the group members can work through the problem sets without being intimidated by you or another member and your group can be as cohesive as Lady Gaga is famous.

Whether or not you are a fan of Lady Gaga, her success is widespread and undeniable. In addition to other factors, her self-confidence, self-awareness, and patience have played major roles in bringing together a huge group of devoted followers. By applying these tips to a very different situation, it can be easy to unite another group of different people, your PLTL group, and discover that coveted and valuable group dynamic.

Dirty, Rich Learning Styles

by Taleef Khan

So you're probably acquainted to how things work now and hopefully your sessions are going really well, but there's always room for improvement right? The biggest barrier as a PLTL leader will be to convey the topic at hand to everyone in a manner they all understand. There's no question that everyone learns in a different way, so you as a PLTL leader must be able to approach the same topic from many unique angles.

I found it useful to demonstrate one concept in an auditory manner but then taking the concept further with a visual. It's extremely crucial that this is done because it's not easy to just say "p-orbitals look like figure 8's and s-orbitals are spheres and when they hybridize they look similar to each other." Drawing it out not only helps the students see what you might mean about a particular concept, but it also gives them reassurance that you know what you're talking about. Asking students to demonstrate what they learned on the board also gives them a chance to see if they can explain a concept when everyone is watching them, and the pressure is bearing down on them (well, not really but you get the idea). So your class can be broken down to two types of learners: auditory learners and visual learners. It's important to convey messages in both these ways. Neglecting this will inevitably alienate a portion of your session, and they'll soon stop attending, which is a huge problem for your whole PLTL group because so much it is based on group effort.

The type of atmosphere that your group runs under must also be taken under consideration. Some students really enjoy working in an extremely focused fashion. Getting off topic disrupts their ability to stay focused. Other students, however, appreciate the occasional stop and chat. I found it to be useful to always take a 5 to 10 min break after about an hour or so because students really hate working for 2 straight hours. So while it may seem best to rush through everything and get out as quickly as possible,

it's most useful to take an occasional break because that undoubtedly boosts the group productivity. But do not get carried away, as some students are looking to get in, get out and party with the beautiful and dirty, rich.

Students' learning styles are one thing, but their personalities also add on to the complexity of teaching to them. You'll have some students in your group who are extremely quiet by nature and some who are extremely outgoing. It's your job as a PLTL leader to always call on the quiet ones, and ignore the outgoing ones. But don't make it seem like you're pick on the quiet ones. Most of the times the quiet ones won't let you know if they're having trouble with a problem because they might be too shy so it's really important to call on them and diagnose where they may be having trouble. So follow these steps (and make sure to bring some food for the group) and I'm sure that all of your students will get the most out of your sessions.

Accommodating Different Learning Strategies

by Derek Miller

With over 500 students in general chemistry each year, there is sure to be a wide range of science backgrounds, personalities, and learning preferences among the class. From this large pool, you, a PLTL leader, will be in charge of around 8 students who will almost undoubtedly differ from one another in each these categories. In addition to the requirement that you understand the material that is being covered in your session for the week, you have an even more difficult task of facilitating your group in such a way that you appeal to everyone's learning styles and make sure no one is left behind.

The Meyers-Briggs Personality Inventory, ranking people on four different personality scales, can help you do this. The first scale is the extroversion/introversion scale. When you were a student in a PLTL group, you can probably recall some of the PLTL stereotypes in your own group: someone who was always talking during the session and contributing to discussion (extrovert) as well as the person who sat in the corner and said a grand total of 12 words during the entire semester (introvert). Both of these extremes can be detrimental to the group; a dominant, extremely outgoing group member can scare others away from contributing to the discussion, and a silent, shy person also leads to less participation. To promote positive group dynamics, you can call on the less talkative students to get them out of their comfort zone and remind the student who always has the answer to let others contribute.

Another important aspect of the Meyers-Briggs personality assessment for PLTL groups is the sensing vs. intuitive scale. Students high in sensing tend to spend more time before they start answering a question whether on paper or in front of a group. Students that are primarily intuitive, on the other hand, sometimes start working on a question before they even finish hearing it. The reason for this difference is not because sensing students think more slowly than intuitive students. Sensing students just typically do

not start answering a question until they have a complete, step-by-step strategy in mind that they will follow, whereas intuitive students prefer to follow their initial instincts on how to solve the problem and figure out the next steps on the fly. These are two different and equally useful methods of approaching a problem, and you will need to be aware of these differences during PLTL sessions.

Sensing students can often feel left out or left behind at PLTL sessions when intuitive students immediately start answering questions as soon as they are read. To deal with this problem, leaders sometimes have students put down their pencils, read the question out loud, and sit quietly for one minute to think about the steps needed to solve the problem. In addition to giving the sensing students time to contemplate the problem, this forces intuitive students to try the sensing student method, which they may find that they prefer. Similarly, on more difficult problems when no one seems to know the answer, leaders can have the students start working out the problem with the first method that comes to mind and see where it takes them, exposing sensing students to the intuitive method.

Ultimately, you are faced with the seemingly impossible task of catering to eight different students' learning strategies. You won't be able to appeal to everyone all of the time, but that is not really your goal. The goal is to find the perfect balance of different problem-solving strategies that will help those with a particular learning strategy preference and give those who do not have that preference a taste of it, providing them with one more tool in their general chemistry utility belt.

Students of Different Songs

by Alissa Stavig

One of the main benefits of PLTL is that it brings together students who may have nothing more in common than the fact that they are taking General Chemistry and are more than likely pre-med. In the best PLTL groups, the students all have different backgrounds and are able to contribute what they have experienced to the group. However, just like students come from different backgrounds and may like different Lady Gaga songs, they also have different learning styles. In order for all the students to learn effectively, the group needs to be taught the information in multiple ways.

Some students are visual learners. They need to see the work being done in order to understand what they are being taught. In order to allow the visual learners to learn effectively, it is important to put absolutely everything up on the white board. Even if it seems like a simple discussion or a short problem, the students who are visual learners will really learn best if it is written on the board and they can hear what is going on. At times, it may be challenging to put everything up on the board. Students may only be discussing ideas and not want to write them on the board. By forcing them to put their ideas on the board you are actually helping them learn. They will have to organize their ideas into concise statements which means that they will have to fully understand what they are trying to say.

Because there are visual learners, there are naturally verbal learners. These students learn best by discussing topics and hearing what other students have to say. To enhance the learning of these students it is important to make sure that discussion is constant. By hearing what the other students have to say, the verbal learners are able to fully understand the topics. While group discussion comes naturally during full group problems like round robin and scribe, it does not always happen during pairs or small group problems. This makes it essential to remind the students to discuss the problem before they begin to solve it. Generally, a reminder is enough. If that does not work, then you can always tell the students that they

are not allowed to write anything down until they have fully discussed how they are going to solve the problem. By enforcing this, you will also be ensuring group discussion for the verbal learners.

Many students are active learners. These students like to learn by actively doing things. This can include physical activities or discussion. Like the verbal learners, these students thrive on the discussion that occurs. In many cases, they are the first to jump into the discussion and have less carefully thought out ideas because of it. They develop their ideas as they discuss or work on the problem. On the opposite side, there are also reflective students. These students learn through introspection. They like to think first about how they are going to solve the problem before jumping in. These students are more likely to join a discussion later or take longer to answer a question because they like to fully form their ideas and opinions instead of forming them as they go along. This may mean that they do not participate in discussions as much because they are not the first to respond. In order to make sure that both active and reflective learners are able to participate in discussions and in solving the problems, you can have everyone sit for a minute and think about the problem before answering. This will allow time for reflective learners to develop their ideas fully so that they too can have a chance to share them with the group and participate in the discussion.

It is important to remember that while there are different learning styles, you can't classify a student as a specific learning style. Students may be different types of learners for different types of problems or different subjects. If you classify them as a certain type of learner, then you may use certain strategies when in fact for that specific problem they are a different type of learner. The best way to make sure that every student learns is to cover all possible learning styles for each problem.

How to Deal with Different Learning Styles without Going Crazy Like Lady Gaga

by Hans Zhang

You may not realize this on the first day, but eventually you will find that there are many different kinds of students in your group, almost as many as the number of outfits Lady Gaga goes through in an hour. One student, for example, may be the active and eager participant who pipes up at every question, while the one sitting next to him/her barely speaks one word through the entire session. This poses a challenge, though, as you have no idea as a leader whether the quieter student actually comprehends the material or if he/she is just too shy to say so. You will have a mix of students, both in terms of personality and learning style, and it is your job as the leader to make sure that all of these different students are able to learn and work effectively each session, and that no one is left behind.

Thankfully, dealing with your mix of students is much easier than dealing with Lady Gaga. Recognizing the different types of learners is a good first step in working to accommodate all of them. In general there are several categories: Active v. Reflective, Sensing v. Intuitive, Visual v. Verbal, and Sequential v. Global, each with their own style of learning and method towards problem solving. For instance, active learners are the students who most likely participate each and every problem. They like to jump right into problems, but they may also dominate the other group members as well. Reflective learners are the students who think carefully through a problem before getting to work, and just because they aren't as prone to discussion, you shouldn't assume that they understand the material less. Sensing students are those who have a solid grasp on facts and details of each problem, but may have trouble using those concepts to solve new problems presented to them. In contrast, Intuitive learners focus less on the details and prefer the application side of the concepts that they know. The visual and verbal learners differ in their preferred medium, with visual students preferring graphs, diagrams, and other material they can see, while verbal learners would rather discuss and talk over the concepts. You shouldn't skew to favor one group, and there needs to be a balance between visual aids and discussion. Lastly, students may be either

sequential or global learners. Sequential learners are adept at solving problems step-by-step, but they can often be unsure as to the reasons behind each. Global learners can get an answer, but they may not know for certain how they have gotten there or the steps that they took. Again, a balance is needed to make sure that students can understand problems conceptually and sequentially.

Once you have gotten a general idea of who in your group falls into which learning category, then you can begin to use the problem solving methods to your advantage in accommodating the students. For instance, you may have a group in which many members are of the Active and Verbal types. This may be good as you get great discussion from them, but you also have one or two quieter members who are of the Reflective and Visual types. In this case, a potentially useful solution would be to use the Scribe or Round Robin methods to make the students put up their discussion onto the board. Now, not only do the Visual learners have a reference to follow, they can also track the solution better as you have controlled the pace of the discussion and problem solving. These detailed steps will also help the Sensing learners in your group while allowing the Intuitive learners to discuss the concepts used.

Small groups and pairs methods also can be very useful in making sure that everyone benefits in your session. For instance, you can pair two students of similar learning styles/personalities so they complement each other and work more efficiently than they would with other types of students. The shy, reflective girl who is normally dominated by a more talkative and Active partner will be encouraged to talk more with a similarly reflective partner. The Sensing learners in your group may be put off when they are placed with Intuitive learners who jump to solutions, but they may work much better together in group. Note that after a couple of early sessions, the students may fall into a routine, sitting in the same places and working with the same people in small groups/pairs. Don't be afraid to move them! If there is a pairing that will work better for you, move the students around to make it happen. Remember that the students are new to each other as well, and they won't begrudge you for shifting things up.

The different problem-solving methods, then, are your best friends in dealing with the various learners in your group. No matter what the personality of a student or how he/she prefers to learn, you can accommodate his/her needs through one of the methods.

Get Out of the Slump! Now!

by Yi Huang

Here comes the exciting part of the semester: everyone is having a ‘fun’ time with all sorts of mid-term exams, papers and projects. If you are unlucky enough, you may have two or three deadlines to meet in one week, plus another two or three mid-term exams to be taken care of. Yet it is tempting to slow down for a while because Thanksgiving is on the way. We are so looking forward to the trip back home. Unsurprisingly, it is such a hard time to stay focused and productive – at least for me.

So my first piece of advice: don’t have too high an expectation for your students. Don’t stress yourself out either. We are all human and we deserve some rest at this point of the semester. If students don’t seem to know their stuff, don’t freak out. Remind them gently that they need to review lecture notes and attempt problem sets before PLTL sessions. Those twenty or thirty minutes they invest before PLTL will benefit themselves tremendously. Some students tend work hard at the beginning of the semester but as more works pile up, they stuck in this ‘mid-term slump’ for quite a long time: I had a great students who always seemed to know the concepts well and had obviously done practice problems before PLTLs. But he was completely lost during that two or three weeks because he was too involved in club activities. A good strategy is to send students emails before PLTL and remind them to get prepared. Show that you understand the difficulties they are facing and share with them how to relax and recharge yourself effectively. Don’t pick on the ‘bad’ students in class. That is discouraging.

Another common problem during the mid-semester time is the low attendance rate. I think such a problem is easier to prevent than to resolve. Leaders need to make sure students know the importance of PLTL from the very beginning so students don’t skip the sessions randomly. Usually, I would stress on the usefulness of the particular topic we were working on right after the warm-up questions. I saw that as either a conclusion to what students had brought out regarding the topic, or as a prelude getting them focused on the problems they were going to work on together. Sometimes, when students came up with

good ideas or concepts worth emphasizing, I would appraise them and sum up the points for them. This would encourage students to attend every session because their voices are heard and appreciated.

Food is always good. You may have been doing that all the time. But in the time of a mid-term slump, you may need something more exciting: you may have mini-competitions among the students when they are supposed to work in pairs or in small groups. Those finish faster and explain better can get bonus candies or cookies. Or, you don't have to give them food right before the PLTL session. Let them guess! You may even set aside five to ten minutes of 'tea time', where students can share what they did for Halloween and what they plan on doing for Thanksgiving. Since all they want to do is just dance, then have fun with them! Just make sure you can bring them back to some serious discussions after their 'party time'.

Of course, you must make sure you are acting as a role model for your group. Don't be late. Don't try to rush the discussions, in the hope of getting out of the discussions earlier. Be professional. You may give the students some tips on what they could try to get out of the slump fast enough. Refer them to the resources available on campus, when you feel you can't necessarily give them what is best for them. Ask them to go to office hours, help sessions, corner stone and even their peers for help in Chemistry. Go to their advisors, health center, parents and friends to make themselves less stressful.

It is a hard period in the semester. But get prepared and you will be a great leader and you can help your fellow students overcome the mid-term slump together with you.

When They Can't See Straight Anymore

by Sophia Korovaichuk

It's mid-semester. October has ushered in not only cool temperatures, but also the seasonal burden of exams, papers, and assignments. For some of your students, the sheer quantity of work is overwhelming, and they may face the temptation of skipping out on a session or two. Others, who establish a sound understanding of the material in the first few weeks of classes, may likewise withdraw. How do you counter this waning enthusiasm and sporadic attendance? While you can't expect every student to be absolutely gaga for PLTL during every session, it is important to be proactive and emphasize the importance of PLTL.

You may want to remind your students that attentive participation in a PLTL group is well correlated with success in General Chemistry. Remind them that the material will only get progressively more challenging with time, and it will be beneficial to keep up with the material in preparation for upcoming midterm exams and the cumulative final. At times, a reiteration of the PLTL attendance policy that allows for only 2 absences during the semester is necessary. I've found that most students value their position in a PLTL group. If made aware that you will *actually* act on the attendance policy and will terminate their PLTL membership, students will choose to meet the requirements in order to stay in PLTL. An email reminder highlighting the attendance policy will do the trick.

Furthermore, it may be a good idea to relay to the students your own personal experiences as a former member. Specifically, mention the all-too-common thought that a Sunday afternoon is better spent writing that 7-page Kant paper due in 10 hours instead of attending a PLTL session 6 days after the last exam. In reality, it's hardly likely that those two hours will ultimately be put to better use. PLTL forces the student to engage with the material even if they haven't been to lectures or thoroughly processed the material.

Those two hours on a weekend working collaboratively may save them hours and hours of work later on in sorting through the lectures and homework problems independently.

Dealing with students who are confident in their chemistry abilities, and may therefore find PLTL not worth the time commitment, is a more difficult endeavor. To make the PLTL more enticing for students of this profile, you may want to generate more challenging conceptual questions before session and presenting them to the group. To counter boredom during the session, you can assign the restless individuals more active roles: call on them to be scribe, ask them to read the problem or synthesize all the comments and formulate a conclusion on a trend. From a psychological perspective it is important to encourage and support such individuals without showing an obvious bias and alienating other group members. Confident students provide momentum to a group, and it is important to keep such students coming back.

Don't be discouraged when the mid-semester slump hits. Maintain your assertiveness as leader and look for new ways to keep all levels engaged in order to successfully overcome this challenging time during the semester.

Mid-Semester Slump: When all they want to do is Just Dance

by Pamela Peters

It was a PLTL session that I thought would be just like any other; I arrived a little early, rearranged the tables, set out the food, got my papers together, and waited for my students to show up. I kept waiting. And waiting... eventually, around 3:08, one person showed up, with two more strolling in a bit later. With a total of 3 students out of 9 in the group (and all three coming in late), I began to think that I **MUST** be doing something wrong—did they think the sessions weren't helpful? Was I being a bad leader? It turns out there are probably a mixture of things that contribute to this mid-semester lack of interest in PLTL—and thankfully, most of these things can be fixed with easy adjustments by the leader.

The first thing that came to my mind when I left was a phenomenon of visual perception I had learned about in psychology; the phenomenon is change blindness, which is a human tendency to not notice very large changes in a scene (usually that result from accumulations of small changes). I begin to think, there is no possible way that my group went from a great one to a completely unmotivated one in one session—it was then that I realized that there had been a series of small occurrences throughout the semester that may have caused the change in my group to become so obvious that I couldn't ignore it anymore. For example, I used to say something when students came in late but gradually began to just let it slide. I used to bring food, but now only did it every once and a while. I used to follow to PLTL methods in a more structured way. As it turns out, my students were only following my example—allowing their behavior to slip when mine did as well. The good news is that there is an easy fix: simply reminding them of the rules and the philosophy, maintaining and positive and friendly mood, and making sure that you yourself are 100% focused on chemistry during your session will cause your students to follow suit.

Of course, the easiest way to avoid being blindsided by the mid-semester slump is to nip in the bud any problems that you may see throughout the year, even when things appear to be going great. It's easy to let

a little bit of lateness slide when everything else is going so well; but when the students are really getting burned out, it will be a good thing that you reminded them of the rules. Coming from someone who feels pretty uncomfortable being assertive as a leader, trust me when I say it is worth it to enforce the rules with your students. As long as you stay happy and positive, they will not think any less of you for it and probably respect you more. The week after my catastrophic 3-student group, I made sure to reassert the rules in a way that was firm but not condescending. Every week following that, more and more of them showed up ready to work; sometimes a little nudge is all they need to get back on track!

**When Life Gets Too Busy to Play the PLTL Love Game
by Madeline Spahr**

It is finally the middle of the semester and you have successfully guided your PLTL group thus far, congratulations! While you have probably overcome many PLTL challenges to get your group to where they are, there will unfortunately be more to come. The middle of the semester is always a hectic time for everyone, including you and your PLTL students. So, in order to prevent mid-semester dropouts and students (and maybe even you!) coming unprepared, there are a few things to do.

PLTL is on the weekend, and by this time in the semester, students do not want to be in class on a Saturday or Sunday. It is important, therefore, to make PLTL different from a class. One of the best ways to do this is by bringing food. Students always look forward to the snacks leaders provide and this helps ease some of the tension. To make sure you bring food they like, ask your group what food they enjoy. If you do not have enough meal points to buy food every week, send a list around at the beginning of the semester and have the students volunteer to bring food.

Another way to make the session different from class is to spend a few minutes talking about something fun. Start by asking about their weekends and, if no one says anything, tell them about yours. They always appreciate that you are trying to get to know them and make the session more interesting.

One common problem in the middle of the semester is that students think they are too busy and do not have time for PLTL or they do not do the problem set. To combat this issue, email students a couple days before the session to remind them to come and also to try the problem set before they arrive. It might also be helpful to let them know what they'll be working on in PLTL that week. Another good way to get students to show up is to give them advice while they work on the problems. Telling them which problems are similar to exam questions, a good way to study for the Chem lab exam or even the best Thai

restaurant on the loop makes them feel like they are getting more out of the session. Remember that a lot of your students are probably freshmen so they have a lot to learn about Wash U.

Another common mid-semester problem for PLTL leaders is not with their group, it's with their own work. Preparing for your PLTL session may seem easy at the beginning of the semester when you do not have exams or papers, but now, putting time into PAM seems more difficult. If you start to skimp on PLTL, your students will start to feel they are not getting as much out of the session and that, therefore, they can skimp as well. This is not a good situation to put yourself in! Make sure you set aside some time before your session to go over the material or, spend more time in PAM trying to understand the concepts. This way you will be able to successfully guide the PLTL session and the students will get more out of it.

Make sure your PLTL students get the most out of their sessions during this difficult time in the semester. Hopefully a tasty snack, reminder email or good piece of advice will help do the trick.

Making the Most Out of Collaborative Learning Strategies

by Emily Middlebrook

Since you have been a student in a PLTL group before, you are probably familiar with the Collaborative Learning Strategies. I remember for the first several weeks of chemistry PLTL, I thought that my leader had made up these methods, and I honestly did not like most of them very much. However, you will come to find out as a leader, just as I did, how helpful these strategies can be in helping your students master the chemistry material.

You probably have your favorite strategy for solving chemistry problems, but it is important to use all of them, to use them correctly, and to use them on the correct problems. Do not let your students try to get you to change what method you use. Many times when a round robin or pairs problem came up, my group would beg just to do the problem as a large group. But the truth is that your students have only seen the problem for about a minute when this happens; the person who assigned the strategy to the problem actually spent time thinking about which method would work best. I hope this paper gives you some advice on how to make the most out of every strategy so that your students can come to appreciate each one of them.

Small Group/ Pairs

These strategies were my favorite as a student because my leader generally did not make us put things on the board, and we got to choose our own group. You should avoid making those mistakes. The quicker that each student works with every other student, the faster the students will be comfortable in a large group setting asking questions. Therefore, it is important that you change up the groups and you do so with a purpose. Also students should not just be quietly working by themselves, and just because every group has come up with an answer does not mean that you are done with the problem by any means. I like to walk around the room to ask each group if there are any problems. If they say yes, I have them ask it to

the whole group to have others explain. After the answer, I bring the groups back to their small groups. Another strategy I use is having everything still go up on the board. I usually assign each group a small part of the problem to put up on the board. Then the students take turns either explaining what they put up or what someone else put up.

Round Robin

This is probably the hardest strategy to control as it tends to devolve into a full group discussion. Just going around in a circle is really not all that helpful because each student will just figure out what he has to contribute and not focus the rest of the time; students will also start cutting in without being asked. So here is some advice: do not call the method round robin to your students! When you say round robin, it implies that you go around in a circle. So make up another name for it that does not imply this. Then come up with another strategy for getting every person to participate. You could have them person who solves the step call on the next person and call the strategy popcorn. Or you could just randomly call on people. It does not really matter how you do it, but when students do not know when they will be called on, they will pay attention to the whole problem.

Scribe

I usually assign the scribe in this method. I do this because when you as the leader assign the scribe you can really do a lot of things with this method. You might want to make a dominant student the scribe to give the other students the chance to fully participate. Or you could make a quieter student the scribe and then after the problem is over have him explain the problem to the group. This gives him a chance to participate without the chance for others to jump in. Or you could make yourself the scribe on a day when your group has been particularly quiet. This means that they will have to work together without you facilitating discussion quite as much.

Throughout this semester, I am sure that you will come up with many of your own tricks to make the most out of these strategies. Hopefully these will get you started so that your sessions will run a little more smoothly.

Loving the Rules of your Game

by Jennifer Stevens

So, you're getting the hang of things, right? You've led a few sessions, and you (hopefully) have everyone's name down. However, you probably have encountered a few bumps ruining your game. What to do about the students who have trouble speaking? Those who seem bored with solving problems? Who tend to dominate conversation? No worries – PLTL has rules for the game, which you, as the leader and referee, can tweak and utilize to maximize the chemistry love and learning.

Everyone in your group is different. Therefore, each and every one of them probably prefers a different problem-solving strategy (Round Robin, Small Groups, Scribe, or Pairs). Likewise, each different strategy can help to bring out the best in different members of your group. Round Robin has always been my favorite strategy, simply because it forces everyone to play in the game, if you handle it properly. I like to do Round Robin popcorn-style, where I call on members “randomly” to have them answer. By calling on them randomly, you can make them pay more attention, rather than working just their one problem and copying down the answers to the rest; plus, you do not really have to call on them randomly. If a student has not spoken much, you can bring him or her into the game with Round Robin. Likewise, if someone lacks confidence to speak their answer, but tends to be right, he or she can learn to be more confident with Round Robin, when you make them say their answer. By calling on these quiet or hesitant students a bit more, you can bring about more equal contributions later on in the semester, when they have learned that PLTL is an excellent place to speak their thoughts.

What about the opposite of the quiet students: those who want to speak all the time, whether or not they are correct? PLTL rules help you deal with them, too. For me, scribe helps the most with the dominant students; by asking a talkative group member to be scribe, you have just forced him or her to be silent and allowed the rest of the group to speak. I have found that the dominant scribe gets extremely frustrated,

and the rest of the group seems exceedingly quiet; but stay confident and never fear, it's all for the best. Do not hesitate to enforce the rules that the scribe must stay silent without adding anything. You are the referee, so you have to mediate, or else you would have complete chaos. I usually try to be more lighthearted and tease the scribe a little when reminding the group of the rules to keep PLTL fun.

So, time for Small Groups or Pairs.... time for you to sit back and relax while the group works? Not at all! These problem-solving strategies, for me, build group cohesion above all else, but you must mediate the PLTLers to make sure it works out correctly. In order to form such cohesion, the groups need to speak to each other while still thinking about concepts on their own. I always walk around the room, both to see if anyone has any questions and to ensure that all members of each group know what's going on. If I notice one person speaking a lot in the group, I might ask a quieter member how the work is coming; just this simple act usually brings forth a torrent of questions that they were hesitant to voice before. If anyone asks me a question during small groups, I generally direct them back to a group or pair that seems on top of the material, building another layer of teamwork among different groups or pairs.

PLTL provides you with the general framework of rules and strategies to follow, but you still have leeway within those guidelines to form your own group style. If anyone in your group seems to hate a certain strategy, do not worry. PLTL allows members the space to expand and improve both as students and as group workers, but no one can improve unless they move outside their comfort zone, which can make people unhappy at times. It is your place, as the group leader, to push each and every member in your group to play the chemistry love game to the best of their abilities; and to do so, you must enforce the rules (and fine tune them as you see fit).

The Love Mission

by Cedric Huchuan Xia

The "love game" that you, as a general chemistry PLTL leader, is trying to play with the students, is definitely not an easy one. Superficially it seems like that you have PAM on Fridays to rely on if the course material is no longer familiar; you have the Leader Direction sheet to follow if you can't remember the collaborative learning strategies (CLS) for each problem. Everything looks so well structured, and you ask yourself, where can I be more creative?

In the song of "the Love Game" by Lady Gaga, there is a line perfect for answering your question: I'm on a mission/ and it involves some heavy touching. The mission is making sure every student learn and master the Chem 111A material through specifically designed collaborative learning strategies; and the heavy touching is the advice I would like to share about the two most challenging CLS to help you win the Game.

CLS 1: Round Robin

If to choose the most demanding CLS for the leader to run in the PLTL sessions, Round Robin is the winner, hands down. It's especially infamous for its difficulty time-controlling, questions-assigning and effectiveness in helping students learn. Because of the difficulty in running the Round Robin, some leaders may choose to run the problem in an alternative strategy. The truth is, however, if you use Round Robin right, it's actually an extremely helpful and fun activity to do. The key here is how to assign the right portion of the question just to the right student. As you may have learned the SAM class, your students come in with very different background in Chemistry, personalities and learning habits. The earlier you grasp all these information about your student, the better you will be at appointing the right student to do the right part of the problem. For example, you know Steven is a fast-thinking student with sequential style of learning, then you probably want to have him do the very beginning portion of the

problem. Or you have Maris who has a more global-styled way of processing information, how about let her do the finish-touching of that problem? Also, you may have noticed David has not been prepared well for each session, so maybe instead of embarrassing him in front of the entire group (and wasting time), you could have fall-behind students like him verbally summarize the problem solving process used in the problem just now. By targeting and catering to each individual student's academic need in the Round Robin, you can really make the activity not only efficient but meaningful for the entire group to get involved in one problem solving.

CLS 2: Small Groups

Facilitating nine students as one group is hard enough. Breaking them into small groups and, more importantly, monitoring of the situation in each group is even more difficult. Therefore there must be some "heaving touching" to be done in this collaborative learning strategy as well. What make this CLS successful are two components: executing and reporting. Executing, aka doing the problem, happens in the small groups format; however, reporting must be done after you bring every group back into one. In order to beautifully facilitate the Small Group during the executing part, making rounds is a necessity. Two important things to note while walking around among the small groups are that A) listen to what the students are talking, who is talking, is it correct; and B) if the students are having trouble, encourage them to talk to the other group or ask some probing questions. Paying attention to the dynamic in each group helps you profoundly in the second stage of this CLS: reporting. Having the knowledge of who was more dominant in the small group discussion, you could assign the quieter student to put what they have come up on the board and ask him or her to explain why they did it. Also by noticing the steps used in each group, you can bring up another group present an interesting approach to the same question. It could be right or wrong, but it doesn't matter. What's important is to have the students think hard about the questions: why this approach is correct while the other one is not; what is the assumption made in each different approach; is all information given in the problem used in the solving process; if not, what do you think the problem author intends to trick you? Small Groups are great for those challenging and thought

provoking problems. The idea of this CLS is to leave open space for students to work collaboratively within each group but individually between groups. In this way, one can really learn, especially in those difficult problems, how to solve it and why.

Armed with the tips above about the two most challenging CLS to run, you are already on a greater level as a PLTL leader. Just keep practicing, because when you are truly "educated in [CLS]", your students will "want it bad, want it bad" -- the weekly Gen-Chem party with you!

Let's Have Some Fun: Bending the Rules of the Love Game

by Andrew Yu

So you've made it through the first couple sessions of PLTL and are finally getting settled into the routine, which is fantastic. However, this turns out to be a very critical time because it can determine whether your future sessions become monotonous or more beneficial to your students. It is just about that time to shift focus from welcoming your students to PLTL to what can you do as a PLTL leader to facilitate their learning.

One of the best ways to improve PLTL is to adapt the collaborative learning strategies so that they best match your group's strengths. Of course, these strategies have been placed with their own rules for a reason: they're extremely effective. However, some groups may be full of really active learners who love to participate in scribe and round robin so that they can write all the steps on the board, while others may be more verbal and like to work with other people in small groups. One of the strategies I have found most effective after changing it for my group was scribe. If you've ever participated in PLTL, you know how dreadful scribe can sometimes be just by the expressions of the students in the group and the usual lack of willingness to volunteer. One way to adapt scribe, if your group loves seeing the steps written out on the board, is to volunteer yourself as scribe. This helps take the pressure off a student who has to leave their notebook and come write on the board for ten minutes. This then allows the whole group to collectively attack the problem, while being able to see their products written on the board by you at the same time.

Another example of taking advantage of these strategies is in round robin, which is probably the most misunderstood strategy of them all. Round robin's proper use is aimed at having a different student to each individual step in a problem, and they are free to go to the board and write down their contribution. I've found that this is also very helpful since it allows everybody to equally participate and keep at the same pace. The only difficulty with this is that the students may end up taking longer to solve the whole

problem, but that is why it is important to have the other members help whoever is up at the board and to smoothly transition between students.

The overall truth of adapting strategies is that each modification must be specific to your group and will take some time for you to get to know the dynamics of your group's learning abilities. The ones listed here are common ones that are helpful in general, but the most important aspect is still that you have to decide what you think is best for your group. One good way is to continue communicating with your students about what strategies they like best or least. With these strategies, you can help make your students' PLTL experience even more enjoyable and educational. Good luck and have fun!